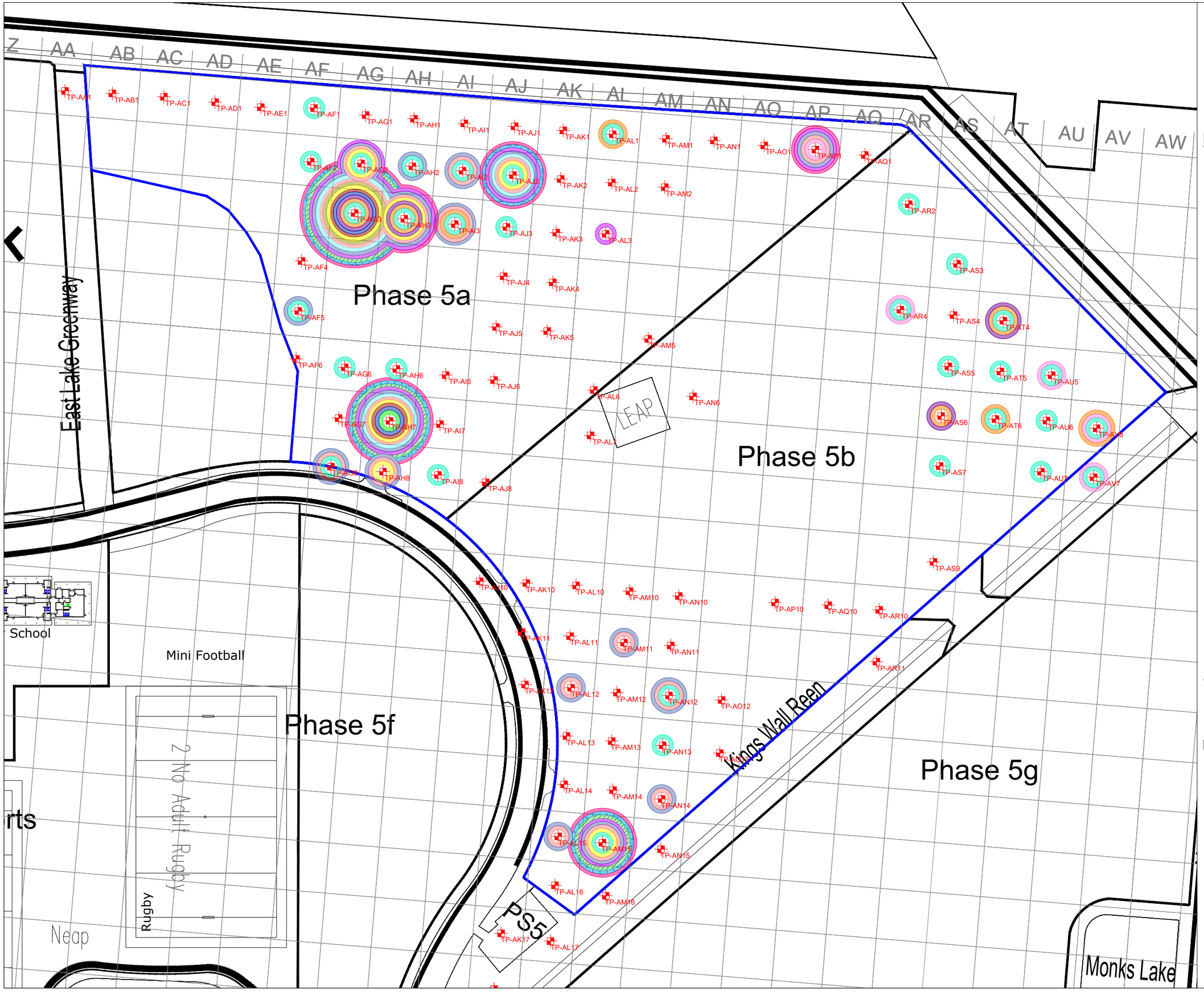


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ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

- TP-AG6 TRIAL PIT LOCATION
- SITE BOUNDARY
- CYANIDE (TOTAL)
- IRON (TOTAL)
- MANGANESE
- VANADIUM
- NAPHTHALENE
- ACENAPHTHYLENE
- FLUORENE
- PHENANTHRENE
- ANTHRACENE
- FLUORANTHENE
- PYRENE
- BENZO[B]FLUORANTHENE
- BENZO[K]FLUORANTHENE
- BENZO(A)PYRENE
- INDENO(1,2,3-C,D)PYRENE
- BENZO[G,H,I]PERYLENE

Rev	Date	Amendments	By	Chk
P01	05/11/2025	First Issue	AMS	CW

Client

BSTMDL

Project

P18-669 Llanwern Reclamation

Drawing Title

Phase 5A & 5B HFC
Exceedances Location Plan

INFORMATION

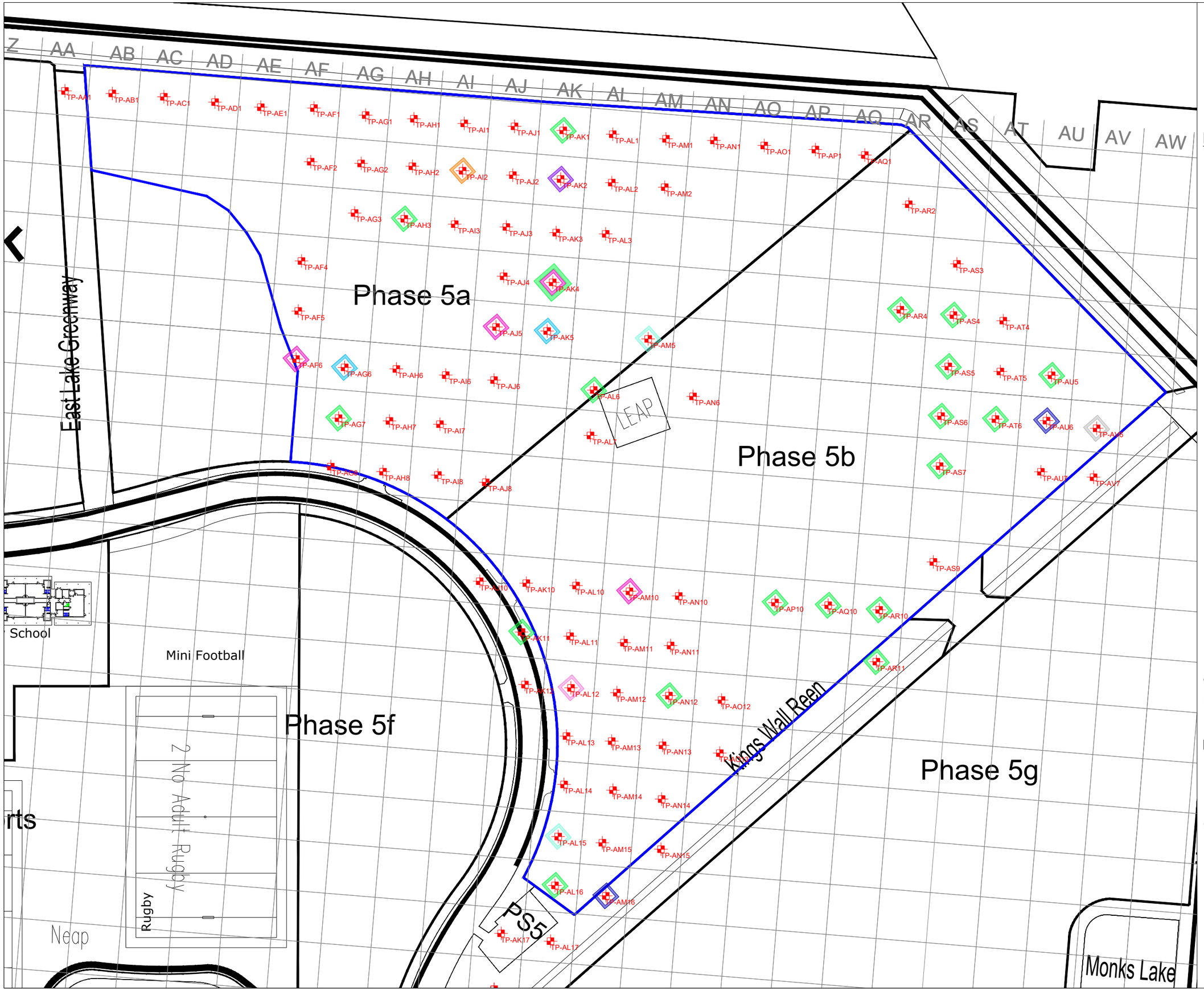
	Drawn	Checked	Date
NTS	AMS	CW	05/11/25

Drawing No. Rev.

18669-RLL-25-XX-DR-O-0818 P01

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ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

- TP-AG6 TRIAL PIT LOCATION
- SITE BOUNDARY
- CONCRETE SLAB
- CONCRETE PILE
- CONCRETE OBSTRUCTION
- CONCRETE BOULDERS
- FUSED SLAG
- METAL PIPE
- PLASTIC PIPE
- UNKNOWN PIPE
- NOT SPECIFIED

Rev	Date	Amendments	By	Chk
P01	06/11/2025	First Issue	AMS	CW

Client

BSTMDL

Project

P18-669 Llanwern Reclamation

Drawing Title

Phase 5A 5B Encountered Obstructions Location Plan

INFORMATION

	Drawn	Checked	Date
NTS	AMS	CW	06/11/25

Drawing No. Rev.

18669-RLL-25-XX-DR-O-0820 P01

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KEY:

- Monks Ditch
- Clean discharge
- Construction Water
- Site discharge through Englobe treatment works
- ML-S Sampling Location
- Blocked off drain
- Discharge Control Point

Rev	Date	Amendments	By	Chk
P04	12/02/2025	Proposed System	DM	CW
P03	10/02/2025	2025 System wide update	DM	CW
P02	28/10/2024	Sampling Positions Amended & Added	AMS	CW
P01	17/01/2023	Sampling Positions Added	SR	CW

Client

St Modwen Developments

Project

P18-669 Llanwern Reclamation

Drawing Title

Residential Site Surface Water Monitoring Location Plan

INFORMATION

	Drawn	Checked	Date
NTS	DM	CW	12.01.24

Drawing No. — Rev.

18669-RLL-24-XX-DR-O-0544 P04

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Appendix B – Phase 5A & 5B Chemical Screening

P18-669 Llanwern Phase 4G Soil Chemical Screening Results

Project: P18-669													RLL Grid Ref:																
Client: Rodgers Leask Environmental			**Job No.:**										201217-34	201217-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34
Quotation No.: Q21-24056			**Sample ID.:**										23450096	23450104	23461553	23461557	23461544	23461548	23461525	23461530	23461536	23461540	23461505	23461514	23461496	23461501	23461488	23461492	23461562	23461483	23461578	23461585	23461479	23461591
Order No.: .			Client Sample Ref.:										AT6-1	AT6-2	AJ4-1	AJ4-2	AL2-1	AL2-2	AM1-1	AM1-2	AM2-1	AM2-2	AN1-1	AN1-2	AO1-1	AO1-2	AP1-1	AP1-2	AQ1-1	AR2-1	AR4-1	AR4-2	AS3-1	AS4-1
			Sample Type:										SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
			Top Depth (m):																															
			Bottom Depth (m):										0.20-0.20	1.70-1.70	0.40-0.40	1.00-1.00	0.20-0.20	1.20-1.20	0.30-0.30	1.00-1.00	0.50-0.50	1.60-1.60	0.50-0.50	1.50-1.50	0.30-0.30	1.30-1.30	0.50-0.50	1.80-1.80	0.50-0.50	0.40-0.40	0.20-0.20	1.30-1.30	0.50-0.50	0.50-0.50
			Date Sampled:										16/12/2020	16/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	17/12/2020	16/12/2020	16/12/2020	17/12/2020	16/12/2020
			Asbestos Lab:																															
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	**HFC Soil Reuse Criteria (mg/kg)**	**Number of Exceedances**	**Maximum Concentration Check**	**Minimum Exceedance Concentration**	**95th Percentile Concentration**	**95th Percentile Check**	**Maximum Concentration**	**Average Concentration**	**Minimum Concentration**																						
ACM Type	U	2192		N/A																Chrysotile (White) Asbestos				Trace Chrysotile (White) Asbestos				Amosite (Brown) Asbestos						
Asbestos Identification	U	2192		N/A										Not Detected		Not Detected		Not Detected		Detected		Not Detected		Detected		Not Detected		Detected		Not Detected	Not Detected			Not Detected
Asbestos by Gravimetry	U	2192	%	0.001																<0.000				<0.000				0.0022						
Total Asbestos	U	2192	%	0.001																<0.001				<0.001				0.0022						
Moisture	N	2030	%	0.020									17	6.4	12	18	10	12	8.1	12	7	6.7	13	17	15	16	15	12	16	24	22	21	18	5.3
Soil Colour	N	2040		N/A										Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Light Brown	Dark Brown	Grey
Other Material	N	2040		N/A										Sandy Silt Loam	Sand	Sand	Sandy Loam	Sandy Loam	Stone/Soil	Sandy Loam	Loamy Sand	Sandy Loam	Stone/Soil	Sandy Loam	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Silty Clay Loam	Sand	Loamy Sand	Sand
Soil Texture	N	2040		N/A										Stones	Stones	Stones	Stones	Vegetation	Vegetation	Stones	Vegetation	Stones	Vegetation	Stones	Stones	Vegetation	Stones	Vegetation	None	Vegetation	Vegetation	Stones	None	Vegetation	Stones
pH	M	2010		4.0										12.1	12.1	10.7	8.63	9.03	10.5	8.87	10.1	9.1	9.28	8.58	9.5	8.42	11	9.08	8.77	8.56	8.04	8.36	8.27	10	9.39
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	43	213.00	2.17	12.86	12.86	213.00	5.39	1.00	7.26	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.06	<1	<1	<1	<1	<1	<1	28.4	6.53	<1	3.55	<1
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	0	no exc.	0.00	25.40	no exc.	123.00	14.67	12.00	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12
Iron (Total)	N	2430	mg/kg	100	305000	6	467000.00	327000.00	256200.00	no exc.	467000.00	90676.04	3420.00	187000.00	184000	39700	42400	41500	16800	31500	108000	9870	15500	34300	257000	82200	230000	76000	334000	58400	140000	340000	11500	131000	46700
Arsenic	M	2450	mg/kg	1	2533	0	no exc.	0.00	18.72	no exc.	52.60	8.76	1.01	9.79	<6	5.97	9.38	5.23	3.21	3.84	9.05	2.57	2.58	6.38	52.6	11.3	14.1	7.89	12.6	9.02	14.6	25.9	3.62	12.6	1.33
Cadmium	M	2450	mg/kg	0.1	73	0	no exc.	0.00	9.01	no exc.	24.00	1.56	0.02	4.58	<0.2	<0.02	<0.02	0.424	<0.02	0.851	0.802	0.171	0.0437	0.424	1.93	2.1	1.6	0.905	2.3	0.337	7.21	12.8	0.142	7.8	<0.02
Chromium	M	2450	mg/kg	1	9431	0	no exc.	0.00	580.20	no exc.	1200.00	148.34	0.90	408.00	1200	6.32	35.4	75.5	13.1	49.1	156	7.71	10.1	58.2	178	116	<9	75.6	<9	124	177	102	9.34	196	141
Manganese	M	2450	mg/kg	5	33300	8	53700.00	33500.00	33300.00	no exc.	53700.00	10218.66	163.00	28700.00	53700	5640	4890	7640	6460	4800	14300	1250	2640	5520	12700	8570	3530	7620	3980	7560	11700	20600	404	17000	14900
Copper	M	2450	mg/kg	0.5	451	0	no exc.	0.00	63.66	no exc.	259.00	25.05	1.40	43.00	<14	3.99	13.4	10.4	<1.4	10.7	29.1	5.9	4.26	13.9	33.1	24.3	49.1	19.8	34.4	21.6	43.4	58.6	7.18	36.9	<1.4
Mercury	M	2450	mg/kg	0.1	132	0	no exc.	0.00	1.40	no exc.	22.90	0.86	0.14	<1.4	<1.4	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<1.4	<1.4	<1.4	<0.14	<1.4	<0.14	<1.4	<1.4	<0.14	<1.4	<0.14
Nickel	M	2450	mg/kg	0.5	11500	0	no exc.	0.00	45.18	no exc.	65.10	18.93	1.09	29.10	7.29	6.54	11.9	8.75	3.73	7.27	20.7	5.91	5.38	12.5	44.7	25.6	51	17	38.1	17.1	37.2	51.8	11.5	26.9	3.13
Lead	M	2450	mg/kg	0.5	15700	0	no exc.	0.00	1058.00	no exc.	2070.00	158.99	1.25	599.00	14.6	8.89	19.4	24.3	4.52	28.6	92.6	14.9	5.44	38.6	78.3	183	75	86.7	169	87.7	940	1110	11.6	959	16.4
Selenium	M	2450	mg/kg	0.2	702	0	no exc.	0.00	15.26	no exc.	33.80	6.86	1.00	13.70	33.8	2.51	2.01	5.03	4.88	2.65	<10	1.35	2.38	3.53	<10	<10	<10	2.18	<10	1.81	<10	<10	<1	<10	5.96
Vanadium	U	2450	mg/kg	5	1606	2	2050.00	1680.00	710.50	no exc.	2050.00	221.40	5.05	1470.00	911	64.6	60.2	76.6	56.8	68.1	210	22.1	36.9	101	296	209	51.9	130	55.9	194	257	552	15.1	467	655
Zinc	M	2450	mg/kg	0.5	138000	0	no exc.	0.00	5018.00	no exc.	10600.00	626.99	13.70	2530.00	33.2	65	86.5	137	35.5	140	372	52.7	29.9	185	182	707	171	398	410	412	3330	5610	27.8	3910	85.7
Organic Matter	M	2625	%	0.4										5.91	0.833	1.88	4.72	9.48	1.33	5.59	4.05	6.91	9.24	1.03	7.5	6.36	4.43	4.57	18.3	3.81	8.1	2.22	1.07	6.91	0.429
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	0	no exc.	0.00	0.04	no exc.	0.35	0.02	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359	0	no exc.	0.00	0.17	no exc.	0.18	0.04	0.01																						
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	0	no exc.	0.00	0.21	no exc.	20.30	0.19	0.01	<0.01	<0.01	<0.01	<0.01	0.022	<0.01	<0.01	0.021	<0.01	<0.01	<0.01	<0.01	<0.01	0.038	<0.01	0.03	<0.01	0.018	<0.01	<0.01	<0.01	<0.01
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	0	no exc.	0.00	1.20	no exc.	10.00	1.17	1.00	<1	<1	<1	<1	<1	<1	<1	<1	<5	1.33	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	0	no exc.	0.00	14.30	no exc.	133.00	4.59	1.00	4.83	<1	<1	10.2	2.5	<1	<1	4.54	<5	6.73	<1	<1	<1	3.25	<1	2.08	<1	<1	<1	<1	<1	7.46	<1
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	0	no exc.	0.00	130.60	no exc.	1590.00	44.41	1.00	26.20	2.6	5.35	68.5	8.3	1.64	6.39	10.5	<5	11.8	2.01	<1	3.5	15.7	1.33	38.7	2.96	15.1	<1	<1	44.4	<1
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	0	no exc.	0.00	129.80	no exc.	1450.00	50.04	1.00	113.00	17.4	14.7	64.8	14.2	7.62	9.97	21.8	11.3	25.4	12.9	6.06	21.3	91.9	12.6	15.2	26.3	75.7	<1	7.79	219	4.6
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	0	no exc.	0.00	46.38	no exc.	337.00	13.28	1.00	31.80	3.41	1.05	8.73	<1	3.72	<1	1.53	<5	3.84	3.14	<1	4.87	47.2	1.26	1.01	4.51	17.9	<1	<1	91.6	<1
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5										177	23.8	22	152	25.5	13	18.4	39	<2.5	49.2	18.3	6.95	30.6	159	15.4	57.2	33.9	110	<5	8.86	363	5.31
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	0	no exc.	0.00	0.13	no exc.	0.65	0.03	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	0	no exc.	0.00	0.03	no exc.	1.85	0.03	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	0	no exc.	0.00	0.14	no exc.	13.50	0.13	0.01	<0.01	<0.01	<0.01	<0.01	0.015	<0.01	<0.01	0.014	<0.01	<0.01	<0.01	<0.01	<0.01	0.025	<0.01	0.019	<0.01	0.012	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	0	no exc.	0.00	10.30	no exc.	169.00	4.03	1.00	<1	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	2.25	<1	<1	<1	<1	<1	<1
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	0	no exc.	0.00	38.82	no exc.	239.00	6.74	1.00	<1	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	1.2	<1	1.1	2.94	<1	<1	<1	<1	1.36	<1
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424	0	no exc.	0.00	167.80	no exc.	966.00	35.53	1.00	7.09	1.49	<1	1.07	1.66	<1	5.24	5.57	<5	12.9	1.94	4.51	23.3	1.64	3.43	35.9	<1	2.39	<1	<1	5.31	<1
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	0	no exc.	0.00	398.00	no exc.	2610.00	101.26	1.00	33.00	6.99	8.63	24.1	107	24.1	174	123	153	433	14.4	19.5	57.7	42.9	13.2	315	13.4	24.2	2.36	3.5	97.4	5.29
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	0	no exc.	0.00	99.24	no exc.	476.00	20.87	1.00	2.25	<1	1.89	1.27	74.6	13.8	126	43.5	99.8	360	3.58	2.67	10.2	4.88	4.82	98.4	1.6	2.5	<1	<1	22.4	<1
Total Aromatic Hydrocarbons	N	2680	mg/kg	5										42.8	9.98	10.6	27.3	184	38.2	305	174	253	806	20	26.8	92.7	49.6	22.6	454	16	29.3	<5	<5	127	6.67
Total Petroleum Hydrocarbons	N	2680	mg/kg	10										219	33.8	32.7	180	210	51.2	324	213	270	855	38.3	33.7	123	209	38	511	49.9	139	<10	<10	489	12
Benzene	M	2760	µg/kg	1	3800	0	no exc.	0.00	284.00	no exc.	1800.00	218.81	9.00	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180
Toluene	M	2760	µg/kg	1	128000	0	no exc.	0.00	140.00	no exc.	4510.00	182.99	7.00	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140
Ethylbenzene	M	2760	µg/kg	1	80000	0	no exc.	0.00	80.00	no exc.	835.00	91.19	4.00	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80
m & p-Xylene	M	2760	µg/kg	1	74000	0	no exc.	0.00	200.00	no exc.	19000.00	338.44	10.00	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
o-Xylene	M	2760	µg/kg	1	74000	0	no exc.	0.00	200.00	no exc.	4430.00	242.41	10.00	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Sum of Xylene									200.00	#DIV/0!	19000.00	290.43	10.00																						
Methyl Tert-Butyl Ether	M	2760	µg/kg	1										<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Naphthalene	M	2800	mg/kg	0.1	27	3	102.00	27.50	7.49	no exc.	102.00	2.23	0.01	0.05	0.0317	0.0335	0.0435	<0.18	<0.045	<0.45	0.33	<0.45	<0.45	0.0286	0.0644	0.184	0.0372	<0.18	1.94	0.0474	0.102	<0.009	<0.009	0.179	<0.009
Acenaphthylene	N	2800	mg/kg	0.1	16.7	2	35.30	18.60	3.73	no exc.	35.30	0.85	0.01	0.02	0.0339	0.0241	<0.012	<0.24	<0.06	<0.6	<0.24	<0.6	<0.6	0.0204	0.0868	0.318	0.0159	<0.24	2.1	0.027	0.0683	<0.012	<0.012	<0.12	<0.012
Acenaphthene	M	2800	mg/kg	0.1	30	0	no exc.	0.00	0.77	no exc.	28.60	0.31	0.01	0.04	0.0113	<0.008	<0.008	<0.16	<0.04	<0.4	<0.16	<0.4	<0.4	<0.008	<0.008	0.0417	<0.008	<0.16	<0.08	0.00964	0.0181	0.016	<0.008	<0.08	0.0108
Fluorene	M	2800	mg/kg	0.1	27	2	49.70	34.00	4.15	no exc.	49.70	1.07	0.01	0.02	<0.01	<0.01	<0.01	<0.2	<0.05	<0.5	<0.2	<0.5	<0.5	<0.01	0.0518	0.288	<0.01	<0.2	0.261	0.0188	0.0498	<0.01	<0.01	<0.1	<0.01
Phenanthrene	M	2800	mg/kg	0.1	27	8	191.00	30.20	25.06	no exc.	191.00	5.30	0.02	0.43	0.126	0.0462	0.0713	0.974	0.0927	<0.75	0.517	<0.75	<0.75	0.0896	0.549	2.23	0.0931	<0.3	2.62	0.183	0.438	0.0999	<0.015	0.46	0.0666
Anthracene	M	2800	mg/kg	0.1	34	1	46.80	46.80	5.12	no exc.	46.80	1.26	0.02	0.09	0.0495	<0.016	<0.016	<0.32	<0.08	<0.8	<0.32	<0.8	<0.8	0.0255	0.339	0.713	0.0237	<0.32	1.03	0.0493	0.157	0.0242	<0.016	<0.16	<0.016
Fluoranthene	M	2800	mg/kg	0.1	6.64	24	216.00	6.77	25.18	25.18	216.00	6.82	0.02	0.89	0.411	0.0725	0.0933	1.38	0.117	<0.85	0.797	<0.85	<0.85	0.19	2.25	4.68	0.173	0.82	8.43	0.364	0.859	0.153	<0.017	1.06	0.11
Pyrene	M	2800	mg/kg	0.1	76	3	149.00	88.30	17.08	no exc.	149.00	4.89	0.02	0.85	0.46	0.0569	0.0754	1.01	0.0938	<0.75	0.633	<0.75	<0.75	0.157	1.74	3.17	0.147	0.626	11.2	0.283	0.663	0.147	<0.015	0.978	0.0973
Benzo[a]anthracene	M	2800	mg/kg	0.1	607	0	no exc.	0.00	8.42	no exc.	99.00	2.96	0.01	0.47	0.241	0.0546	0.06	0.6	<0.07	<0.7	0.378	<0.7	<0.7	0.123	1.19	2.03	0.112	0.427	5.86	0.181	0.44	0.102	<0.014	0.581	0.0733
Chrysene	M	2800	mg/kg	0.1	621	0	no exc.	0.00	7.53	no exc.	82.90	2.59	0.01	0.51	0.28	0.0481	0.0718	0.478	0.0682	<0.5	0.432	<0.5	<0.5	0.142	1.13	1.62	0.112	0.458	8	0.204	0.509	0.113	<0.01	0.691	0.0821
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	27	136.00	3.47	17.40	17.40	136.00	3.96	0.02	0.77	0.415	0.122	0.134	0.99	0.0954	<0.75	0.651	<0.75	<0.75	0.207	1.85	2.56	0.198	0.726	21.6	0.286	0.725	0.179	<0.015	1.07	0.14
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	9	43.40	5.83	4.89	no exc.	43.40	1.31	0.01	0.29	0.131	0.0344	0.0352	<0.28	<0.07	<0.7	<0.28	<0.7	<0.7	0.0687	0.549	0.875	0.0536	<0.28	5.83	0.115	0.217	0.078	<0.014	0.437	0.0487
Benzo[a]pyrene	M	2800	mg/kg	0.1	34	3	87.60	39.60	12.04	no exc.	87.60	2.61	0.02	0.53	0.27	0.0577	0.0687	0.603	<0.075	<0.75	0.378	<0.75	<0.75	0.136	1.09	1.6	0.107	0.407	15	0.183	0.389	0.125	<0.015	0.646	0.0866
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25	4	69.30	25.50	9.84	no exc.	69.30	2.18	0.02	0.41	0.27	0.0721	0.0773	0.606	<0.09	<0.9	<0.36	<0.9	<0.9	0.115	0.844	1.15	0.084	<0.36	20.4	0.145	0.301	0.113	<0.018	0.577	0.0853
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838	0	no exc.	0.00	2.33	no exc.	11.70	0.47	0.02	0.08	0.0407	<0.023	<0.023	<0.46	<0.115	<1.15	<0.46	<1.15	<1.15	<0.023	0.161	0.231	<0.023	<0.46	3.24	0.0297	0.0733	<0.023	<0.023	<0.23	<0.023
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13	7	55.00	13.90	8.35	no exc.	55.00	1.94	0.02	0.39	0.245	0.0678	0.0702	0.551	<0.12	<1.2	<0.48	<1.2	<1.2	0.113	0.744	1.01	0.0828	<0.48	23.1	0.126	0.321	0.107	<0.024	0.563	0.0778
Total Of 16 PAH's	N	2800	mg/kg	2										5.82	3.02	0.69	0.801	7.2	<0.59	<5.9	4.12	<5.9	<5.9	1.42	12.6	22.7	1.24	3.46	131	2.25	5.33	1.26	<0.118	7.24	0.879
Resorcinol	M	2920	mg/kg	0.02																															
Phenol	M	2920	mg/kg	0.02	3.05	0	no exc.	0.00	0.02	no exc.	0.31	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0114	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0131	<0.01	<0.01	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02																															
Xylenols	M	2920	mg/kg	0.02	74	0	no exc.	0.00	0.02	no exc.	0.02	0.02	0.02																						
1-Naphthol	N	2920	mg/kg	0.02																															
Trimethylphenols	M	2920	mg/kg	0.02																															
Total Phenols	M	2920	mg/kg	0.1																															

P18-669 Llanwern Phase 4G Soil Chemical Screening Results

Project: P18-669																																		
Client: Rodgers Leask Environmental				**Job No.:**		201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201218-34	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	201219-57	210105-10	210105-10	210105-10	210105-10	210106-76	210106-76
Quotation No.: Q21-24056				**Sample ID.:**		23461599	23461567	23461571	23461465	23461520	23461607	23461469	23461475	23471766	23471748	23471754	23471742	23471733	23471738	23471776	23471781	23471725	23471729	23471714	23471720	23471705	23471762	23471770	23471814	23471710	23498287	23498291	23498295	23498299	23504862	23504831
Order No.: .				Client Sample Ref.:		AS4-2	AS6-1	AS6-2	AS7-1	AS7-2	AT4-1	AT4-2	AT4-3	AG1-1	AH1-1	AH1-2	AI1-1	AJ1-1	AJ1-2	AJ6-1	AJ6-2	AK1-1	AK1-2	AK2-1	AK2-2	AK3-1	AK5-1	AK5-2	AL1-1	AL1-2	AR10-1	AR10-2	AR11-1	AR11-2	AS9-1	AS9-1
				Sample Type:		SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
				Top Depth (m):																															
				Bottom Depth (m):		1.60-1.60	0.30-0.30	1.60-1.60	0.40-0.40	1.50-1.50	0.20-0.20	1.50-1.50	2.60-2.60	0.50-0.50	0.20-0.20	1.10-1.10	0.40-0.40	0.20-0.20	1.00-1.00	0.50-0.50	1.30-1.30	0.30-0.30	1.70-1.70	0.10-0.10	1.30-1.30	0.50-0.50	0.20-0.20	1.20-1.20	0.50-0.50	1.00-1.00	0.50-0.50	1.70-1.70	0.50-0.50	1.80-1.80	0.50-0.50	1.20-1.20
				Date Sampled:		16/12/2020	16/12/2020	16/12/2020	16/12/2020	16/12/2020	17/12/2020	17/12/2020	17/12/2020	18/12/2020	18/12/2020	18/12/2020	18/12/2020	18/12/2020	18/12/2020	17/12/2020	17/12/2020	18/12/2020	18/12/2020	18/12/2020	18/12/2020	17/12/2020	17/12/2020	17/12/2020	18/12/2020	18/12/2020	1/4/2021	1/4/2021	1/4/2021	1/4/2021	05/01/2021	05/01/2021
				Asbestos Lab:																															
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																															
ACM Type	U	2192		N/A									Chrysotile (White) Asbestos																Trace Chrysotile (White) Asbestos					
Asbestos Identification	U	2192		N/A			Not Detected		Not Detected		Not Detected		Detected			Not Detected	Not Detected	Not Detected			Not Detected	Not Detected		Not Detected		Not Detected			Not Detected	Detected		Not Detected		Not Detected	Not Detected
Asbestos by Gravimetry	U	2192	%	0.001									<0.001																	<0.001					
Total Asbestos	U	2192	%	0.001									<0.001																	<0.001					
Moisture	N	2030	%	0.020		12	9.4	15	21	20	16	25	20	13	8.4	21	15	7.6	4.2	23	7.7	7	4.3	12	5.7	6.1	18	7.9	6.2	9.5	6.7	10	5.1	7.1	10	9.9
Soil Colour	N	2040		N/A		Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Light Brown	Dark Brown	Dark Brown	Dark Brown	Light Brown	Dark Brown	Light Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown
Other Material	N	2040		N/A		Stone/Soil	Sand	Stone/Soil	Sandy Clay Loam	N/A	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	N/A	Sandy Loam	Stone/Soil	Sandy Silt Loam	N/A	Clay Loam	Sand	Loamy Sand	N/A	Sandy Silt Loam	N/A	Loamy Sand	Clay Loam	N/A	N/A	Sand	Sand	Sand	Loamy Sand	Loamy Sand	Sandy Loam	Sandy Loam
Soil Texture	N	2040		N/A		Stones	Stones	Stones	Stones	Stones	Vegetation	None	Vegetation	Stones	Stones	Stones	None	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Crushed Brick	Stones	Stones	Stones	Stones
pH	M	2010		4.0		12	11.6	12.2	8.73	9.49	8.83	10.5	12.5	8.93	9.5	8.76	11.2	9.89	11.3	8.01	8.96	9.53	10.9	9.51	10.3	9.17	8.24	11.8	11.3	11.6	9.75	11.1	9.95	11.7	10.3	11.6
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	1.8	<1	<1	<1	2.65	10.3	11.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.4	<1	<1	<1	<1	2.23	<1	<1	<1	<1	<1	<1
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	<12	<12	<12	<12	16.8	<12	<12	25.8	18.8	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	18.5	<12	<12	<12	48.1	<12	<12	<12	<12	<12
Iron (Total)	N	2430	mg/kg	100	305000	78300	235000	207000	147000	81200	139000	164000	152000	35100	18700	72200	94000	75400	7400	64100	13500	80900	3420	90600	35000	16200	39700	59400	157000	164000	197000	83200	5660	147000	177000	121000
Arsenic	M	2450	mg/kg	1	2533	3.89	<6	7.08	12.8	5.11	17.4	21	6.24	6.89	4.07	9.53	9.15	<6	3	12.8	4.58	12.2	1.01	<6	1.47	2.41	10.7	6.58	<6	<6	<6	8.68	1.26	7.45	9.11	10
Cadmium	M	2450	mg/kg	0.1	73	1.12	<0.2	1.29	2.05	1.04	7.33	14.9	1.08	0.15	0.0341	0.906	0.744	0.885	0.0831	0.21	0.148	1.08	0.061	0.853	0.147	0.227	0.576	0.114	0.653	0.797	<0.2	0.219	0.238	0.391	2.89	1.4
Chromium	M	2450	mg/kg	1	9431	96	644	683	182	120	135	141	624	16.8	18.2	126	69.6	315	5.75	238	17	206	6.36	373	81.1	22	30.9	72.4	489	650	321	<9	2.16	190	112	110
Manganese	M	2450	mg/kg	5	33300	12100	33300	43100	12200	13800	10600	12100	38300	3070	4420	13100	6430	14500	2430	8980	1310	11900	1640	14800	8630	4770	2370	9450	36400	26600	16100	4710	163	19700	10700	11600
Copper	M	2450	mg/kg	0.5	451	12	31.1	29.4	36.2	24.2	38.7	51.2	29.3	31.3	8.75	16.2	<14	15	3.51	13.9	6.65	28.3	2.41	<14	1.87	7.88	13.5	14.7	<14	<14	<14	16.6	<1.4	19.2	26.6	22.9
Mercury	M	2450	mg/kg	0.1	132	<0.14	<1.4	<0.14	<1.4	<0.14	<0.14	<1.4	<1.4	<0.14	<0.14	<1.4	<1.4	<1.4	<0.14	<0.14	<0.14	<1.4	<0.14	<1.4	<0.14	<0.14	<0.14	<0.14	<1.4	<1.4	<1.4	<1.4	<0.14	<1.4	<1.4	2.05
Nickel	M	2450	mg/kg	0.5	11500	7.99	23.7	21	34	10.1	24.3	36	22.5	12.1	7.57	21.7	9.01	24.8	2.92	22.4	7.96	15.5	3.17	13.8	1.09	5.2	19.2	14.8	3.17	11.3	28.1	7.16	2.13	8.17	25.8	15
Lead	M	2450	mg/kg	0.5	15700	65.1	70.4	31.1	172	134	1330	1890	41.7	20.6	13.5	79.2	26.1	47.5	7.89	47.2	15.1	32.6	6.2	49.8	4.29	24.4	52.9	22.3	<7	12	17.3	24.2	7.87	25.2	334	261
Selenium	M	2450	mg/kg	0.2	702	4.37	14.9	15.5	<10	4.14	2.86	<10	20.3	1.26	3.05	<10	<10	<10	2.4	3	<1	<10	1.52	<10	3.53	3.53	<1	3.05	18.1	13.5	<10	<10	<1	<10	<10	2.27
Vanadium	U	2450	mg/kg	5	1606	722	566	2050	481	212	205	376	1680	34.5	47.7	160	109	236	15.9	217	40.6	211	5.41	277	109	39.9	65.2	144	344	487	296		5.05	385	268	297
Zinc	M	2450	mg/kg	0.5	138000	398	194	110	624	761	4640	7140	128	67.7	38.5	193	55.7	177	26	140	35.6	144	50.8	164	39.6	117	213	38.8	38.3	78.9	70.8	39.6	13.7	46.2	1540	1010
Organic Matter	M	2625	%	0.4		0.919	3.19	2.9	6.26	80	12.7	11.3	2.69	85.5	3.57	8.09	>100	4.84	0.41	6.6	1.19	8.33	<0.35	21.6	2.16	3.15	7.33	1.84	0.567	1.18	0.509	0.75	<0.35	0.748	4	8.45
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.018	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.043	<0.01	<0.01	<0.01	0.051	0.019	0.024	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359																															
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.049	0.021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.047	<0.01	<0.01	<0.01	1.68	0.045	0.021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	<1	<1	2.76	<1	<1	<1	1.23	1.2	<1	<1	<1	<1	1.28	<1	<1	<1	<1	<1	12.3	17.2	2.83	<1	<1	<1	4.7	<1	1.03	<1	1.88	1.06	10.6
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	2.35	8.3	12.7	3.77	2.36	9.85	9.92	8.99	2.79	<1	<1	<1	58	2.25	1.06	<1	1.32	3.92	31.9	54.3	18.1	1.14	<1	<1	24.1	<1	2.75	<1	5.71	7.82	30.3
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	9.87	93.2	90.4	18.7	9.66	49.8	67.5	65.3	8.32	4.47	2.84	5.21	31.8	<1	11	<1	2.74	<1	19.9	16.4	37.9	16.7	1.31	5.38	30.3	7.06	8.51	14.3	20.7	34.6	69.2
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	1.49	34.7	28.7	3.06	2.17	2.51	26.2	28	<1	1.03	<1	<1	<1	<1	1.03	<1	<1	<1	1.17	<1	<1	<1	<1	<1	1.18	1.44	<1	<1	4.02	7.1	16.5
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		14.1	136	135	25.7	14.8	62.9	105	104	11.7	5.5	<5	6.41	91.5	<5	13.6	<5	<5	5.4	65.3	88.5	59.2	18.5	<5	5.62	60.3	8.75	12.8	16.3	32.4	50.5	127
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.032	0.014	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.031	<0.01	<0.01	<0.01	1.12	0.03	0.013	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.14	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.95	<1	<1	<1	<1	<1	6.71	11.1	1.64	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.12
Aromatic TPH >C16-C21	M	2680	mg/kg	1	1.13E+04	3.9	16.4	41	20.1	9.31	69.3	19.1	47.3	16.9	1.44	10.9	7.29	71.3	1.03	13.7	<1	55.5	2.83	61.1	77.1	604	15.4	10.4	<1	11.3	7.5	1.6	1.19	25.6	14.5	14.3
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	3.9	16.4	41	20.1	9.31	69.3	19.1	47.3	16.9	1.44	10.9	7.29	71.3	1.03	13.7	<1	55.5	2.83	61.1	77.1	604	15.4	10.4	<1	11.3	7.5	1.6	1.19	25.6	14.5	14.3
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	<1	1.48	6.63	3.82	<1	31.1	1.96	7.64	1.08	<1	<1	<1	19	<1	7.4	<1	9.42	<1	10.1	16.3	476	7	3.54	<1	<1	2	<1	<1	2.3	1.7	1.33
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		5.13	18.4	55.1	26.6	12.2	103	22.6	60.5	24.1	<5	15.2	10.4	103	<5	22.8	<5	80.3	5.98	94.9	131	1080	23.8	14.5	<5	14.8	10.2	<5	<5	30.8	18.3	20.1
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		19.2	155	190	52.2	27.1	166	128	164	35.8	<10	15.2	16.8	195	<10	36.3	<10	80.3	11.4	160	220	1140	42.3	15.6	<10	75.1	19	12.8	16.3	63.2	68.9	147
Benzene	M	2760	µg/kg	1	3800	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<9	<9	<9	<9	<180	<180
Toluene	M	2760	µg/kg	1	128000	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<7	<7	<7	<7	<140	<140
Ethylbenzene	M	2760	µg/kg	1	80000	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<4	<4	<4	<4	<80	<80
m & p-Xylene	M	2760	µg/kg	1	74000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<10	<10	<10	<10	<200	<200
o-Xylene	M	2760	µg/kg	1	74000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<10	<10	<10	<10	<200	<200
Sum of Xylene																																				
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<10	<10	<10	<10	<200	<200
Naphthalene	M	2800	mg/kg	0.1	27	0.0104	0.0441	0.0335	0.0708	0.0668	0.154	0.211	0.0637	0.138	0.0167	0.352	0.222	1.07	0.0357	0.034	<0.045	0.378	0.0839	0.217	2.87	<0.45	0.0697	<0.045	<0.009	0.0482	0.0234	<0.009	0.0131	0.0238	0.0379	0.0393
Acenaphthylene	N	2800	mg/kg	0.1	16.7	<0.012	<0.012	<0.012	0.0942	0.062	<0.12	<0.12	<0.012	0.0975	<0.012	0.138	0.0913	0.664	0.039	0.0293	<0.06	0.371	0.0786	0.247	1.16	<0.6	0.0839	<0.06	<0.012	0.0423	0.0251	<0.012	<0.012	<0.012	0.0361	0.024
Acenaphthene	M	2800	mg/kg	0.1	30	<0.008	0.0833	0.0616	0.013	0.0128	<0.08	0.191	0.07	<0.008	<0.008	0.0351	0.014	<0.08	<0.008	<0.008	<0.04	0.029	<0.008	0.0413	0.0964	<0.4	<0.04	<0.04	<0.008	<0.008	<0.008	<0.008	<0.008	0.0383	0.0112	0.0226
Fluorene	M	2800	mg/kg	0.1	27	<0.01	0.0291	0.0272	0.0186	0.0259	<0.1	0.159	0.0415	0.0472	<0.01	0.102	0.0432	0.155	<0.01	<0.01	<0.05	0.106	0.0404	0.102	0.471	<0.5	<0.05	<0.05	<0.01	0.0189	<0.01	<0.01	<0.01	0.0196	0.013	0.0194
Phenanthrene	M	2800	mg/kg	0.1	27	0.0614	0.302	0.414	0.225	0.255	0.738	0.898	0.634	0.694	0.033	0.695	0.46	1.4	0.117	0.116	<0.075	1.04	0.303	0.714	3.47	<0.75	0.266	0.0864	0.0273	0.118	0.0868	0.0194	0.0252	0.244	0.181	0.254
Anthracene	M	2800	mg/kg	0.1	34	<0.016	0.0839	0.099	0.0998	0.0612	<0.16	<0.16	0.112	0.128	<0.016	0.283	0.1	0.488	0.0389	0.0259	<0.08	0.321	0.186	0.239	1.12	<0.8	<0.08	<0.08	<0.016	0.0408	0.0196	<0.016	<0.016	0.0559	0.0568	0.0527
Fluoranthene	M	2800	mg/kg	0.1	6.64	0.117	0.577	1.15	0.584	0.454	1.03	1.22	1.17	1.07	0.0503	1.17	0.852	2.93	0.443	0.236	<0.085	2.6	0.894	1.81	5.85	<0.85	0.571	0.133	0.0473	0.295	0.231	0.0269	<0.017	0.645	0.548	0.631
Pyrene	M	2800	mg/kg	0.1	76	0.123	0.552	1.21	0.539	0.391	0.797	1.03	1.13	0.792	0.0389	0.846	0.659	2.32	0.354	0.177	<0.075	2.07	0.633	1.44	4.51	<0.75	0.426	0.117	0.0618	0.239	0.181	0.0242	<0.015	0.644	0.45	0.572
Benzo[a]anthracene	M	2800	mg/kg	0.1	607	0.0772	0.52	0.96	0.478	0.314	0.542	0.573	0.773	0.508	0.0364	0.629	0.42	1.75	0.282	0.136	<0.07	1.53	0.449	1.17	2.86	<0.7	0.323	<0.07	0.0654	0.155	0.139	0.0218	<0.014	0.429	0.343	0.385
Chrysene	M	2800	mg/kg	0.1	621	0.095	0.544	1	0.504	0.356	0.646	0.583	0.816	0.564	0.0355	0.601	0.55	1.49	0.261	0.137	<0.05	1.39	0.398	0.981	2.63	<0.5	0.286	0.0674	0.0506	0.145	0.142	0.0274	<0.01	0.445	0.404	0.436
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	0.135	0.998	1.52	1.07	0.601	1	0.715	1.24	0.8	0.0425	0.773	0.705	2.1	0.248	0.186	<0.075	2.16	0.424	1.44	2.45	<0.75	0.277	0.099	0.0481	0.167	0.242	0.0471	<0.015	0.773	0.551	0.603
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	0.0475	0.361	0.614	0.291	0.19	0.409	<0.14	0.472	0.239	0.0184	0.307	0.274	1.04	0.143	0.0716	<0.07	0.892	0.192	0.534	1.44	<0.7	0.189	<0.07	<0.014	0.0614	0.0753	<0.014	<0.014	0.245	0.166	0.184
Benzo[a]pyrene	M	2800	mg/kg	0.1	34	0.0928	0.727	1.21	0.646	0.367	0.618	0.518	1.04	0.437	0.0331	0.541	0.378	2.01	0.256	0.131	<0.075	1.68	0.343	1.17	2.91	<0.75	0.317	<0.075	0.0366	0.169	0.156	0.0238	<0.015	0.522	0.322	0.382
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25	0.0791	0.656	0.862	0.593	0.296	0.594	0.379	0.796	0.399	0.0351	0.426	0.441	2.71	0.206	0.146	<0.09	1.71	0.271	1.1	3.22	<0.9	0.271	<0.09	0.0282	0.15	0.165	0.0271	<0.018	0.465	0.298	0.311
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838	<0.023	0.0797	0.117	0.101	0.0613	<0.23	<0.23	0.156	0.0968	<0.023	0.0721	0.0617	0.339	0.0371	<0.023	<0.115	0.215	0.0427	0.17	0.455	<1.15	<0.115	<0.115	<0.023	<0.023	0.028	<0.023	<0.023	0.0356	0.0533	0.0561
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13	0.0731	0.581	0.795	0.603	0.311	0.587	0.411	0.743	0.362	0.0294	0.371	0.334	2.72	0.194	0.11	<0.12	1.23	0.225	0.901	2.52	<1.2	0.263	<0.12	0.0438	0.123	0.161	<0.024	<0.024	0.453	0.272	0.297
Total Of 16 PAH's	N	2800	mg/kg	2		0.912	6.14	10.1	5.93	3.82	7.12	6.89	9.26	6.37	0.369	7.34	5.6	23.2	2.66	1.54	<0.59	17.7	4.56	12.3	38	<5.9	3.34	<0.59	0.409	1.77	1.67	0.218	<0.118	5.04	3.74	4.27
Resorcinol	M	2920	mg/kg	0.02																																
Phenol	M	2920	mg/kg	0.02	3.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0252	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0109	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02																																
Xylenols	M	2920	mg/kg	0.02	74																															
1-Naphthol	N	2920	mg/kg	0.02																																
Trimethylphenols	M	2920	mg/kg	0.02																																
Total Phenols	M	2920	mg/kg	0.1																																

P18-669 Llanwern Phase 4G Soil Chemical Screening Results

Project: P18-669

Client: Rodgers Leask Environmental				**Job No.:**		210108-19	210108-19	210108-19	210108-19	210108-19	210108-19	210108-19	210108-19	210108-19	210108-19	210108-19	210108-52	210108-52	210108-52	210108-52	210108-52	210108-52	210108-52	210109-42	210109-42	210109-42	210109-42	210109-42	210109-42	210109-42	210109-42	210109-42	210112-39	210112-39
Quotation No.: Q21-24056				**Sample ID.:**		23512069	23512073	23512103	23512111	23512115	23512040	23512046	23512055	23512065	23512094	23512099	23513440	23513530	23513568	23513578	23513589	23513603	23513615	23518594	23518599	23518603	23518581	23518588	23518567	23518577	23518557	23518561	23518548	23518552	23527439	23527534
Order No.: .				Client Sample Ref.:		AN10-1	AN10-2	AN11-1	AN11-2	AN12-1	AN12-2	AN12-3	AP10-1	AP10-2	AQ10-1	AQ10-2	AN13-1	AN13-2	AN14-1	AN14-2	AN14-3	AN15-1	AN15-2	AL12-1	AL12-2	AL12-3	AL13-1	AL13-2	AL14-1	AL14-2	AM15-1	AM15-2	AM16-1	AM16-2	AL10-1	AL10-2
				Sample Type:		SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
				Top Depth (m):	**HFC Soil Reuse Criteria (mg/kg)**																															
				Bottom Depth (m):		0.90-0.90	1.80-1.80	0.40-0.40	2.10-2.10	0.50-0.50	1.60-1.60	2.30-2.30	0.40-0.40	2.20-2.20	0.20-0.20	1.80-1.80	0.60-0.60	1.80-1.80	1.00-1.00	1.70-1.70	2.50-2.50	0.40-0.40	1.60-1.60	0.50-0.50	1.00-1.00	2.15-2.15	0.30-0.30	1.50-1.50	0.30-0.30	1.70-1.70	0.50-0.50	1.70-1.70	0.20-0.20	1.80-1.80	0.10-0.10	2.00-2.00
				Date Sampled:		06/01/2021	06/01/2021	06/01/2021	06/01/2021	06/01/2021	06/01/2021	06/01/2021	06/01/2021	06/01/2021	06/01/2021	07/01/2021	06/01/2021	06/01/2021	06/01/2021	06/01/2021	06/01/2021	07/01/2021	07/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021
				Asbestos Lab:																																
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																																
ACM Type	U	2192		N/A																								Chrysotile (White) Asbestos				Chrysotile (White) Asbestos				
Asbestos Identification	U	2192		N/A			Not Detected	Not Detected		Not Detected		Not Detected		Not Detected	Not Detected		Not Detected		Not Detected		Not Detected		Not Detected	Not Detected		Not Detected	Not Detected		Detected		Not Detected		Detected		Not Detected	
Asbestos by Gravimetry	U	2192	%	0.001																								N/A				<0.001				
Total Asbestos	U	2192	%	0.001																												<0.001				
Moisture	N	2030	%	0.020		17	11	17	8.6	15	15	18	16	18	12	13	14	17	16	14	17	15	15	10	17	19	13	14	10	12	13	19	14	13	13	10
Soil Colour	N	2040		N/A		Dark Brown	Dark Brown	Grey	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Black	Black	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Black	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Black	Dark Brown	Dark Brown	Dark Brown	Light Brown
Other Material	N	2040		N/A		Sand	Sand	Loamy Sand	Sand	Sandy Loam	Sand	Sand	Sandy Loam	Loamy Sand	Sandy Loam	Sandy Loam	Loamy Sand	Loamy Sand	Loamy Sand	Sand	Stone/Soil	Sand	Sand	Loamy Sand	Sand	Sand	Loamy Sand	Loamy Sand	Sand	Sand	Sand	Loamy Sand	Sandy Clay Loam	Sand	Sand	Sand
Soil Texture	N	2040		N/A		Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Vegetation	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Vegetation	Stones
pH	M	2010		4.0		11	10.9	10.7	11.7	9.31	10.8	10.6	10.2	9.78	8.95	10.6	10	11	11.6	11.7	11.4	11.1	11.3	10.7	10.8	7.67	10.9	10.5	10.6	10.5	10.5	9.48	8.74	11.5	8.84	10.2
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	<1	<1	<1	<1	<1	2.99	1.48	<1	<1	<1	<1	<1	<1	3.78	<1	1.64	<1	<1	<1	1.52	1.02	<1	<1	1.42	<1	1.75	11.2	<1	<1	<1	<1
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	<12	13.6	<12	<12	<12	<12	<12	<12	43.6	<12	<12	<12	21.3	<12	<12	<12	22.2	16.7	<12	<12	<12	<12	<12	38.8	<12	<12	<12	<12	<12	<12	<12
Iron (Total)	N	2430	mg/kg	100	305000	172000	62600	63600	31300	71000	20600	30000	48800	28600	56000	87600	51400	40000	21200	34500	36600	69800	130000	176000	102000	23900	179000	138000	229000	59700	65700	35400	96600	43900	63900	98500
Arsenic	M	2450	mg/kg	1	2533	9.76	9.18	12.3	1.71	9.43	11.2	6.64	11.3	7.72	5.43	6.44	9.08	7.32	4.18	7.08	7.48	8.84	6.72	19.4	20.1	12.5	8.73	12.6	17.3	10.4	4.58	6.25	45.2	12.8	10.2	8.24
Cadmium	M	2450	mg/kg	0.1	73	2.11	0.221	0.47	0.0514	1.05	0.269	0.732	0.679	0.975	0.309	0.323	0.098	0.706	0.995	0.629	0.0585	0.205	2.1	2.16	1.41	<0.02	2.47	1.57	2.96	0.406	<0.02	0.731	0.432	0.484	<0.02	0.5
Chromium	M	2450	mg/kg	1	9431	51.4	11.1	122	70.3	128	33.5	33.8	50	36	86.8	13.8	97.1	42.8	224	37.1	50.1	24.1	14.2	58.1	57.2	28.5	268	22	66.9	67.2	187	42	581	50.9	35	57.2
Manganese	M	2450	mg/kg	5	33300	5650	3100	12100	9960	9770	931	3210	4310	1280	7580	2790	9950	2940	4780	3740	4800	4120	3890	6070	2990	1430	13700	3980	4550	2630	12200	3630	11000	1920	3920	10300
Copper	M	2450	mg/kg	0.5	451	27.4	12.9	31.5	2.24	21.5	10.3	21.7	23	21.5	14.3	17.9	16	29.9	13.3	13.6	12.7	21.4	12.6	38.4	71.4	15	32.9	23.4	50.6	26.4	25.3	30.4	259	28.6	17.8	25.1
Mercury	M	2450	mg/kg	0.1	132	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<1.4	<1.4	<0.14	<1.4	<1.4	<1.4	<0.14	<0.14	0.235	2.21	0.182	<0.14	<1.4
Nickel	M	2450	mg/kg	0.5	11500	27.3	14.4	19.6	1.65	18.1	23.9	10.9	21.7	30.8	14.6	15.2	15	16.4	11.9	10.3	13.8	19.4	16	22.9	65.1	12.5	26.5	38.4	51.1	28.4	8.76	13.6	48.4	28	16.2	24.3
Lead	M	2450	mg/kg	0.5	15700	131	69.8	98.4	2.45	50.9	18.8	29.8	62.9	34.9	44.7	27.6	56.1	12.3	20.3	28.2	11.7	41.1	43.9	117	127	16	220	297	587	97.3	51.8	110	177	81.5	61.8	57.8
Selenium	M	2450	mg/kg	0.2	702	<1	<1	4.93	4.75	3.93	<1	1.98	1.64	<1	3.15	<1	4.34	1.82	7.25	1.9	2.79	<1	<1	<10	<10	<1	<10	<10	<10	<1	4.81	1.98	1.82	<1	1.31	<10
Vanadium	U	2450	mg/kg	5	1606	81.8	56.1	241	205	185	46	101	88.1	39.3	147	44.1	145	83.9	320	89.2	197	46.2	37.5	132	67	44.9	364	67.5	64.9	78.2	302	69.8	144	38.7	60	180
Zinc	M	2450	mg/kg	0.5	138000	143	66.8	280	21.6	209	171	217	398	106	139	126	307	49.9	103	139	59.7	88.8	154	288	293	58.6	548	321	267	99.2	116	182	437	233	161	128
Organic Matter	M	2625	%	0.4		2.17	1.28	35.9	1.16	8.59	5.47	7.86	4.53	2.1	2.31	1.98	4.5	4.83	38.1	9.93	3.59	16.5	2.24	4.12	24.1	4.59	4.4	4.14	3.91	3.17	22.2	31.7	3.1	15	8.79	2.45
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	<0.01	<0.01	<0.01	<0.01	<0.01	0.043	0.03	<0.01	0.029	<0.01	<0.01	<0.01	0.026	<0.01	0.014	0.019	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	<0.01	<0.01	<0.01	<0.01
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359																															
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	<0.01	<0.01	<0.01	<0.01	<0.01	0.178	0.803	<0.01	0.048	<0.01	<0.01	0.013	0.109	0.019	0.068	0.034	<0.01	0.011	0.028	0.023	0.046	0.056	<0.01	<0.01	0.01	0.03	0.127	<0.01	0.02	<0.01	<0.01
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.84	<1	<1	<1	<1	<1
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	<1	4.06	<1	<1	3.67	1.04	1.86	<1	1.45	<1	<1	3.46	14.5	18.2	2.59	3.93	2.85	1.49	2.1	<1	1.2	5.22	14	4.54	<1	3.45	<1	<1	<1	<1	1.74
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	<1	8.44	7.47	4.93	34.6	20.5	29.9	7.36	4.14	3.64	4.32	19.6	23.5	210	41.7	16.6	27.4	12.9	8.43	5.47	135	17.7	124	46.5	11.3	8.91	1.77	3.85	1.87	2.15	34.6
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	2.34	7.21	65	8.92	221	73.2	88.5	34.8	38.7	10.7	23.3	47.8	30.8	72.1	78.4	20.2	31.4	53.3	36.9	71.3	51.6	110	106	728	199	24	5.62	20.4	13.7	15.7	33.1
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	<1	1.23	14.7	6.08	41.1	18.1	29.6	7.82	7.84	2.81	12.2	12.1	8.03	53.9	29.5	5.88	37.3	94.4	9.5	14.8	3.61	22.2	5.94	337	41.5	22.8	1.96	6.13	2.36	<1	2.85
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		<5	20.9	88	20	300	113	150	50.9	52.1	17.4	40.2	83.5	77.6	355	152	46.7	99.6	162	56.9	92.5	192	155	250	1120	252	61	9.69	30.6	18.2	19.1	72.3
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.021	<0.01	<0.01	<0.01
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	<0.01	<0.01	<0.01	<0.01	<0.01	0.119	0.536	<0.01	0.032	<0.01	<0.01	<0.01	0.073	0.013	0.046	0.023	<0.01	<0.01	0.019	0.014	0.03	0.038	<0.01	<0.01	<0.01	0.02	0.085	<0.01	0.013	<0.01	<0.01
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.27	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	8.5	25.5	<1	<1	<1	<1
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	<1	<1	1.44	<1	2.15	<1	1.4	<1	<1	<1	<1	<1	2.23	12.9	4.19	1.03	1.17	<1	1.13	3.42	6.48	<1	<1	<1	<1	36	46	<1	<1	<1	<1
Aromatic TPH >C16-C21	M	2680	mg/kg	1	1424	<1	1.13	10.9	6.37	11.1	10.1	4.71	<1	<1	<1	<1	2.98	12.4	54.9	35.3	3.86	8.25	1.54	5.21	64.6	17.4	2.39	2.63	<1	<1	430	294	7.61	1.31	1.04	<1
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	16.4	21.5	124	38	113	81	107	13.1	22.2	10.9	20.4	25.1	48.4	113	137	26	57.7	50.3	24.3	152	61.6	38.2	47.1	255	51.3	1550	389	48.6	5.84	26.5	6.42
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	7.04	10.1	16	5.03	6.14	7.46	9.73	1.93	1.74	2.59	2.58	2.45	5.56	5.53	18.1	8.49	9.43	9.29	3.52	15.7	4.29	4.89	9.3	7.44	3.21	212	44.5	13.4	<1	15.1	<1
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		23.6	33.4	153	49.4	133	99.7	123	16	25.4	14.2	23.6	31.1	69.1	188	196	39.8	76.7	61.3	34.7	237	90	46.2	59	263	54.9	2230	799	70.2	8.3	42.8	8.59
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		23.6	54.4	241	69.5	432	214	274	66.9	77.7	31.6	63.8	115	147	542	349	86.6	176	223	91.7	329	282	201	309	1380	307	2290	809	101	26.5	61.8	80.9
Benzene	M	2760	µg/kg	1	3800	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180
Toluene	M	2760	µg/kg	1	128000	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140
Ethylbenzene	M	2760	µg/kg	1	80000	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80
m & p-Xylene	M	2760	µg/kg	1	74000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
o-Xylene	M	2760	µg/kg	1	74000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Sum of Xylene																																				
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Naphthalene	M	2800	mg/kg	0.1	27	<0.045	<0.045	0.126	0.0914	0.192	0.197	0.169	0.0284	0.0234	0.0217	<0.045	0.161	0.165	0.88	1.31	0.0927	0.387	0.0577	0.476	0.482	1.99	0.183	<0.09	<0.09	0.166	3.38	26.5	0.0905	0.17	0.0302	0.0116
Acenaphthylene	N	2800	mg/kg	0.1	16.7	<0.06	<0.06	<0.06	<0.06	0.0804	0.0807	0.0726	<0.012	0.0184	<0.012	<0.06	0.149	0.213	1.31	0.751	0.0433	0.216	<0.06	0.22	0.291	0.406	0.08	<0.12	<0.12	0.0717	2.17	9.59	0.0259	0.0571	0.0142	0.021
Acenaphthene	M	2800	mg/kg	0.1	30	<0.04	<0.04	0.0871	<0.04	0.0305	0.0524	0.136	<0.008	0.0155	<0.008	<0.04	0.0262	0.0231	0.111	0.11	0.0117	<0.04	<0.04	0.0449	0.106	0.247	0.0421	<0.08	<0.08	<0.008	1.75	0.937	0.0752	<0.016	<0.008	<0.008
Fluorene	M	2800	mg/kg	0.1	27	<0.05	<0.05	0.0844	<0.05	0.0499	0.085	0.0811	<0.01	0.0212	<0.01	<0.05	0.141	0.102	1.12	0.624	0.0474	0.104	<0.05	0.2	0.272	1.72	0.0706	<0.1	<0.1	0.044	3.17	5.88	0.0742	0.0351	<0.01	0.0248
Phenanthrene	M	2800	mg/kg	0.1	27	<0.075	<0.075	0.756	0.579	0.327	1.17	4.91	0.0852	0.0849	0.0629	<0.075	1.09	0.812	8.49	5.38	0.315	1.03	0.124	1.42	5.76	17.4	0.527	<0.15	<0.15	0.321	39.3	34.5	0.702	0.473	0.0756	0.223
Anthracene	M	2800	mg/kg	0.1	34	<0.08	<0.08	0.263	0.181	0.104	0.299	0.945	0.0247	0.051	<0.016	<0.08	0.33	0.273	1.83	1.71	0.0784	0.278	<0.08	0.731	1.31	3.58	0.215	<0.16	<0.16	0.083	10.7	9.31	0.202	0.101	<0.016	0.0441
Fluoranthene	M	2800	mg/kg	0.1	6.64	0.113	0.113	1.63	1.51	0.656	6.77	11.8	0.137	0.208	0.117	<0.085	1.85	2.04	13.5	9.01	0.461	2.3	0.249	2.49	12.3	16.7	1.24	<0.17	<0.17	0.553	75.8	56.8	1.12	0.857	0.142	0.341
Pyrene	M	2800	mg/kg	0.1	76	0.1	0.106	1.48	1.51	0.541	5.43	8.25	0.124	0.161	0.103	<0.075	1.4	1.42	10.4	8.18	0.384	2.07	0.249	1.92	9.13	10.9	0.997	<0.15	0.215	0.416	59.1	43.2	0.909	0.659	0.117	0.259
Benzo[a]anthracene	M	2800	mg/kg	0.1	607	<0.07	0.0975	1.61	1.19	0.409	4.77	5.24	0.0716	0.145	0.0812	<0.07	1.03	1.04	6.02	4.71	0.29	1.35	0.162	1.18	6.05	6.25	0.662	<0.14	<0.14	0.299	42	25.7	0.593	0.342	0.0869	0.151
Chrysene	M	2800	mg/kg	0.1	621	0.0876	0.104	1.59	1.23	0.43	4.4	5.08	0.0875	0.134	0.106	<0.05	0.975	1.03	4.87	4.1	0.263	1.12	0.139	1.19	5.94	5.56	0.679	<0.1	<0.1	0.276	36.1	24.2	0.626	0.368	0.0983	0.121
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	0.145	0.201	2.92	2.06	0.731	5.67	5.67	0.12	0.152	0.163	<0.075	1.58	1.63	6.4	5	0.361	1.75	0.249	0.812	7.83	6.86	1.07	<0.15	<0.15	0.472	54.1	35.2	0.851	0.399	0.0896	0.157
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	<0.07	<0.07	0.877	0.635	0.222	1.81	1.88	0.0368	0.0576	0.0512	<0.07	0.501	0.449	2.57	1.9	0.125	0.605	<0.07	0.334	2.83	2.18	0.375	<0.14	<0.14	0.13	18.9	10.8	0.278	0.126	0.0386	0.0492
Benzo[a]pyrene	M	2800	mg/kg	0.1	34	<0.075	0.119	1.72	1.25	0.412	2.84	2.97	0.0625	0.094	0.0898	<0.075	0.883	0.924	4.9	3.85	0.293	1.3	0.136	0.865	5.21	4.17	0.607	<0.15	<0.15	0.279	39.6	23.7	0.517	0.229	0.0817	0.108
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25	<0.09	0.136	1.43	1.01	0.368	2.21	2.07	0.0541	0.0599	0.0848	<0.09	0.713	0.751	4.26	3.12	0.27	1.12	0.12	0.662	4.61	3.16	0.489	<0.18	<0.18	0.247	31.1	19.3	0.408	0.16	0.0779	0.0912
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838	<0.115	<0.115	0.428	0.254	0.0984	0.678	0.626	<0.023	<0.023	<0.023	<0.115	0.147	0.147	0.901	0.671	0.0577	0.22	<0.115	0.151	1.03	0.603	0.0915	<0.23	<0.23	0.047	6.87	4.07	0.0821	<0.046	<0.023	<0.023
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13	<0.12	<0.12	1.39	0.997	0.362	1.89	1.8	0.0536	0.0531	0.0884	<0.12	0.686	0.671	3.51	2.81	0.235	1.06	<0.12	0.629	4.1	2.61	0.473	<0.24	<0.24	0.213	27.4	19.4	0.369	0.144	0.0765	0.0812
Total Of 16 PAH's	N	2800	mg/kg	2		<0.59	0.876	16.4	12.5	5.01	38.4	51.7	0.884	1.28	0.969	<0.59	11.7	11.7	71.1	53.2	3.33	14.9	1.48	13.3	67.2	84.3	7.8	<1.18	<1.18	3.62	451	349	6.92	4.12	0.928	1.68
Resorcinol	M	2920	mg/kg	0.02																																
Phenol	M	2920	mg/kg	0.02	3.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012	0.0119	0.0117	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	0.0115	0.0123	<0.01	<0.01	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02																																
Xylenols	M	2920	mg/kg	0.02	74																															
1-Naphthol	N	2920	mg/kg	0.02																																
Trimethylphenols	M	2920	mg/kg	0.02																																
Total Phenols	M	2920	mg/kg	0.1																																

P18-669 Llanwern Phase 4G Soil Chemical Screening Results

Project: P18-669																																		
Client: Rodgers Leask Environmental				**Job No.:**		210112-39	210112-39	210112-39	210112-39	210112-39	210112-39	210112-39	210112-39	210112-39	210112-39	210112-39	210112-39	210112-39	210120-68	210120-68	210120-68	210120-68	210120-68	210120-68	210120-68	210120-68	210120-68	210120-68	210120-68	210121-44	210121-44	210121-44	210121-44	210121-44	210121-44
Quotation No.: Q21-24056				**Sample ID.:**		23527299	23527369	23527539	23527546	23527550	23527559	23527563	23527310	23527315	23527320	23527326	23527335	23527341	23577280	23577284	23577289	23577269	23577276	23577450	23577459	23577433	23577438	23577358	23577424	23577310	23584634	23584642	23584623	23584630	23584610	23584617
Order No.: .				Client Sample Ref.:		AL11-1	AL11-2	AM10-1	AM10-2	AM11-1	AM11-2	AM12-1	AM12-2	AM13-1	AM13-2	AM14-1	AM14-2	AM14-3	AG7-1	AH6-1	AH6-2	AH7-1	AH7-2	AI6-1	AI6-2	AI7-1	AI7-2	AI8-1	AI8-2	AK10-1	AF2-1	AF2-2	AF4-1	AF4-2	AF5-1	AF5-2
				Sample Type:		SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
				Top Depth (m):	**HFC Soil Reuse Criteria (mg/kg)**																															
				Bottom Depth (m):		0.30-0.30	1.40-1.40	0.20-0.20	1.90-1.90	0.20-0.20	1.80-1.80	0.10-0.10	2.10-2.10	0.00-0.80	1.50-1.50	0.20-0.20	1.80-1.80	2.10-2.10	0.50-0.50	0.40-0.40	2.00-2.00	0.40-0.40	1.50-1.50	0.10-0.10	1.60-1.60	0.40-0.40	1.30-1.30	0.40-4.00	2.00-2.00	0.30-0.30	0.60-0.60	1.30-1.30	0.50-0.50	1.60-1.60	0.50-0.50	1.80-1.80
				Date Sampled:		08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	08/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	19/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021
				Asbestos Lab:																																
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																																
ACM Type	U	2192		N/A																																
Asbestos Identification	U	2192		N/A		Not Detected		Not Detected		Not Detected		Not Detected		Not Detected		Not Detected		Not Detected	Not Detected		Not Detected	Not Detected		Not Detected		Not Detected		Not Detected		Not Detected		Not Detected		Not Detected		Not Detected	
Asbestos by Gravimetry	U	2192	%	0.001																																
Total Asbestos	U	2192	%	0.001																										-	-	-	-	-	-	-
Moisture	N	2030	%	0.020		12	11	9	7.9	9.4	14	6.4	11	13	8.6	8.1	13	13	7.4	9.9	10	10	9.2	8.7	15	7.5	12	6.8	7.1	8.3	17	14	7.4	15	9.7	13
Soil Colour	N	2040		N/A		Dark Brown	Dark Brown	Dark Brown	Light Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Black	Dark Brown	Dark Brown	Dark Brown	Black	Dark Brown	Dark Brown	Dark Brown	Black	Dark Brown
Other Material	N	2040		N/A		Sand	Stone/Soil	Sand	Sand	Sand	Sand	Loamy Sand	Stone/Soil	Sand	Sand	Sand	Stone/Soil	Stone/Soil	Sand	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sand	Sand	Sand	Stone/Soil	Stone/Soil	Sand	N/A	Sandy Loam	Sand	Loamy Sand	Stone/Soil	Sand	Sandy Loam
Soil Texture	N	2040		N/A		Vegetation	None	Vegetation	Stones	None	None	Stones	None	None	Stones	Vegetation	None	N/A	Vegetation	Stones	Stones	Stones	Stones	Vegetation	Vegetation	Vegetation	Oil/Petroleum	Stones	None	Stones	None	Stones	None	None	None	Stones
pH	M	2010		4.0		8.99	10.2	9.3	9.41	11	11.1	8.94	10.4	11.3	10.8	10.1	11	10.9	11.3	8.95	10.4	9.29	11	8.89	9.38	9.72	10.9	12	9.27	9.07	8.68	8.61	12.1	11	11	9.37
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.04	4.46	6.68	<1	1.27	<1	1.12	<1	<1	<1	4.42	<1	<1	9.96	<1	1.16	<1	5.96
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	23	<12	<12	<12	<12	<12	<12	<12	25.4	<12	<12	<12	<12	<12	<12	<12
Iron (Total)	N	2430	mg/kg	100	305000	71200	16200	174000	32700	53800	40200	15000	22800	92900	39200	32700	28500	28300	153000	56200	29300	94700	96700	52400	64900	104000	104000	112000	39800	56700	36800	23500	120000	43300	66300	58300
Arsenic	M	2450	mg/kg	1	2533	8.96	5.84	8.22	6.68	6.77	8.23	20.7	6.15	9.07	4.51	5.98	5.75	7.43	6.16	6.03	5.98	4.02	<6	2.77	7.05	<6	<6	<6	6.52	6.06	5.02	8.62	2.13	5.76	3.55	10.5
Cadmium	M	2450	mg/kg	0.1	73	<0.02	0.0296	1.54	<0.02	0.361	<0.02	0.227	<0.02	0.208	0.296	0.302	<0.02	0.33	0.529	0.0677	1.55	0.0282	<0.2	0.121	<0.02	0.228	<0.2	<0.2	0.231	<0.02	0.195	0.111	0.166	0.303	<0.02	0.335
Chromium	M	2450	mg/kg	1	9431	118	12.6	<9	12.3	15.2	71.1	4.7	30.1	3.77	15.7	9.09	22.5	9.42	505	43.9	8.61	210	332	35.2	157	348	384	589	8.3	<0.9	91.2	8.02	453	56.1	91.1	94.1
Manganese	M	2450	mg/kg	5	33300	11300	809	2790	891	1820	4130	3940	3650	4690	3580	2800	3230	1900	20400	6260	2340	12600	24100	9580	8500	22500	23900	32400	2010	1960	4380	920	33300	8530	8770	7040
Copper	M	2450	mg/kg	0.5	451	16	9.09	18.6	21.7	21.2	21.1	5.27	8.69	13.7	11.7	10.7	10.6	15	30.3	13.4	10.1	8.55	18.1	9.14	17.4	<14	<14	<14	6.31	8.78	22.2	26.7	14.2	11.7	10.1	15.9
Mercury	M	2450	mg/kg	0.1	132	<0.14	<0.14	<1.4	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	22.9	<1.4	<0.14	<0.14	<0.14	<1.4	0.581	<0.14	<1.4	<1.4	<1.4	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Nickel	M	2450	mg/kg	0.5	11500	14.4	12.2	33.8	23.3	25.8	19.4	3.86	8	17.6	9.86	10.3	13	13.2	23.4	11.5	16	7.23	42.6	10.4	18.2	7.43	41.8	5.7	5.96	11	13.7	29.2	6.83	16.5	6.26	17.8
Lead	M	2450	mg/kg	0.5	15700	26.8	12.5	343	19.2	30	30.4	12.2	1.25	56.8	14	29.4	12	13	55.7	39.5	179	17.3	44.8	14.9	21.6	15.5	<7	10.1	11.8	28.4	22.3	22.1	16.7	19	66.1	28.5
Selenium	M	2450	mg/kg	0.2	702	3.25	<1	<10	<1	<1	2.2	2.22	2.55	<1	1.75	1.42	3.44	1.6	11.8	3.54	1.06	5.09	12	4.47	3.38	10.6	12.2	17.2	1.03	1.17	2.02	<1	14.9	2.63	2.05	2.11
Vanadium	U	2450	mg/kg	5	1606	213	20.2	55.7	24	37.9	85	14.8	35.2	36.5	22.8	33.2	25.9	19.3	411	73.9	42	184	444	103	130	311	276	478	15.7	19.1	96.1	23.1	396	107	99.2	85.8
Zinc	M	2450	mg/kg	0.5	138000	125	62.1	128	66.4	92.1	107	59.3	76.5	125	58	237	74.8	97	184	910	124	103	41.9	86.5	73.6	87.1	38.9	59.9	50.8	98.8	72.7	81.8	37.5	62.3	89.8	114
Organic Matter	M	2625	%	0.4		5.84	1.98	2.69	1.3	4.19	15.3	4.12	8.4	5.83	7.15	10.7	<0.35	12.9	3.88	24.1	1.28	9.45	12.3	20	5.69	21	32.6	3.79	0.619	5.1	88.4	6.31	1.4	4.24	25.7	6.02
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.037	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.039	<0.01	0.352	<0.01	0.023	<0.01	0.019	<0.01	0.028	<0.01	<0.01	0.035	<0.01	0.022	<0.01	<0.01
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359																															
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	<0.01	<0.01	<0.01	0.039	0.034	0.022	<0.01	0.099	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.592	0.013	20.3	<0.01	0.07	<0.01	0.048	<0.01	0.096	<0.01	<0.01	0.066	<0.01	0.037	<0.01	0.03
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	<1	<1	<1	2.62	<1	2.08	1.02	<1	4.5	<1	<1	<1	<1	<1	<1	4.18	<1	133	<1	<1	<1	2.67	<1	1.82	<1	<1	1.09	<1	<1	<1	<1
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	12.5	<1	2.71	324	4.93	19.8	5.06	1.86	39.1	5.38	3.6	2.29	1.45	28.9	7.55	63.2	11.9	1590	3.71	75.9	12.1	72.1	11.3	73.9	1.97	1.26	5.34	1	1.4	6.32	7.1
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	29	2.03	10.5	135	32.6	45.6	15.6	9.29	62.5	116	18.7	8.34	6.77	34.4	14.4	31.1	6.24	391	1.46	22.6	3.86	12.6	37	28.8	11.6	4.34	3.27	19.8	8.42	13.8	3.54
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	4.9	<1	<1	<1	30.9	19	1.04	1.5	63.4	45.3	10.8	6.23	3.58	14.1	<1	<1	<1	<10	<1	2.5	<1	<1	4.87	5.07	<1	<1	<1	5.42	1.26	1.84	<1
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		47.6	<5	13.7	461	69	86.6	23.2	12.9	170	168	34.2	17.1	12	77.5	22.6	98.6	18.3	2120	5.58	102	16.4	87.4	53.3	110	14	5.68	10.2	26.3	11.6	22.8	11.3
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.367	<0.01	0.329	<0.01	0.071	<0.01	0.011	<0.01	0.083	<0.01	<0.01	0.028	<0.01	0.018	<0.01	<0.01
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.063	<0.01	1.85	<0.01	0.013	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.022	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	<0.01	<0.01	<0.01	0.026	0.023	0.015	<0.01	0.066	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.394	<0.01	13.5	<0.01	0.047	<0.01	0.032	<0.01	0.064	<0.01	<0.01	0.044	<0.01	0.025	<0.01	0.02
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.07	<1	132	2.06	6.29	<1	1.58	<1	1.21	<1	<1	<1	<1	<1	<1	<1
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	<1	<1	<1	<1	<1	3.07	<1	<1	<1	<1	1.07	<1	<1	<1	<1	1.25	<1	197	1.56	2.44	<1	1.46	<1	2.06	<1	<1	2.05	<1	<1	2.08	<1
Aromatic TPH >C16-C21	M	2680	mg/kg	1	1424	2.15	18.4	<1	<1	<1	32	2.34	<1	2.57	<1	5.02	2.09	<1	1	4.03	3.3	4.46	772	43.7	6.72	3.06	8.59	<1	16.2	<1	6.21	2.89	<1	<1	15.9	7.63
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	26.6	29.6	23.3	3.71	19.9	84.8	87.2	6.17	68.4	42.9	31.4	12.6	9.36	16.2	77.7	3.82	20.4	749	35.3	28.5	13.4	5	2.87	12.7	30.7	22	4.45	2.39	3.14	75.3	35.8
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	4.56	4.47	8.92	<1	1.74	9.93	57.6	<1	7.09	3.83	3.58	1.43	1.02	3.16	25.2	<1	3.14	113	10.4	6.98	1.59	<1	<1	<1	10	4.18	<1	<1	<1	10.8	6.48
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		33.5	53	32.7	5.67	22.5	131	148	7.84	78.3	47.7	41.2	16.3	11.5	20.6	107	11.4	28.5	1960	93	50.9	18.7	17.6	<5	33.2	41.1	32.6	11.1	<5	<5	105	51.2
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		81.1	53	46.4	467	91.5	217	171	20.9	248	215	75.5	33.4	23.5	98.1	130	112	46.8	4120	98.6	153	35.1	105	53.3	143	55.1	38.3	21.6	26.3	11.7	128	62.6
Benzene	M	2760	µg/kg	1	3800	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	390	<180	1370	<180	<180	<180	<1800	<180	<180	<180	<180	<180	<180	<180	<180	<180
Toluene	M	2760	µg/kg	1	128000	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	238	<140	4510	<140	<140	<140	<1400	<140	<140	<140	<140	<140	<140	<140	<140	<140
Ethylbenzene	M	2760	µg/kg	1	80000	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	835	<80	<80	<80	<800	<80	<80	<80	<80	<80	<80	<80	<80	<80
m & p-Xylene	M	2760	µg/kg	1	74000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	19000	<200	<200	<200	<2000	<200	<200	<200	<200	<200	<200	<200	<200	<200
o-Xylene	M	2760	µg/kg	1	74000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	4430	<200	<200	<200	<2000	<200	<200	<200	<200	<200	<200	<200	<200	<200
Sum of Xylene																																				
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<2000	<200	<200	<200	<200	<200	<200	<200	<200	<200
Naphthalene	M	2800	mg/kg	0.1	27	0.0249	0.0516	<0.09	0.0125	<0.09	7.3	0.0871	0.0279	0.0794	0.0235	0.27	<0.09	0.028	0.137	0.175	1.24	0.255	80.6	1.97	2.28	0.182	0.938	0.031	0.838	0.0264	0.0552	0.381	0.0357	0.182	0.446	0.207
Acenaphthylene	N	2800	mg/kg	0.1	16.7	0.0263	0.0502	<0.12	<0.012	<0.12	3.54	0.144	0.0472	0.0719	0.0214	0.147	<0.12	0.0141	0.139	0.303	0.272	0.286	18.6	0.716	0.224	0.101	0.0789	<0.012	0.0998	0.0231	0.118	0.129	0.0325	<0.012	0.543	0.15
Acenaphthene	M	2800	mg/kg	0.1	30	0.0179	0.0153	<0.08	<0.008	<0.08	0.157	0.0352	0.0116	0.0696	0.00991	0.0481	<0.08	<0.008	0.0206	0.0143	0.166	0.0177	2.19	0.0288	0.0361	0.00942	0.0606	<0.008	0.0792	<0.008	0.0227	0.474	0.0142	<0.008	<0.04	0.0149
Fluorene	M	2800	mg/kg	0.1	27	0.0146	0.0394	<0.1	<0.01	<0.1	2.96	0.0462	0.0149	0.0764	<0.01	0.104	<0.1	<0.01	0.0229	0.0389	0.746	0.0999	34	0.132	0.159	0.0198	0.0981	<0.01	0.136	<0.01	0.0861	0.131	0.0126	<0.01	0.127	0.0402
Phenanthrene	M	2800	mg/kg	0.1	27	0.154	0.527	<0.15	0.0378	<0.15	13.7	0.428	0.112	0.54	0.1	1.31	0.253	0.105	0.24	0.436	2.61	0.721	163	0.929	0.565	0.269	0.434	0.0506	0.325	0.126	0.729	0.248	0.157	0.0321	1.7	0.405
Anthracene	M	2800	mg/kg	0.1	34	0.0436	0.131	<0.16	<0.016	<0.16	4.09	0.177	0.0547	0.158	0.0293	0.328	<0.16	0.0197	0.109	0.14	0.491	0.227	27	0.591	0.127	0.0793	0.101	<0.016	0.0934	0.0285	0.214	0.13	0.0508	<0.016	0.678	0.135
Fluoranthene	M	2800	mg/kg	0.1	6.64	0.39	0.974	<0.17	0.0539	<0.17	13.7	1.3	0.407	1.2	0.364	2.72	0.528	0.157	0.618	1.4	2.63	1.73	143	1.28	0.35	0.701	0.542	0.166	0.562	0.239	1.23	1.03	0.361	0.0316	5.07	1.14
Pyrene	M	2800	mg/kg	0.1	76	0.37	0.76	<0.15	0.0448	<0.15	10.2	1.14	0.336	1.4	0.299	2.26	0.417	0.121	0.551	1.15	1.87	1.32	91.8	0.946	0.291	0.539	0.388	0.127	0.499	0.182	0.917	0.753	0.274	0.0247	3.98	0.903
Benzo[a]anthracene	M	2800	mg/kg	0.1	607	0.278	0.455	<0.14	0.0295	<0.14	4.54	0.8	0.259	1.1	0.218	1.54	0.259	0.0844	0.482	1.12	0.624	0.953	50.5	0.686	0.161	0.417	0.185	0.0676	0.185	0.158	0.57	0.499	0.19	<0.014	2.61	0.644
Chrysene	M	2800	mg/kg	0.1	621	0.307	0.453	<0.1	0.028	<0.1	4.58	0.648	0.26	0.917	0.19	1.56	0.275	0.0928	0.413	1.01	0.652	0.859	35.7	0.537	0.128	0.361	0.166	0.0704	0.197	0.14	0.631	0.495	0.209	0.015	2.69	0.648
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	0.51	0.644	<0.15	0.0411	<0.15	5.05	1.1	0.437	1.11	0.275	2.12	0.38	0.135	0.898	1.92	0.639	1.65	61	1.33	0.235	0.593	0.27	0.129	0.202	0.232	0.854	0.782	0.308	0.0196	4.58	1.05
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	0.164	0.191	<0.14	<0.014	<0.14	1.69	0.373	0.127	0.458	0.0886	0.712	<0.14	0.0409	0.271	0.658	0.177	0.688	20.8	0.395	0.082	0.201	0.0888	0.0359	0.0733	0.061	0.269	0.233	0.0916	<0.014	1.38	0.312
Benzo[a]pyrene	M	2800	mg/kg	0.1	34	0.338	0.427	<0.15	0.0223	<0.15	3.94	0.749	0.258	0.905	0.184	1.56	0.22	0.0751	0.538	1.28	0.399	0.989	41.9	0.87	0.187	0.385	0.147	0.0627	0.178	0.124	0.487	0.428	0.168	<0.015	2.48	0.581
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25	0.297	0.391	<0.18	<0.018	<0.18	3.17	0.731	0.214	0.708	0.134	1.37	<0.18	0.0673	0.626	1.3	0.304	0.926	32.2	1.63	0.228	0.414	0.172	0.0665	0.136	0.115	0.422	0.366	0.152	<0.018	2.22	0.517
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838	0.0464	0.0832	<0.23	<0.023	<0.23	0.569	0.141	0.0369	0.168	0.0256	0.278	<0.23	<0.023	0.117	0.272	0.0667	0.173	5.41	0.224	0.041	0.0854	<0.023	<0.023	0.0279	0.0293	0.0966	0.079	0.0362	<0.023	0.507	0.112
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13	0.291	0.383	<0.24	<0.024	<0.24	3.03	0.575	0.206	0.591	0.118	1.28	<0.24	0.069	0.705	1.2	0.266	0.918	27.6	2.11	0.28	0.389	0.157	0.0625	0.148	0.107	0.374	0.383	0.147	<0.024	2.14	0.493
Total Of 16 PAH's	N	2800	mg/kg	2		3.27	5.58	<1.18	0.27	<1.18	82.2	8.47	2.81	9.56	2.08	17.6	2.33	1.01	5.89	12.4	13.1	11.8	835	14.4	5.37	4.74	3.83	0.869	3.78	1.59	7.08	6.54	2.24	0.305	31.1	7.35
Resorcinol	M	2920	mg/kg	0.02																																
Phenol	M	2920	mg/kg	0.02	3.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	0.0219	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02																																
Xylenols	M	2920	mg/kg	0.02	74																															
1-Naphthol	N	2920	mg/kg	0.02																																
Trimethylphenols	M	2920	mg/kg	0.02																																
Total Phenols	M	2920	mg/kg	0.1																																

P18-669 Llanwern Phase 4G Soil Chemical Screening Results

Project: P18-669																																		
Client: Rodgers Leask Environmental				**Job No.:**		210121-44	210121-44	210121-44	210121-44	210121-44	210123-50	210123-50	210123-50	210123-50	210123-50	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210123-55	210126-90	210211-154	210211-154	210211-154
Quotation No.: Q21-24056				**Sample ID.:**		23584648	23584593	23584600	23584664	23584669	23598960	23598967	23598889	23598948	23598955	23599110	23599117	23599097	23599106	23599088	23599092	23599148	23599152	23599156	23599163	23599167	23599072	23599133	23599175	23599180	23599078	23599083	23610107	23709291	23709374	23709378
Order No.: .				Client Sample Ref.:		AG2-1	AG6-1	AG6-2	AH2-1	AH2-2	AL15-1	AL15-2	AL16-1	AL16-2	AL16-3	AD1-1	AD1-2	AE1-1	AE1-2	AF1-1	AF1-2	AG3-1	AG3-2	AH3-1	AH3-2	AI2-1	AI3-1	AI3-2	AJ2-1	AJ2-2	AJ3-1	AJ3-2	AN6-1	AJ5-1	AS5-1	AS5-2
				Sample Type:		SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
				Top Depth (m):	**HFC Soil Reuse Criteria (mg/kg)**																															
				Bottom Depth (m):		0.30-0.30	0.30-0.30	1.50-1.50	0.50-0.50	1.50-1.50	0.50-0.50	1.40-1.40	0.60-0.60	1.50-1.50	3.00-3.00	0.40-0.40	1.10-1.10	0.30-0.30	1.40-1.40	0.70-0.70	1.50-1.50	0.80-0.80	1.90-1.90	0.50-0.50	1.50-1.50	0.50-0.50	0.50-0.50	1.20-1.20	0.50-0.50	1.50-1.50	0.30-0.30	1.70-1.70	0.30-0.30	0.60-0.60	0.50-0.50	2.00-2.00
				Date Sampled:		20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021	22/01/2021	10/02/2021	10/02/2021	10/02/2021
				Asbestos Lab:																																
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																																
ACM Type	U	2192		N/A		Amosite (Brown) Asbestos																		Trace Chrysotile (White) Asbestos		Chrysotile (White) Asbestos										
Asbestos Identification	U	2192		N/A		Detected	Not Detected			Not Detected		Not Detected	Not Detected		Not Detected		Not Detected			Not Detected		Not Detected	Not Detected		Detected		Detected	Not Detected			Not Detected		Not Detected	Not Detected		Not Detected
Asbestos by Gravimetry	U	2192	%	0.001		<0.001																		<0.001		<0.001									
Total Asbestos	U	2192	%	0.001		<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	<0.001	-	-	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020		15	9.3	11	9.6	12	12	11	7.9	9.3	7.4	14	7.8	12	10	11	12	18	10	15	12	11	15	7.8	8.5	4.8	17	15	13	5.4	20	23
Soil Colour	N	2040		N/A		Black	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Grey	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown
Other Material	N	2040		N/A		Sand	Sand	Stone/Soil	Loamy Sand	N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sandy Loam	Sand	Loamy Sand	Sand	Sandy Loam	Sand	Sandy Loam	Loamy Sand	Sandy Loam	Sand	Sand	Sandy Loam	Sandy Loam	Stone/Soil	Sand	Stone/Soil	Sandy Loam	Stone/Soil	Sandy Loam	Sandy Loam
Soil Texture	N	2040		N/A		None	Vegetation	None	Stones	Vegetation	Stones	Vegetation	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones
pH	M	2010		4.0		8.15	9.09	9.44	9.53	9.68	10.4	9.66	11.8	9.9	9.93	8.93	9.44	10.2	8.76	8.33	7.9	7.77	11.7	11.9	11.3	11.8	10.4	11.7	9.52	8.95	8.78	8.95	8.8	8.49	10.4	8.78
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	3.08	<1	3.2	8.34	2.17	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	6.9	213	17.2	45.2	13.7	7.34	6.53	3.64	2.96	3.75	2.87	1.89	<1	<1	<1	18.7
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	<12	<12	38.8	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	34	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	19.2	<12	<12
Iron (Total)	N	2430	mg/kg	100	305000	45500	92600	25600	85300	30000	56800	47700	80300	46100	76700	12000	<10000	54300	32800	42700	30600	23000	186000	93800	200000	119000	19300	170000	80200	23000	16200	<10000	48400	32300	62800	258000
Arsenic	M	2450	mg/kg	1	2533	11.2	5.96	7.36	9.47	7.52	7.4	10.3	6.59	7.87	7.95	<6	<6	6.92	9.06	12.7	7.47	<6	<6	<6	<6	<6	<6	<6	6.64	<6	<6	<6	12.5	<6	6.61	14.3
Cadmium	M	2450	mg/kg	0.1	73	0.256	<0.02	0.289	<0.02	0.136	0.336	0.637	0.79	0.403	0.544	<0.2	<0.2	0.362	0.497	0.54	0.492	0.318	<0.2	0.543	<0.2	0.658	0.414	<0.2	0.487	0.265	0.29	<0.2	0.45	<0.2	1.96	13
Chromium	M	2450	mg/kg	1	9431	14.5	244	34.2	198	25.1	81.1	33.4	58	35	42.3	17.9	22.5	161	26	25.6	13	37.7	555	262	541	451	88.8	579	55.4	<9	28.8	<9	32.1	120	129	579
Manganese	M	2450	mg/kg	5	33300	1720	16900	2980	9410	2300	4800	1510	4140	2260	2520	3550	5620	13500	2590	1150	542	2530	42200	16400	43100	24700	2600	36900	3550	1100	1990	1290	2470	8150	8480	29900
Copper	M	2450	mg/kg	0.5	451	21.6	26.6	10.8	22.5	8.07	41	26.9	18.7	14.3	16.6	<14	<14	24	19.8	29.7	<14	91.8	49.1	19.9	19.9	<14	18.4	18	56.1	<14	15.5	<14	23.7	<14	27.3	63.6
Mercury	M	2450	mg/kg	0.1	132	0.622	<0.14	<0.14	0.558	<0.14	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<0.14	<1.4	<1.4	<1.4	1.96	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<0.14	<1	<1	<1
Nickel	M	2450	mg/kg	0.5	11500	11.3	10.8	10.6	23.4	18.4	13.9	26.9	15.8	16.3	17	5.25	5.52	16.3	25.4	42.7	33.7	20.3	10.6	7.44	5.33	<2	6.28	28.7	21.5	9.2	7.03	2.78	22.2	9.86	20.1	41.3
Lead	M	2450	mg/kg	0.5	15700	51.7	26.1	34.5	29.3	7.77	167	37.7	30.8	21.2	11.1	<7	<7	58.3	24.4	26.6	16.6	47	31.9	10.6	8.73	38.8	27.9	8.34	26.6	<7	32.1	8.38	62.9	7.03	163	1040
Selenium	M	2450	mg/kg	0.2	702	<1	3.86	1.81	1.83	<1	<10	<10	<10	<10	<10	<10	<10	7.72	<10	<10	<10	<10	28.6	<10	27.3	12.2	<10	24.7	<10	<10	<10	<10	<10	<1	<10	<10	<10
Vanadium	U	2450	mg/kg	5	1606	21.1	185	45.2	129	26.6	73.6	65.1	73.4	56	69.4	26	64.8	151	44.4	43.3	16.4	44.4	639	305	691	372	52.1	721	65	13.9	33.6	10.8	58.7	82.4	247	593
Zinc	M	2450	mg/kg	0.5	138000	112	136	126	137	42.8	115	129	185	80.4	55	31.7	30.1	113	110	97	77.4	345	55.5	83.6	19.4	134	104	<19	79.1	35.7	118	35.2	182	40.2	618	5270
Organic Matter	M	2625	%	0.4		>100	28.1	4.17	18.4	2.52	46.4	7.05	66.9	2.29	2.07	3.02	16.6	6.17	20.7	2.36	1.78	7.95	5.4	64.8	24.1	10.3	>100	5.52	11.8	1.69	>100	83.8	6.96	0.779	4.98	6.93
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	0.018	<0.01	0.021	<0.01	0.017	0.021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.085	0.014	0.024	0.025	<0.01	0.025	0.028	0.012	<0.01	0.034	0.024	<0.01	0	<0.01	<0.01
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359																															
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	0.071	<0.01	0.056	<0.01	0.227	0.014	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.517	0.076	0.126	0.071	0.047	0.084	0.093	0.051	<0.01	0.032	0.028	<0.01	<0.01	<0.01	<0.01
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5.86	<1	1.33	<1	<1	5.38	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	<5	<1	<1	<1	<1	<1	<1	<1	1.27	<1	<1	<1	<1	<1	<1	<1	55.8	8.11	11	<1	4.62	11.5	4.23	2.25	<1	1.44	<1	<1	<1	2.94	<1
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	7.99	2.67	10.6	2.86	<1	13.4	<1	3.64	1.93	<1	4.06	<1	<1	<1	<1	<1	601	53.7	117	11.6	21.6	24	56.4	12.1	<1	45.3	16.1	<1	2.56	12.8	5.67
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	25.7	3.73	4.41	7.64	2.06	57.4	8.15	51.8	6.81	7.42	10.7	3.69	1.26	3.81	<1	<1	379	49.3	151	25.7	20.4	49	15.9	9.83	<1	12.9	5.19	<1	10.3	102	31.7
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	<5	<1	<1	<1	<1	34.3	3.62	16	1.04	2.38	2.47	<1	<1	<1	<1	<1	67.1	9.01	23.4	3.68	2.61	11.1	<1	<1	<1	1.11	<1	<1	1.59	36.6	7.01
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		36.3	6.59	16	11.4	<5	106	12	71.7	11	10.8	17.7	<5	<5	<5	<5	<5	1110	120	303	41.9	49.8	101	76.6	25.2	<5	60.8	21.8	<5	14.8	154	45.2
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	0.018	<0.01	0.288	<0.01	0.65	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.456	0.013	0.169	0.017	<0.01	0.023	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	0.018	<0.01	0.015	<0.01	0.166	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	<0.01	0.034	<0.01	<0.01	0.015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	0.047	<0.01	0.037	<0.01	0.151	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.345	0.05	0.084	0.048	0.031	0.056	0.062	0.034	<0.01	0.021	0.019	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	<5	<1	1.42	<1	2.4	1.14	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	169	17	40.9	3.98	2.45	11.5	<1	3.82	<1	1.24	<1	<1	<1	<1	<1
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	96.3	<1	<1	1.22	<1	3.24	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	239	40.7	46.6	8.31	5.88	54.9	1.24	7.37	<1	2.36	<1	<1	<1	<1	<1
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424	966	11.5	<1	18.3	7.75	37.6	2.84	<1	<1	<1	1.77	<1	1.51	1.92	<1	<1	866	324	204	30.4	36.3	273	14.5	78.9	3.86	19.9	3.16	4.87	<1	2.03	1.61
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	2610	56.6	15.9	74.2	30.5	173	14.4	14	10.8	5.55	7.71	35.5	4.44	12.7	1.02	<1	1730	696	404	61.9	126	718	23.7	243	18.2	170	21.4	7.43	14.8	37.6	12.3
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	284	13.1	6.02	17.4	3.61	23.2	2.41	<1	<1	<1	1.02	8.63	<1	<1	<1	<1	294	118	50.6	9.35	36.2	91.8	3.38	29.5	3.07	36.5	3.13	<1	2.17	2.22	<1
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		3960	81.8	24.7	112	44.7	238	19.6	15.7	12	6.7	10.6	44.6	7.08	15.8	<5	<5	3300	1200	746	114	207	1150	43.3	363	25.6	230	29	13.7	17.6	42.5	15
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		4000	88.4	41.2	123	45.6	344	31.6	87.5	23	17.5	28.3	44.6	<10	15.8	<10	<10	4410	1320	1050	156	256	1250	120	388	25.6	291	50.9	13.7	32.4	197	60.2
Benzene	M	2760	µg/kg	1	3800	229	<180	214	<180	296	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180	258	<180	481	<180	<180	<1800	<180	<180	<180	<180	<180	<180	<180	<180	<180
Toluene	M	2760	µg/kg	1	128000	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140	<14000	<140	<140	<140	<140	<140	<140	<140	<140	<140
Ethylbenzene	M	2760	µg/kg	1	80000	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<8000	<80	<80	<80	<80	<80	<80	<80	<80	<80
m & p-Xylene	M	2760	µg/kg	1	74000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<20000	<200	<200	<200	<200	<200	<200	<200	<200	<200
o-Xylene	M	2760	µg/kg	1	74000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<20000	<200	<200	<200	<200	<200	<200	<200	<200	<200
Sum of Xylene																																				
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<20000	<200	<200	<200	<200	<200	<200	<200	<200	<200
Naphthalene	M	2800	mg/kg	0.1	27	1.63	0.124	0.196	0.241	1.07	<0.009	0.119	0.0944	0.0387	0.0233	0.0828	0.0834	0.109	0.107	<0.009	0.0147	102	8.34	27.5	3.15	1.96	3.93	0.49	14.7	7.61	0.921	0.108	0.155	0.0155	0.0606	0.0315
Acenaphthylene	N	2800	mg/kg	0.1	16.7	3.85	0.292	0.0742	0.466	0.267	<0.012	0.379	0.0327	<0.012	<0.012	0.0444	0.0353	0.0368	0.0556	<0.012	<0.012	35.3	2	7.71	0.794	1.27	4.85	0.284	1.01	13.5	0.434	0.098	0.193	0.0151	0.0218	<0.012
Acenaphthene	M	2800	mg/kg	0.1	30	0.532	0.0107	<0.008	<0.008	<0.008	<0.008	0.0216	0.0124	0.0267	<0.008	<0.008	<0.008	<0.008	0.00913	<0.008	0.117	28.6	3.28	1.03	0.105	0.203	1.98	0.0494	0.0897	1.88	0.0346	<0.008	0.0186	<0.008	0.0258	<0.008
Fluorene	M	2800	mg/kg	0.1	27	4.58	0.03	0.0232	0.102	0.144	<0.01	0.389	0.0171	0.0281	<0.01	0.0301	0.0157	0.0214	0.0226	<0.01	<0.01	49.7	3.51	10.2	0.946	1.3	5.04	0.204	0.556	25.1	0.106	0.021	0.162	<0.01	0.0341	<0.01
Phenanthrene	M	2800	mg/kg	0.1	27	37.5	0.385	0.117	1.13	1.44	0.0202	9.79	0.241	0.0791	0.0454	0.395	0.131	0.238	0.186	0.0272	0.0238	191	14.4	57.5	4.01	9.49	25.5	1.14	4.11	123	1.04	0.191	1.15	0.0389	0.219	0.0686
Anthracene	M	2800	mg/kg	0.1	34	10.6	0.147	0.0282	0.477	0.554	<0.016	2.67	0.0592	0.0181	<0.016	0.0697	0.0358	0.0524	0.0431	<0.016	<0.016	46.8	3.63	17.5	0.964	2.3	7.97	0.329	1.39	22.3	0.364	0.0707	0.406	<0.016	0.0562	<0.016
Fluoranthene	M	2800	mg/kg	0.1	6.64	61.1	2.51	0.178	4.33	3.35	0.0263	15.4	0.378	0.05	0.0454	0.434	0.157	0.375	0.339	0.0214	<0.017	216	16.2	71	4.31	14.3	46.4	2.47	8.26	133	2.43	0.399	1.88	0.0855	0.423	0.114
Pyrene	M	2800	mg/kg	0.1	76	40.1	2.28	0.146	3.26	2.35	0.0218	10	0.295	0.0393	0.0328	0.334	0.118	0.28	0.25	0.0181	0.0171	149	11.4	49.9	3.06	10.3	32.5	1.96	6.99	88.3	1.86	0.314	1.29	0.0681	0.373	0.101
Benzo[a]anthracene	M	2800	mg/kg	0.1	607	24.1	1.6	0.121	2.14	1.43	0.0163	4.68	0.182	0.0209	0.0178	0.237	0.0895	0.202	0.179	<0.014	<0.014	99	7.24	29.6	1.72	6.37	21.3	1.35	4.36	41.3	1.57	0.26	0.736	0.0611	0.227	0.0688
Chrysene	M	2800	mg/kg	0.1	621	23.2	1.63	0.142	2.12	1.42	0.0159	3.55	0.173	0.0252	0.0231	0.251	0.0857	0.225	0.17	0.0138	0.0202	82.9	5.85	26.1	1.53	5.87	18.5	1.29	3.73	36.5	1.32	0.236	0.668	0.0621	0.278	0.0786
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	31.3	3.28	0.291	3.47	2.08	0.019	3.56	0.22	0.033	0.0245	0.293	0.148	0.364	0.268	0.0169	0.0198	136	8.28	36	1.52	8.85	27.2	1.9	5.95	50.1	1.58	0.352	0.603	0.126	0.379	0.121
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	9.56	0.899	0.0922	1.03	0.658	<0.014	1.33	0.0893	<0.014	<0.014	0.114	0.0458	0.0994	0.0844	<0.014	<0.014	43.4	2.68	12.2	0.615	2.68	8.77	0.691	1.74	17.3	0.854	0.138	0.292	0.0375	0.108	0.0382
Benzo[a]pyrene	M	2800	mg/kg	0.1	34	17.3	1.82	0.191	1.96	1.15	<0.015	3.16	0.167	0.0167	<0.015	0.206	0.0838	0.177	0.166	<0.015	<0.015	87.6	6.87	22.7	1.39	5.12	17.1	1.13	3.75	31	1.62	0.302	0.62	0.0725	0.202	0.0672
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25	12.9	1.73	0.214	1.73	0.996	<0.018	2.42	0.14	<0.018	<0.018	0.221	0.0832	0.175	0.174	<0.018	<0.018	69.3	5.49	18.4	1.09	4.24	12.7	1.01	2.91	25.5	1.72	0.345	0.514	0.0755	0.173	0.0517
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838	3.11	0.368	0.041	0.39	0.216	<0.023	0.514	0.0277	<0.023	<0.023	0.0505	<0.023	0.0335	0.0388	<0.023	<0.023	11.7	1.08	3.26	0.241	0.735	3.34	0.227	0.743	5.56	0.376	0.0565	0.0889	<0.023	0.0381	<0.023
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13	11.3	1.61	0.243	1.63	0.895	<0.024	2.06	0.136	<0.024	<0.024	0.162	0.0761	0.151	0.154	<0.024	<0.024	55	4.78	13.9	0.974	3.38	10.4	0.994	2.54	19.9	1.75	0.317	0.428	0.0668	0.178	0.0587
Total Of 16 PAH's	N	2800	mg/kg	2		293	18.7	2.1	24.5	18	0.12	60.1	2.26	0.376	0.212	2.92	1.19	2.54	2.25	<0.118	0.212	1400	105	405	26.4	78.3	248	15.5	62.8	642	18	3.21	9.2	0.725	2.8	0.799
Resorcinol	M	2920	mg/kg	0.02																																
Phenol	M	2920	mg/kg	0.02	3.05	0.0118	<0.01	<0.01	0.0111	0.0113	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.305	0.0111	0.0236	0.0113	<0.01	0.0234	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0375	<0.01
Cresols	M	2920	mg/kg	0.02																																
Xylenols	M	2920	mg/kg	0.02	74																															
1-Naphthol	N	2920	mg/kg	0.02																																
Trimethylphenols	M	2920	mg/kg	0.02																																
Total Phenols	M	2920	mg/kg	0.1																																

P18-669 Llanwern Phase 4G Soil Chemical Screening Results

Project: P18-669

Client: Rodgers Leask Environmental					**Job No.:**		210211-154	210211-154	210211-154	210211-154	210211-154	210211-154	210211-154	210120-68	210120-68	210120-68	210120-68	210120-68	210120-68	210120-68	210120-68	201219-57	201219-57	210123-50	201217-34	210211-154	210211-154	210211-154	201217-34
Quotation No.: Q21-24056					**Sample ID.:**		23709365	23709370	23709347	23709357	23709361	23709332	23709339																
Order No.: .					Client Sample Ref.:		AT5-1	AT5-2	AU5-1	AU5-2	AU5-3	AU6-1	AU6-2	AG8-1	AG8-2	AH8-1	AH8-2	AH8-3	AH8-4	AI8-1	AI8-2	AJ8-1	AJ8-2	AL3-1	AU7-1	AV6-1	AV6-2	AV6-3	AV7-1
					Sample Type:		SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Top Depth (m):	**HFC Soil Reuse Criteria (mg/kg)**								0.40-0.40	1.50-1.50	0.10-0.10	1.00-1.00	2.00-2.00	3.90-3.90	0.40-4.00	2.00-2.00	0.40-0.40	1.00-1.00	0.30-0.30	0.50-0.50	0.50-0.50	1.20-1.20	2.00-2.00	0.30-0.30
					Bottom Depth (m):		0.40-0.40	1.30-1.30	0.70-0.70	1.60-1.60	2.30-2.30	0.50-0.50	1.70-1.70																
					Date Sampled:		10/02/2021	10/02/2021	10/02/2021	10/02/2021	10/02/2021	10/02/2021	10/02/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	18/01/2021	17/12/2020	17/12/2020	22/01/2021	16/12/2020	10/02/2021	10/02/2021	10/02/2021	16/12/2020
					Asbestos Lab:																								
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																									
ACM Type	U	2192		N/A					Chrysotile (White) Asbestos													Chrysotile (White Asbestos)							
Asbestos Identification	U	2192		N/A				Not Detected	Detected		Not Detected	Not Detected		Not Detected		Not Detected		Not Detected		Not Detected		Trace					Not Detected		Not Detected
Asbestos by Gravimetry	U	2192	%	0.001					<0.001													<0.001							
Total Asbestos	U	2192	%	0.001			-	-	<0.001	-	-	-	-																	
Moisture	N	2030	%	0.020			14	14	16	23	24	25	22	9.5	15	13	9.7	11	13	6.8	7.1	5.3	8.9	11	13	13	6.9	31	20
Soil Colour	N	2040		N/A			Light Brown	Red	Light Brown	Dark Brown	Dark Brown	Dark Brown	Black	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Light Brown	Light Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown
Other Material	N	2040		N/A			Sandy Clay Loam	Sandy Clay Loam	Sandy Clay Loam	Sandy Loam	Sandy Clay Loam	Loamy Sand	Loamy Sand	Oil/Petroleum	None	Vegetation	None	Stones	None	Stones	None	Stones	Stones	Stones	Vegetation	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A			Stones	Stones	Stones	Stones	Stones	Stones	Stones									Loamy Sand	Loamy Sand		Loamy Sand				Loamy Sand
pH	M	2010		4.0			10.4	10.7	10.6	10.7	9.18	7.7	11.4	11.1	10.5	8.89	9.17	11.3	11	12	9.27	8.32	8.57	11.5	11.4	12.5	11.4	9.84	11.6
Cyanide (Total)	M	2300	mg/kg	0.5	2.02		<1	6.9	<1	23.1	37.2	1.11	9.79	1.41	2.63	<1	<1	<1	<1	<1	4.42	<1	<1	<1	8.68	4.42	6.99	184	10.8
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154		<12	<12	<12	<12	<12	123	<12	<12	24.8	93.4	<12	<12	<12	<12	25.4	<12	<12	<12	<12	<12	<12	<12	<12
Iron (Total)	N	2430	mg/kg	100	305000		45100	47100	104000	349000	261000	22100	254000	114000	54600	62800	112000	85300	97400	112000	39800	11500	11400	67200	255000	192000	467000	417000	327000
Arsenic	M	2450	mg/kg	1	2533		7.08	9.76	10.2	19.7	17.7	17.7	13.7	5.08	6.09	5.96	16	4.3	6.32	<6	6.52	3.94	4.77	6.59	16.3	<6	16.9	22.2	17.2
Cadmium	M	2450	mg/kg	0.1	73		0.95	3.38	2.12	21.9	16.5	0.913	12.6	0.371	<0.02	0.215	<0.2	0.164	<0.2	<0.2	0.231	0.177	0.118	0.493	9.82	6.38	7.44	24	10.4
Chromium	M	2450	mg/kg	1	9431		138	39.6	588	267	115	17.2	551	215	108	148	448	127	288	589	8.3	9.37	11.7	163	273	430	172	104	91.7
Manganese	M	2450	mg/kg	5	33300		5900	1940	12700	23600	13400	624	26300	17000	12300	10400	3340	17400	25000	32400	2010	585	784	16300	23300	33500	14600	14400	16700
Copper	M	2450	mg/kg	0.5	451		34.6	88.3	64.7	85.3	63.7	52.8	55.3	22.1	13.8	21.9	29.2	19.3	22.1	<14	6.31	9.19	11.8	<14	56.5	38	117	82	60
Mercury	M	2450	mg/kg	0.1	132		<1	1.97	<1	<1	<1	<1	<1	<0.14	<0.14	<0.14	<1.4	<0.14	<1.4	<1.4	<0.14	<0.14	<0.14	<1.4	<1.4	<1	1.39	1.34	<1.4
Nickel	M	2450	mg/kg	0.5	11500		22.7	29.4	26.1	52.3	44	21.2	28.5	9.95	13.6	13.1	33.6	10	11.1	5.7	5.96	8.94	9.98	14.4	45.5	39.2	40.1	59.2	60.2
Lead	M	2450	mg/kg	0.5	15700		56.4	255	135	1920	1370	564	1070	28.1	18.1	31.2	182	32.3	18.7	10.1	11.8	14.7	9.07	18.3	1320	494	447	2070	1270
Selenium	M	2450	mg/kg	0.2	702		<10	<10	<10	<10	<10	<10	<10	6.3	5.37	4.29	<10	5.72	10.2	17.2	1.03	<1	<1	13	<10	11.8	<10	<10	<10
Vanadium	U	2450	mg/kg	5	1606		107	56.9	490	945	460	23.6	485	157	110	181	74.1	165	199	478	15.7	12	17.1	256	1180	1490	472	379	691
Zinc	M	2450	mg/kg	0.5	138000		208	1260	559	9230	6550	187	5520	75.7	77.1	154	283	82.3	71.5	59.9	50.8	35.6	16.6	86.2	5510	2100	1920	10600	5830
Organic Matter	M	2625	%	0.4			4.43	10.3	6.55	9.28	6.62	39.1	18.3	2.26	2.26	7.6	6.71	13	30.7	3.79	0.619	1.42	0.902	<0.35	6.5	2.79	2.72	8.83	8.96
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0122	0.0401	<0.01	<0.01	0.0426	0.0441	<0.01	0.028	<0.01	<0.01	<0.01	<0.01	<0.01	0.0107	<0.01	<0.01
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359									0.0389	0.092	<0.01	<0.01	0.162	0.176	<0.01	0.0506	<0.01	<0.01	<0.01	0.0242	<0.01	0.0311	0.0115	0.0175
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841		<0.01	<0.01	0.051	<0.01	<0.01	<0.01	<0.01	0.091	0.373	<0.01	<0.01	1.88	1.16	<0.01	0.0958	<0.01	<0.01	<0.01	0.0311	<0.01	0.0634	0.0158	0.025
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04		<1	<1	<1	<1	1.99	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05		<1	1.79	1.12	1.74	1.09	1.26	1.32	49.4	79.4	<1	<1	27.9	30.8	<1	1.82	<1	<1	<1	3.37	10.8	6.03	6.34	1.52
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07		3.46	5.67	5.8	11.1	5.43	5.18	7.11	672	1190	27.9	20.3	213	251	11.3	73.9	<1	1.13	1.03	19.4	31	20.7	20.6	6.04
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07		19.8	28.1	80.1	45.8	29.4	32.2	16.8	122	1450	3.49	7.8	39.9	43.7	37	28.8	2.86	5.32	4.57	96.8	122	91.2	50.3	24.7
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07		5.27	13.9	22.6	12.9	7.77	5.39	1.27	5.45	249	<1	<1	5.55	5.23	4.87	5.07	<1	<1	<1	31.8	47.1	45.2	12.9	4.25
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5			29.3	49.8	110	71.7	45.7	44.7	26.6	849	2970	32.1	29.2	287	331	53.3	110	<5	7.17	5.75	152	211	164	90.7	36.9
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0866	0.341	<0.01	<0.01	0.164	0.212	<0.01	0.0829	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0322	0.072	<0.01	<0.01	0.288	0.232	<0.01	0.0204	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144		<0.01	<0.01	0.035	<0.01	<0.01	<0.01	<0.01	0.0599	0.248	<0.01	<0.01	1.25	0.77	<0.01	0.0635	<0.01	<0.01	<0.01	0.0207	<0.01	0.0419	0.0101	0.0163
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227		<1	<1	<1	<1	6.64	<1	<1	2.42	20.4	<1	<1	25.8	37	<1	1.21	<1	<1	<1	<1	<1	<1	<1	<1
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451		<1	<1	<1	<1	<1	3.05	<1	18.2	23.1	2.58	1	47.4	43.1	<1	2.06	7.87	<1	<1	<1	<1	<1	<1	<1
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424		1.94	2.49	3.37	1.54	3.7	18.9	<1	123	133	53	44.8	166	169	<1	16.2	100	<1	1.54	7.5	9.72	6.53	3.16	<1
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04		11	17.5	20	19.8	26.8	122	7.84	121	188	140	109	179	177	2.87	12.7	225	6.63	6.6	32.6	46.8	46.8	22.9	5.6
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04		<1	<1	2.19	1.53	1.33	23	<1	18.5	8.63	31.2	23	25.6	26	<1	<1	27.1	<1	<1	2.21	3.99	3.03	<1	<1
Total Aromatic Hydrocarbons	N	2680	mg/kg	5			14	21.6	25.6	23.1	38.9	167	10.1	283	373	227	178	443	452	<5	33.2	360	8.49	9.14	43	61.2	57.2	27.5	7.9
Total Petroleum Hydrocarbons	N	2680	mg/kg	10			43.2	71.4	135	94.7	84.7	212	36.7	1130	3340	259	207	734	785	53.3	143	360	15.7	14.9	195	273	221	118	44.8
Benzene	M	2760	µg/kg	1	3800		<180	<180	<180	<180	<180	<180	<180	266	1480	<180	<180	376	623	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180
Toluene	M	2760	µg/kg	1	128000		<140	<140	<140	<140	<140	<140	<140	<140	320	<140	<140	478	432	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140
Ethylbenzene	M	2760	µg/kg	1	80000		<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80
m & p-Xylene	M	2760	µg/kg	1	74000		<200	<200	<200	<200	<200	<200	<200	<200	549	<200	<200	1190	618	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
o-Xylene	M	2760	µg/kg	1	74000		<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	298	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Sum of Xylene																													
Methyl Tert-Butyl Ether	M	2760	µg/kg	1			<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Naphthalene	M	2800	mg/kg	0.1	27		0.175	0.0576	0.0694	0.0281	0.0472	0.041	0.0207	1.83	4.9	0.144	0.237	19.9	25.8	0.031	0.838	<0.009	0.0125	0.0135	0.0612	0.0441	0.121	0.0287	0.0615
Acenaphthylene	N	2800	mg/kg	0.1	16.7		0.0216	<0.06	0.0176	<0.012	<0.012	0.0207	<0.012	1.52	1.13	0.906	1.24	6.21	5.78	<0.012	0.0998	<0.012	<0.012	0.0152	0.0498	<0.012	0.0935	<0.012	0.0205
Acenaphthene	M	2800	mg/kg	0.1	30		0.143	0.0542	0.0475	<0.008	0.0265	0.0361	<0.008	0.637	0.311	<0.008	<0.008	0.614	0.864	<0.008	0.0792	<0.008	<0.008	<0.008	0.04	0.074	0.0776	<0.008	<0.008
Fluorene	M	2800	mg/kg	0.1	27		0.105	<0.05	0.0585	<0.01	0.0331	0.0457	<0.01	1.21	1.01	0.0966	0.0868	7.81	7.61	<0.01	0.136	<0.01	<0.01	<0.01	0.0297	0.0374	0.054	<0.01	0.0151
Phenanthrene	M	2800	mg/kg	0.1	27		1.16	0.41	0.352	0.119	0.301	0.339	0.0809	3.33	2.73	0.783	1.73	30.2	24.4	0.0506	0.325	0.0392	0.0569	0.153	0.468	0.691	0.662	0.064	0.129
Anthracene	M	2800	mg/kg	0.1	34		0.236	0.189	0.0995	0.0239	0.0671	0.0668	<0.016	1.16	0.75	0.38	0.66	5.3	4.85	<0.016	0.0934	<0.016	<0.016	0.0264	0.13	0.122	0.197	<0.016	0.0328
Fluoranthene	M	2800	mg/kg	0.1	6.64		1.46	1.72	0.499	0.233	0.508	0.675	0.149	7.26	5.59	4.82	9.19	26.7	22.9	0.166	0.562	0.0962	0.11	0.408	1.17	1.32	1.82	0.0923	0.26
Pyrene	M	2800	mg/kg	0.1	76		1.18	1.54	0.43	0.217	0.424	0.523	0.109	5.6	5.54	4.28	7.85	18	15.7	0.127	0.499	0.073	0.087	0.376	1.14	1.24	1.9	0.1	0.301
Benzo[a]anthracene	M	2800	mg/kg	0.1	607		0.636	1.45	0.249	0.121	0.285	0.402	0.0692	2.97	2.4	3.3	4.75	9.14	7.35	0.0676	0.185	0.0752	0.1	0.238	0.639	0.705	1.29	0.0581	0.173
Chrysene	M	2800	mg/kg	0.1	621		0.519	1.57	0.245	0.153	0.311	0.461	0.0701	2.76	1.85	3.19	4.32	6.82	5.82	0.0704	0.197	0.0849	0.0982	0.262	0.87	0.71	1.62	0.0717	0.192
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42		0.896	2.06	0.41	0.219	0.416	0.712	0.12	5.14	3.19	7.64	8.99	11.1	9.51	0.129	0.202	0.0886	0.108	0.48	1.19	1.16	2.41	0.0973	0.293
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05		0.318	0.717	0.126	0.0664	0.143	0.219	0.0316	1.55	0.938	2.11	2.47	3.47	2.79	0.0359	0.0733	0.0314	0.0528	0.141	0.352	0.373	0.707	0.0281	0.0946
Benzo[a]pyrene	M	2800	mg/kg	0.1	34		0.57	1.13	0.244	0.108	0.25	0.371	0.0514	3.35	1.94	4.38	5.56	7.6	6.19	0.0627	0.178	0.0654	0.09	0.268	0.716	0.837	1.53	0.0428	0.151
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25		0.449	0.799	0.207	0.0927	0.185	0.307	0.0437	3.67	1.59	4.05	5.17	5.56	5	0.0665	0.136	0.0452	0.0652	0.28	0.65	0.592	1.17	0.0356	0.118
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838		0.0684	0.218	0.0362	<0.023	0.0334	0.0656	<0.023	0.492	0.344	0.843	0.947	1.11	0.838	<0.023	0.0279	<0.023	<0.023	0.0388	0.121	0.0841	0.222	<0.023	<0.023
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13		0.402	0.748	0.188	0.0849	0.182	0.26	0.0493	4.14	1.48	4	5.28	4.98	4.43	0.0625	0.148	0.0427	0.0613	0.273	0.616	0.55	1.2	0.0399	0.121
Total Of 16 PAH's	N	2800	mg/kg	2			8.33	12.6	3.28	1.47	3.21	4.55	0.794	46.6	35.7	40.9	58.5	165	150	0.869	3.78	0.642	0.841	2.97	8.24	8.54	15.1	0.658	1.96
Resorcinol	M	2920	mg/kg	0.02																									
Phenol	M	2920	mg/kg	0.02	3.05		0.0468	0.0117	<0.01	0.013	0.0132	<0.01	<0.01	0.0111	<0.01	<0.01	<0.01	0.0112	0.0116	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.069	0.172	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02										0.0111	<0.01	0.0115	<0.01	0.0224	0.0232	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0107	<0.01	<0.01
Xylenols	M	2920	mg/kg	0.02	74									<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
1-Naphthol	N	2920	mg/kg	0.02																									
Trimethylphenols	M	2920	mg/kg	0.02																									
Total Phenols	M	2920	mg/kg	0.1										<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.069	0.183	<0.035	<0.035

Appendix C – RLL CWDQRA

Glan Llyn Llanwern

Controlled Water DQRA 2019

Controlled Waters Detailed Quantitative Risk

Assessment

Glan Llyn Llanwern (Sitewide)

2019 Update

For

St. Modwen Developments

DATE: August 2019

REV: A

18669-RLE-19-RP-O-0006

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Appendices

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Appendix B: Atkins Permeability Technical Note

Appendix C: Groundwater Levels Monitoring

Appendix D: Glan Llyn Diagrammatic CSM

Appendix E: Soils Analysis

Appendix F: Sampling Location Plans

Appendix G: Soil Leachate Analysis

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Appendix I: Chemical Input Parameters and Justifications

Appendix J: Table 5-4 CWDQRA Reuse Criteria - 40% Infiltration

Appendix K: Level 3 Groundwater Excel Worksheets

Appendix L: Dilution Calculations Excel Worksheets

Appendix M: Sensitivity Analyses Outputs

Drawings

Drawing 186669-RLE-19-XX-DR-O-0004 – Site Location Plan

Drawing 8111-008-A011 – Showing Proposed Site Redevelopment

Drawing 5111373-LLA-DWG-EG-0295 – CWRA Borehole Location Plan

Drawing 186669-RLE-22-XX-DR-O-0254 – CWRA Assessment Soil Samples Location Plan

Drawing 5111373-LLA-DWG-EG-0408 - Current Surface Water Drainage and Sampling Locations

Drawing D12-084-512 – Post-development Surface Water Drainage Plan

1.0 Introduction

Rodgers Leask Environmental Ltd (RLE) has been commissioned by St Modwen Developments Ltd (St Modwen) to update and further develop a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) of the potential risk to Controlled Waters for the Glan Llyn development at Llanwern, Newport (herein referred to as the site). Atkins Limited (Atkins), also prepared a CWDQRA for this site, the latest version of which was identified as: Document Reference: 5111373-LLA-OUT-0257, Version: 3 and dated February 2017. Although the current RLE CWDQRA is designed to be read as a standalone document, it is recommended that reference be made to the aforementioned Atkins Report, in order to obtain greater detail on the known/documented Reporting background to this site

The principal objectives of the current exercise is to provide, as practicably possible, future surface water flow contributions from the site are compliant upon entry in to the Monks' Ditch, surface water course, which bisects the site, following the redevelopment of the Glan Llyn site for mixed residential and commercial redevelopment and further limiting the amount of material which require off-site removal by virtue of its contaminative potential towards local Controlled Waters.

These introductory comments provide a narrative and rationale for the assumptions made within this updated model, and also provide considerations relating to the temporary management of the water whilst redevelopment is being undertaken, and sustainability of the brownfield project.

As alluded above, an interim state will exist where the site has been reclaimed, but full residential and commercial development is under construction. The reclamation, in terms of surface water quality, will be at its most effective when it is fully developed. The underlying natural clay currently provides a barrier to downward migration of water and the reens (surface water ditches) which are cut into the natural clay and/or peat, drain the water within the Made Ground.

1.1. Atkins Controlled Waters Detailed Quantitative Risk Assessment of 2016

The earlier DQCWRA prepared by Atkins (Version: 3 and dated February 2017), was issued with the intention that, as site specific information was collected, the assessment would be reviewed and updated. It was described as the starting point and that the criteria were understood to be conservative. The CWDQRA modelled two site conditions for the mixed use development comprising; residential and commercial end usage.

The residential end use was assumed to have a rainwater interception/ infiltration ratio of 60:40. The commercial end use was assumed to have a rainwater interception/ infiltration ratio of 95:5. The interception is where roofs, roads and hard paving take the rain water and transfer it directly into the surface water reens. The infiltration is where rainwater lands

on grassed or landscaped areas and is able to percolate into the construction material (soils, piling mat, sub base etc) and underlying post-development Made Ground. The current evapotranspiration rate for grassed areas is estimated as 600mm/a against an annual rainfall rate of 953mm/a. The earlier Atkins value utilised, (applicable to permeable areas) was; 416mm/annually. Assumptions and estimations used in these calculations within the current RLE Report have been largely reproduced from the aforementioned Atkins 2017 Report, some details of which are provided in Appendix I of the current Report.

The Atkins CWDQRA, that generated the initial criteria, assumed that 100% of the infiltrated rainwater (12.85mm per year or 1.3% of total rainfall) mm/a) percolated through the construction material and in to the Made Ground.

Upon derivation of their soil re-use criteria (calculated to be expressed as mg/kg for direct comparison against actual soil analytical data obtained), it was previously noted by Atkins in their 2017 CWDQRA Report and demonstrated in their associated Table 5.5, that the maximum and average soil sample concentrations exhibit some exceedances for inorganic compounds, copper and vanadium. It was also noted that there were exceedances in surface water analyses for iron, manganese, cyanide, and ammoniacal nitrogen. Although these had not been previously analysed by Atkins in soil samples, subsequent analyses has now included these determinands.

Exceedances were also noted in soil samples analysed for organic compounds, especially C_{12}-C_{35} species aromatic TPH (total petroleum hydrocarbons), and a number of PAH (polynuclear aromatic hydrocarbon) species as compared to the derived soil re-use criteria. Concentrations of PAHs present in actual soil analytical data obtained were, in some cases, over one order of magnitude in excess of the calculated re-use criteria, suggesting that attenuation, particularly of heavy fraction TPH and PAHs may potentially be an issue on this site requiring further consideration as part of the proposed remedial and redevelopment works. Although previous analyses of soil samples undertaken by Atkins did not include phenols, recent analyses has also now included this determined.

1.2. Rationale for Updated Model

The principal rationales for reviewing and revising the Atkins model that generated the initial criteria have been:

1. The amount of additional field, site specific, data collected since preparation of the earlier Atkins CWDQRA;

2. The remedial benefits of the currently proposed pre-development turnover and reengineering process were not included in the earlier Atkins CWDQRA. Further details of this proposed Made Ground re-engineering strategy to be employed are provided by Rodgers Leask Environmental Ltd in their Reclamation Performance Specification A – Turnover – Technical Note, dated 14/12/18, Ref: 17480-RLE-18-XX-

RP-O-1016). A copy of this Technical Note is provided in **Appendix A** to the current Report.

The large and increasing amount of site specific field data for soils and surface waters has provided further confirmation that the criteria, which is based on theoretical values, is conservative. This is indicated where chemical results for soil placed do not appear to deliver the modelled concentrations to the surface water. The undeveloped site is currently at a worst case scenario where rainfall is free to percolate through material that has not been reengineered. Reengineering and redevelopment will only reduce infiltration and mobilisation serving to improve the currently monitored conditions.

In 2016, geotechnical information relating to the permeability of the Made Ground was assessed (Atkins Ltd Permeability Infiltration Technical Note Ref: 5111373-LLA-OUT-0256, dated 15th December 2016), but this was not used in the model for the Atkins 2017 CWDQRA. A copy of this Technical Note is provided in **Appendix B** of the current Report. The Atkins Ltd Technical Note presented information on the characteristics of the reengineered ground. The earthworks specification for the placement of material (following the turnover to natural clay), requires particle size distribution (PSD) tests, density tests, compaction tests and air void tests on each layer to validate the material has been compacted sufficiently. The particle size distribution within the Made Ground is known to be well graded and when compacted, the permeability is assessed as having a low permeability/poor drainage potential. A number of falling head tests were undertaken within a reengineered plot, which returned failed test results. The reengineering therefore has a remediation/stabilising benefit, by creating a low permeability material and this can be validated by the geotechnical information already collected.

In contrast to the reengineered ground, the construction materials (6F2 piling mat & clean soils) placed above the Made Ground are likely to be of good drainage potential (if they are not, then they will only serve to further limit the downward migration of rainwater). The permeability of the construction materials/ piling mat will be assessed as part validation of the clean cover in accordance with the Technical Note 260 (Remediation Strategy - Appendix F, 18669-RLL-22-XX-RP-0260, CWDQRA Validation Plan June 2022).

The low permeability reengineered material inhibits the downward migration of infiltrated rainwater as the pore water in the construction material does not readily flow into the material with much reduced pore spaces (air voids <10%). Lowering the permeability of this material also greatly increases time taken by the perched water to travel within the material.

The engineered characteristics have two distinct remedial benefits as follows:

1. The volume of infiltrated water entering the body of reengineered Made Ground is reduced, therefore the volume of water exposed to mobile contaminants is also reduced;

2. The time taken for migration of the perched water within the reengineered ground is greatly increased and therefore, the volume of perched water reaching the surface water via this route is reduced, increasing the ratio of clean rainwater in the surface water reens. Where this passage is also through areas of cleaner reengineered Made Ground, there are likely to be benefits associated with increased contamination attenuation prior to reen discharge. These are the areas of the site where some retardation (degradation and/or sorption) of contaminants within the Made Ground is considered possible. On this basis it is proposed to place 'cleaner' Made Ground closer to the reens which are known to be the surface water receptors for the perched waters.

The Atkins CWDQRA, that generated the initial criteria, assumed that in areas of soft landscaping, 100% of the infiltrated rainwater (12.85mm per year or 1.3% of total rainfall) percolated through the construction material (imported top soils), and in to the Made Ground. This value takes account of estimated surface-water run-off (55% of total rainfall) and evapotranspiration (43.7% of total rainfall). It is considered likely that the lowest achievable, permeability of the post-development Made Ground is like to be in the region of ($1x10^{-7}$ m/s).

It was also apparent in the Atkins CWDQRA and Conceptual Site Model that although lateral drainage within the capping layer was anticipated, this wasn't accounted for in the earlier Atkins CWDQRA calculations, where it assumed that essentially all (1.3% of the total rainwater), passed into the underlying post-development Made Ground. It is therefore reasonable to assume that a reduction in infiltration into post-development Made Ground will be enabled by the placement of higher permeability ground surface construction materials (imported soils) and any possible introduced gradient within this layer which will encourage an element of lateral flow.

In order to gauge potential impacts on the existing calculated soil reuse criteria, a process of sensitivity analyses was therefore proposed using possible scenarios where 40% of the 12.85mm per year (5.14mm/year) or 5% (0.64mm/year) penetrates into the underlying post-development Made Ground. The 40% infiltration value has been adopted as it is still considered to represent a conservative value, but does reflect the increased compaction and reduction in air voids. This 40% value was developed through discussion with civil and geotechnical engineers on which might be reasonably achievable with these types of soils. This value is conservative and supported by Figure 4.2 (Appendix TN 272) of CIRIA 609 Sustainable Drainage Systems, Hydraulic, Structural and Water Quality Advice, London 2004. which shows 15% deep infiltration in a non engineered site. It has been assumed that the hydraulic gradient would favour flow through construction materials (at approximate rate of 1xE-3 m/s), particularly with a fall across the formation level. It has also been reasonably assumed that the silting of the pathways within the construction materials, over the course of time, would further reduce the ability of the infiltrated water to reach the re-engineered Made Ground.

It is recognised that this modelling is of a further potential reduction in what is already, apparently, a low rate of rainwater infiltration (1.3% of total rainfall). Reuse criteria would then be derived for the range of determinands as previously selected for the site (which are considered to remain reasonable), but it was proposed that these criteria additionally include; iron, manganese, cyanide, ammoniacal nitrogen and phenol, which would be modelled in the current RLE Report.

It was considered that the very low 5% (0.64mm/year) infiltration rate may not necessarily be achievable and is not taken further within the assessment, but was assessed as a mechanism to reflect distance from the surface water receptors (existing reens), and effectively represent a greater travel of infiltrated water. It was proposed that the findings should be superseded by modelled travel time parameters. A P20 assessment was undertaken as an additional line of evidence to model the distance at which point soil concentration source become incidental/ less significant in their contribution to the body of perched receiving surface water. The P20 has been used as a check in assessing what would be considered to be, realistic, achievable, soil reuse criteria.

1.3 Natural Attenuation from Site Features

It is also considered that there is a potential for natural attenuation benefits from further improving and expanding the existing surface water features on the site, which mainly comprise reens and ponds/small lakes. This is anticipated particularly through:

1. Further establishing the vegetation within the reens which will help reduce the concentrations of organic contaminants and particularly nutrients such as ammoniacal nitrogen. The reens are known to vegetate rapidly and require regular maintenance to remove surplus growth;

2. Undertaking organic matter enrichment of soils along margins of the reens and ponds/lakes into which water penetrating the Made Ground are likely to discharge. This could be undertaken by placement of locally excavated peat (obtained from Alluvial and underlying Tidal Flat Deposits) and other soils containing high concentrations of organic matter. This should enable a further stripping out of low concentrations of PAHs and TPH within these discharge waters. Amendment of these soils with other materials will also be considered, taking into consideration further knowledge of the residual contaminant profile, in order to provide a passive sustainable solution to the long-term remediation of this site.

1.4 Works to date

The preparation of the updated RLE DQCWRA was followed by a sitewide sampling exercise, of the insitu soils on a 25m grid and sampling of the stockpiles at a frequency 1 per 500m3. The sampling was undertaken, in early 2021, in accordance with the sitewide remediation strategy (Ref. 18669-RLL-21-XX-RP-O-015) prepared by RLL. The sitewide sampling exercise has allowed, using updated soil criteria, the assessment of whether the made ground is suitable for reuse on site, treatment or disposal. The works to date have comprised the excavation of approximately 300,000m3 of made ground unsuitable for reuse in the

residential area. The material, suitable for reuse in the commercial area, has been relocated for placement in the business park. The works have been undertaken in accordance with the On Site Reuse Material Management Plan.

The works to date have assisted in reducing source concentrations in the residential site and it is intended to collect information as part of the validation works to verify the improvement in site conditions.

A validation plan (Remediation Strategy - Appendix F, Technical Note 0260 CWDQRA Validation Plan) has been prepared to specify the monitoring information, relevant to the CWDQRA, to be collected for each phase. The post earthworks monitoring information is to comprise permeability testing (falling/rising head tests), and pore water concentration testing (sampling of the perched water) to compare field data with assumptions made in the CWDQRA assessment.

2.0 Site History and Environmental Setting

2.1 Site Setting

The Glan Llyn development site is located south of Llanwern, immediately east of Newport at National Grid Reference (NGR) ST 36101 86848. The site covers an area of approximately 243 ha which comprises previously developed land (Section 2.2). The site is bound to the north by a railway line and to the south by Queen's Way (A4810). The operational Tata steelworks is located adjacent to the eastern boundary and a north-south drainage ditch borders the western boundary, beyond which lies Newport Retail Park. A plan showing the site's location is presented on Drawing 18669-RLE-19-XX-DR-O-0004. The site is proposed to be redeveloped as a mixed residential and commercial development (Drawing8111-008-A0111). Residential development is proposed for the majority of the site, whilst commercial development is limited to the Celtic Business Park area in the east of the site (Drawing 8111-008-A0111). A copy of this Drawing is provided to the rear of this Report.

2.2 Site History

Details of the documented site history are provided in the above-noted Atkins CWDQRA Report dated February 2017. However, in summary, the site was extensively developed as a steelworks by Richard Thomas and Baldwins Ltd in the 1960s. Prior to construction, marshland and arable farmland within the site boundary was subject to significant land raise and engineering to bring ground level to current levels. Within the confines of the development site, steelworks ancillaries included but were not limited to; mineral stockyards, blast furnaces, offices, railway sidings, a 'Bit Mac' plant and coking works. Steel making operations ceased in the western half of the steelworks site in 2001, with the majority of infrastructure demolished in 2004, following land transfer to St. Modwen Developments Ltd.

It is much of the material used as part of this pre-development land raise, together with demolished former steelworks buildings and structures that comprise the existing Made Ground across the site, which will be subject to the proposed reengineering and compaction works associated with this redevelopment.

Approximately 20% of the development has been completed up to August 2019, including near completion of two residential phases (Phase 1 & Phase 2), the construction of two commercial units (Amazon & CAF), the park and a pub within the Western Sub Area.

2.3 Geology

2.3.1. Published Geology

The BGS GeoIndex (BGS, 2016a) indicates that Superficial Tidal Flat Deposits comprising clays and silts underlie the areas of interest. The BGS Lexicon of Named Rock Units (BGS, 2016b)

describes these deposits as: *'normally a consolidated soft silty clay, with layers of sand, gravel and peat. Characteristically low relief; from the tidal zone'* Bedrock geology underlying the areas of interest comprises mudstones of the Mercia Mudstone Group (BGS, 2016a); the BGS Lexicon of Named Rock Units (BGS, 2016b) describes the Mercia Mudstone as: *'dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite* [are] *widespread, sandstones are also present.'* Given the history of development within the areas of interest, it is anticipated that a layer of Made Ground will be present across the proposed developments.

2.3.2. Local Geology

The Glan Llyn development site benefits from several phases of GI and the ground model for the site is well constrained. For ease of discussion and brevity, a summary of local geology underlying the site is presented in Atkins Table 2-1 below (reproduced from their February 2017 Report). However, a full discussion of local geology within each development phase is presented in the respective "Ground Investigation and Ground Conditions" section of the geo environmental reports (Atkins; 2015b, 2015c, 2015d). Boreholes drilled as part of the 2016 CWRA Ground Investigation (IFA, 2016) confirm the presence of Made Ground, Tidal Flat Deposits and Bedrock across the site, as outlined in Table2-1 below.

Table 2-1 Summary of Local Geology (Atkins, 2015 a)

Geological Unit		Indicative Geological Composition	Approximate Thickness
Topsoil		Soft brown slightly sandy clay.	Nominal thickness, only locally
Made Ground	Made Ground 1	Grey occasionally clayey, sandy gravel of and angular to sub-angular fine to coarse slag with occasional tarmac, concrete, brick, limestone and ceramic / fused slag.	0.02 2.6 m
	Made Ground 2	Red brown / brown clayey sandy gravel (locally gravelly sand) with cobbles and boulders	
	Made Ground 3	Red brown / brown soft to firm sandy gravelly clay with cobbles and boulders. Gravel includes sub-rounded to angular fine to coarse burnt shale, brick, slag, sandstone, mudstone, shale and occasional coal.	
Tidal Flat Deposits	Upper Tidal Clay	Generally very soft to firm blue grey slightly gravelly silty clay with rare localised pockets of peat.	7 – 10 m (IFA, 2016)
	Upper Peat	Generally a spongy dark brown occasionally clayey pseudo-fibrous to fibrous peat.	
	Lower Peat	Generally a spongy to plastic dark brown occasionally clayey occasionally sandy pseudo-fibrous to amorphous peat.	
	Lower Tidal Clay	Generally described as a soft to firm bluish grey slightly sandy slightly gravelly clay gravel is of angular to sub-angular fine to medium sandstone.	
	Red Clay	Generally described as a firm to stiff red brown mottled grey slight gravelly clay, gravel is angular to sub-angular fine to coarse mudstone.	
	Basal Sand	Generally a medium dense light brown slightly silty slightly gravelly fine grained sand the gravel is of sub-rounded to sub-angular fine siltstone and quartzite.	
Bedrock	Mercia Mudstone Group	Weathered Mercia Mudstone being described as stiff to very stiff reddish brown slightly gravelly clay and extremely weak to weak occasionally laminated red brown mudstone.	Encountered, thickness not proven

2.3.3 Post-development Ground Conditions

The post-development ground conditions on site are as detailed in Table 2-2 below. Existing Made Ground is to be excavated and re-compacted to comply with the Atkins geotechnical specification for the development (Atkins, 2016b). In addition, it was proposed that a 1 in 100 gradient (0.01) be applied to the surface of the Made Ground to prevent ponding and promote lateral drainage within the construction materials.

Potential further mitigation to promote lateral flow that may be considered is the provision of a drainage blanket to cap the reengineered material and increasing the fall from the centre of a plot to periphery.

Table 2-2 Post-Development Ground Conditions

Unit	Approximate Thickness	Description
Impermeable Construction Materials/ Housing Sub-base/Permeable Topsoil	0.6 m	Imported clean topsoil/construction materials
Piling Mat*	0.5 m	Imported 6F2 (*may be included within 600mm of construction materials)
Made Ground	1.5 – 2.0 m	Excavated and re-compacted Made Ground
Tidal Flat Deposits	7.0 – 10.0 m	No change from current conditions
Bedrock (Mercia Mudstone Group)	>1,350m	No change from current conditions

2.4 Hydrogeology

The following details are based upon information presented in the Atkins 2017 Report, and reviewed again prior to preparation of the current update.

2.4.1. Published Hydrogeology

Groundwater maps previously available on the Environment Agency website (Atkins, 2015a) show that the Mercia Mudstone bedrock deposits below the proposed developments are classified as a Secondary B Aquifer. The Environment Agency define a Secondary B Aquifer as being: *'predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.'*

The Tidal Flat Deposits are classified as non-productive strata which are defined by the Environment Agency as being: *'deposits with low permeability that have negligible significance for water supply or river base flow'.*

It is understood from investigations carried out by Atkins that the Environment Agency website indicated that there were no groundwater abstractions within 1 km of the proposed developments. Information presented on the GroundSure Enviro Data Viewer website (http://groundsure.io/), accessed August 2019, indicates that the Site is not located within a Groundwater Source Protection Zone (SPZ).

2.4.2. Local Hydrogeology

A site-wide programme of monthly groundwater level monitoring was undertaken from May to November 2016 in the shallow and deep wells installed during the CWRA GI (Drawing 5111373-LLA-DWG-EG-0295) to inform the hydrogeological conceptual site model. A copy of this Drawing is provided in the Appendices to the current Report.

This monthly monitoring was subsequently continued until 2017.

A summary of groundwater levels recorded in the deep and shallow wells were presented in Appendix A of the Atkins 2017 CWDQRA Report and are reproduced in the current Report (**Appendix C**). It is indicated that groundwater level monitoring and water strike data recorded during the Ground Investigations (GI) of each site development phase, were presented in the "Ground Investigation and Ground Conditions" section of the relevant geo-environmental Report (Atkins; 2015b, 2015c, 2015d); and are summarised in the CWRA Position Statement (Atkins, 2015a).

It was considered that groundwater levels recorded during the CWRA GI and subsequent monitoring suggested that the groundwater is present beneath the proposed development as follows (Atkins, 2015a):

- Shallow / perched groundwater within the Made Ground (shallow boreholes); and
- Groundwater within the Tidal Flat Deposits (confined to the basal sand layers) and Mercia Mudstone (deep boreholes).

Groundwater monitored within the deep boreholes was considered to be primarily derived from the bedrock geology, and hydraulic continuity between the upper perched shallow groundwater and 'regional' groundwater was considered likely to be limited. Post-development, the excavation and re-compaction of the Made Ground was recognised as likely to reduce its permeability, lowering still further, the hydraulic continuity.

The permeability of the reengineered material based on the compaction necessary to attain the requirements of the specification is likely to consistently achieve low permeability or poor drainage characteristics. This is likely to be a permeability of 10^{-7} m/s.

Downward percolation of water through the Tidal Flat Deposits was considered to be limited due to the low permeability of the clay-rich strata. This is likely to cause water to accumulate within the overlying Made Ground. Regional groundwater within the Basal Sands of the Tidal Flat Deposits and Mercia Mudstone bedrock is confined by the overlying clay within the Tidal Flat Deposits and is under sub-artesian pressure (Atkins, 2015a). These conditions are further confirmed by the presence of water strikes consistent with the top of the Mudstone/Basal Sands which rose several metres within a short time period (IFA, 2016).

Where the piezometric level in the regional aquifer is higher than shallow perched water then the shallow perched water system is likely to be hydraulically contained with limited downward leakage permitted. However, it is unknown how groundwater conditions will change throughout the hydraulic year within the post-development site. As outlined by Atkins (2015a), during hydraulic conditions where the piezometric level is below the level of the shallow perched water, slow downward migration of this water through the Tidal Flat

Deposits is to be expected. Table 2-4 of the Atkins 2017 CWDQRA Report, below (reproduced from their February 2017 Report), presents deep – shallow groundwater levels (mAOD) for the available groundwater level data across the site. It was indicated by Atkins that based on a review of the water levels in the deep and shallow borehole pairs, there are examples of both conditions being present at the proposed development site during all 2016 monitoring rounds. It was indicated that the majority of differences between piezometric levels are less than half a metre across the site, with only four occurrences where shallow piezometric levels are at or greater than 1.00m than deep levels (BH05 03/11/16, BH06 03/11/16, BH21 05/10/16 and 07/07/16, BH30 05/10/16).

Table 2-4 Deep and Shallow Groundwater Level Comparison

Deep Borehole	Shallow Borehole	Deep Groundwater Level (mAOD) – Shallow Groundwater Level (mAOD)*						
		10/05/2016	06/06/2016	07/07/2016	02/08/2016	01/09/2016	05/10/2016	03/11/2016
CWCP-03	CWWS-03	0.195	0.005	-0.145	0.035	-0.025	n/a	-0.305
CWCP-04	CWWS-04	-0.264	-0.764	-0.664	-0.584	-0.544	n/a	-0.774
CWCP-05	CWWS-05	0.181	-0.819	n/a	-0.429	-0.659	-0.769	-1.069
CWCP-06	CWWS-06	n/a	n/a	n/a	-0.336	n/a	n/a	-1.186
CWCP-07	CWWS-07	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-08	CWWS-08	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-09	CWWS-09	0.018	-0.682	-0.982	0.068	-0.162	-0.122	-0.432
CWCP-10	CWWS-10	-0.089	n/a	n/a	-0.279	-0.389	-0.399	-0.419
CWCP-11	CWWS-11	0.048	0.018	-0.012	-0.092	0.018	-0.032	-0.012
CWCP-12	CWWS-12	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-13	CWWS-13	-0.904	-0.834	-0.984	-0.844	-0.894	-0.774	-0.864
CWCP-14	CWWS-14	0.008	0.078	-0.022	-0.112	-0.002	-0.212	-0.132
CWCP-15	CWWS-15	0.078	0.118	0.668	-0.032	0.178	-0.242	0.108
CWCP-18	CWWS-18	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-19	CWWS-19	-0.112	-0.072	-0.232	-0.082	-0.182	-0.252	-0.112
CWCP-20	CWWS-20	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-21	CWWS-21	-0.93	-0.77	-1.06	0.34	-0.82	-1.18	n/a
CWCP-22	CWWS-22	-0.818	0.152	0.002	0.682	0.232	-0.088	-0.048
CWCP-23	CWWS-23	0.526	0.596	0.856	0.146	0.036	0.036	0.026
CWCP-24	CWWS-24	0.607	0.127	0.117	-0.013	0.127	n/a	-0.253
CWCP-25	CWWS-25	-0.617	-0.257	-0.247	-0.397	-0.337	0.553	-0.637
CWCP-26-e	CWWS-26-e	-0.006	0.014	-0.196	-0.116	-0.156	-1.196	-0.206
CWCP-26-w	CWWS-26-w	0.525	0.365	0.345	0.325	0.155	0.675	-0.305
CWCP-27	CWWS-27	n/a	-0.09	-0.1	-0.17	-0.15	-0.31	-0.36
CWCP-28	CWWS-28	0.189	0.069	0.039	-0.021	0.179	0.069	0.219
CWCP-29	CWWS-29	-0.193	-0.363	-0.413	-0.263	-0.383	0.487	-0.553
CWCP-30	CWWS-30	0.38	0.17	0.15	0.2	-1	0	0.13
CWCP-31	CWWS-31	-0.298	-0.328	-0.398	n/a	-1.088	-0.388	-0.508
CWCP-32	CWWS-32	-0.562	-0.452	-0.552	-0.702	-0.702	-0.562	-0.552
CWCP-34	CWWS-34	n/a	n/a	n/a	n/a	n/a	-5.468	n/a
CWCP-35	CWWS-35	-0.27	-0.47	-0.47	-0.36	0.6	-0.51	-0.44
CWCP-36	CWWS-36	n/a	-0.165	-0.295	n/a	-0.385	n/a	n/a

*n/a indicates no two corresponding samples available for comparison (i.e. dry borehole/no data), where value is negative deep groundwater levels are lower than shallow, positive values indicate deep groundwater levels above shallow.

Further analysis of regional groundwater data (13/10/2015) from the boreholes installed into the bedrock geology was undertaken in the CWRA Position Statement (Atkins, 2015a). Deep groundwater contours produced suggest a regional groundwater flow direction towards the south and south east towards the estuary of the River Severn, which is broadly expected. This is confirmed by analysis of recent groundwater level monitoring data.

Review of the shallow perched water system indicates that it is likely to be extremely complex with no discernible single flow direction (Atkins, 2015a). The Made Ground is known to be highly heterogeneous (Table 2-1), resultant flow of perched water is likely to be discontinuous and tortuous through permeable and connected pathways only. In addition, flow within the Made Ground is fragmented across the site by the extensive network of surface water drainage ditches (reens) across the site (Section 2.5.1); it is anticipated that flow converges towards these surface water features where permeable pathways exist within the Made Ground. As a result of natural clay lining of the reens around the periphery of the site (Section 2.5.1), no lateral hydraulic connection exists between the Made Ground onsite and surrounding superficial deposits.

2.4.2.1. Hydrogeological Properties

Capping Drainage Layer

The gravels of the capping drainage layer are expected to have a permeability of approximately 1x10-3 m/s (Freeze and Cherry, 1979), assuming the material to have good drainage characteristics consistent with a clean gravel/sand (Atkins, 2016b).

Made Ground

It was indicated by Atkins, that soakaway tests undertaken within the re-engineered Made Ground onsite (in accordance with BRE 365 (BRE, 2007)) produced very little seepage and therefore analysis of results was not possible. It was noted that composition of the Made Ground as indicated by Particle Size Distribution (PSD) laboratory tests approximate the hydraulic conductivity of the post-development Made Ground at 1x10-7 m/s (Atkins, 2016b). It was therefore indicated that the assigned hydraulic conductivity of the re-engineered Made Ground be based on the values included within Barnes (2010) for a material with poor drainage characteristics as indicated by the soakaway tests. It was noted that this value is consistent with previous analysis undertaken by Atkins. The results of these tests are presented in Table 2-5, as reproduced below.

Table 2.5: Properties of the Re-engineered Made Ground

Made Ground	PSD No./ Average	BRE Soakaway Test Result	Adopted Permeability(*k*)
Test 1	102 No./ 11% fines, 22% sand, 62% gravel, 5% cobbles	Fell 4mm in 3hrs	1 x 10^{-7} m/s
Test 2		Fell 20mm in 2hrs	1 x 10^{-7} m/s

2.5. Hydrology

2.5.1. Surface Water Features

It was previously indicated by Atkins that, the surface water drainage onsite comprises several man-made surface water drainage ditches (reens) cut into the natural clay which divide the site north to south, receiving water from the land to the north in addition to onsite drainage and baseflow. A maximum channel flow of 10.64 l/s was previously recorded at sampling location D5N. The reens are connected to east-west drains which run the length of the site along the A4810 (Queen's Way Road) within 50m from the southern boundary and the northern carrier drain within the site adjacent to the northern boundary(Drawing 5111373-LLA-DWG-EG-0408); ultimately discharging to the water treatment works at the operational Tata steelworks to the east. Drawing 5111373-LLA-DWG-EG-0408 depicts the current surface water drainage onsite and indicates sampling locations.

Monks' Ditch, a main river (Waterbody ID GB109056026850) crosses the site flowing north to south. The river flows across the site in a fully contained deep piled concrete channel approximately 7 m wide and 3 m deep (Rodgers Leask, 2016) before crossing the Gwent Levels to the south as a natural channel (Section 2.5.3) and discharging to the Severn Estuary via a tidal exclusion gate. A number of reens and watercourses controlled and maintained by Cyfoeth Naturiol Cymru / Natural Resources Wales (CNC/NRW) surround the site and are described in the surface water drainage strategy (Rodgers Leask, 2016).

A comprehensive surface water drainage strategy for the site has been developed by Rodgers Leask (2016), considering areas already developed (Western Sub Area and parts of the Celtic Business Park) and those yet to be developed. The strategy outlines the sustainable surface water management planned for the finished development. Approximately 399,000 m3 of storage is planned within the site, taking the form of an extensive network of blueways/reens, lakes and Sustainable Drainage Systems (SuDS), receiving all surface water runoff from the site. A post-development surface water drainage plan is presented in Drawing D12- 084-512 and summarised below:

- Blueways (Reen 1, Reen 2, Julian's Reen, Ellen Reen, East Lake Reen, King's Wall Reen and Celtic Business Park Reens) – primary surface water channels comprising existing and newly created reens which will be engineered to flow south to north across the site, culminating in a west-east channel adjacent to the northern boundary of the site, from which water will be discharged to Monk's Ditch. Reens within the site boundary will be unlined (other than being cut into the underlying clay to achieve the required invert level therefore the base and deeper parts of banks will be formed in the natural clay);
- Greenways – high level dry, shallow ditches intended to channel overland surface water from the development plots into the blueways;
- Lakes – a number of lakes and ponds are anticipated to be connected to the blueway system to provide amenity with some additional storage for surface water runoff; and
- Monks' Ditch – surface water from the site is proposed to be pumped to the Main River at a maximum flow rate of 750 l/s as specified by CNC/NRW.

The strategy as submitted (Rodgers Leask, 2016), states that discharges to Monks' Ditch will be allowed once the specified quality criteria and quality control systems have been

established and are met, until that point discharges to the Tata system will continue from the development site.

2.5.2. Rainfall

In the absence of an onsite rain gauge, rainfall data used within the Atkins 2017 CWDQRA assessment was taken from MAFF (1976) for the area surrounding Newport. Literature values for annual total rainfall, (953 mm, MAFF, 1976) are comparable to available data from nearby CNC/NRW rain gauge at Newport for the year 2015 (945 mm).

2.5.3. Designated Areas

Gwent Levels (Nash and Gold Cliff) Site of Special Scientific Interest (SSSI) encompasses the area between the southern site boundary and the Severn Estuary and comprises a large area of ancient grazing marshes, farmed wetland, and reens. The area is part of a series of adjoining SSSI designated for their wildlife and archaeology; specifically water beetles and dragonflies found in the reens, farmland birds, and brown hare, otter and water vole.

3.0 Conceptual Site Model

3.1 Introduction

A Conceptual Site Model (CSM) was previously prepared for the Glan Llyn site, as a whole. It was indicated that the CSM, which was considered to be representative of the site in an un-remediated, undeveloped scenario, considered all available geological and hydrogeological information relating to the proposed development to produce a CSM upon which a detailed assessment of the risk to Controlled Waters could be assessed. Risks to Human health via inhalation, direct ingestion or dermal contact of soils did not form part of the CSM. Again, it is recommended that the relevant chapter of the Atkins Report is read in conjunction with this section of the current Report. However, much of the earlier CSM is presented again below for convenience.

3.2 Potential Sources of Contamination

The following potential sources of contamination were identified with respect to Controlled Waters considering the available historical and recent data for the site:

The Made Ground, which was historically used to build up the level of the site was known to include imported waste products (slag, concrete, brick, burnt shale) from other steelworks in addition to natural deposits (Table 2-1).

Chemical compounds which have the potential to contaminate the ground outlined by the Department of Environment (DoE, 1995) as being associated with metal production industry are: metals and metalloids, inorganic compounds, acids and alkalis. Contaminants, particularly related to coke-making include; PAHs, cyanides, ammoniacal liquors, sulphur and sulphates, BTEX VOCs and also include petroleum-based fuels and oils. Contaminants of Concern (CoC) are presented in Section 5.1.1.

It was noted by Atkins that groundwater within the bedrock has previously been impacted by contaminants associated with the former steel producing industry formerly located on this site. However, given the direction of the groundwater flow and the location of elevated concentrations a link between the steelworks as a source and regional groundwater could not be confirmed.

3.3 Potential Receptors

Receptors relating to Controlled Waters are identified to comprise:

- Monks' Ditch (into which surface water from the development site is pumped);
- Engineered surface water reens onsite;
- Perched groundwater within the Made Ground;
- Groundwater within the Tidal Flat Deposits Unproductive Strata; and
- Mercia Mudstone Secondary B Aquifer.

It was indicated that the Made Ground and Tidal Flat Deposits (unproductive strata) are not considered to be a Controlled Waters receptor in the context of the assessment due to their anticipated low resource potential. The post-development surface water reens within the site were not considered to be Controlled Waters given the artificial nature of their origin and the fact that discharge from this system will always be entirely managed by on site pumping stations. The reens are therefore treated as part of the engineered water management system in the same way that SuDS features are on many developments.

Monks' Ditch, as a Main River, was considered to the principal receptor for any Controlled Waters impact at the site.

3.4 Potential Pathways

Potential Controlled Waters pathways were identified as follows:

Leaching of soil-borne contamination in Made Ground and subsequent lateral migration through permeable pathways in Made Ground to Monks' Ditch via onsite reens.

No effective pathway was identified between the shallow groundwater in the Made Ground and the deep groundwater within the Mercia Mudstone Secondary B Aquifer, due to the low permeability of the clay-rich Tidal Flat Deposits.

3.5 Potential Pollutant Linkages

It was assessed that contamination present within the Made Ground onsite is anticipated to directly leach into the underlying perched shallow groundwater via infiltration and diffusion. The degree of leaching from the source materials present within the Made Ground is a function of portioning to the soil matrix and volatilisation potential to the gaseous phase. Little dilution was anticipated to occur within the Made Ground as the site was considered to be hydraulically isolated from the surrounding superficial deposits by reens formed in the natural clay, preventing inflow of uncontaminated groundwater. The base of the reens are also known to be excavated into the clay-rich Tidal Flat Deposits.

The prevailing flow of perched groundwater was anticipated to be separated along the central north-south divide of each sub-area, flowing laterally to the adjacent reen following the slope of the Made Ground (Section 2.3.3). Groundwater flow was considered to be able to move laterally within the Made Ground without impedance. However, it is recognised that areas of low hydraulic conductivity are likely to exist in the Made Ground (i.e. due to the presence of silts and clays), which will baffle flow locally and prevent bulk advection of contaminants.

It was assumed that no dilution occurs within the shallow groundwater in the Made Ground and that concentrations of contaminants reach equilibrium. Substantial dilution will occur within the reens as groundwater mixes with surface water runoff from the site.

Water in the reens is proposed to be physically pumped into the Controlled Waters receptor, Monks' Ditch; details of which are outlined in the Surface Water Drainage Strategy (Rodgers

Leask, 2016). Currently it is understood that the surface water discharge from site flows into the Tata surface water system and is controlled and discharged as part of their industrial discharge consent.

As previously outlined, due to the low resource potential and low permeability nature of the Made Ground, Tidal Flat Deposits and Mercia Mudstone, in addition to the restricted pathway between shallow and deep groundwater, no credible groundwater receptors were realised. A diagrammatic CSM was prepared, which has been reproduced by RLE (dated 05/07/19) and is provided in **Appendix D**.

4.0 Contamination Data Assessment

4.1. Water Quality Standards

The CSM identified Monks' Ditch as a Controlled Waters receptor for the site. Therefore, the annual average Inland Surface Waters EQS applicable under the Water Framework Directive was adopted as the primary WQS (DEFRA/Welsh Ministers, 2015). Where a value was not available for a particular element or compound, then the following standards were used in order of preference:

- EU Statutory EQS (Protection of Surface Water Quality) (Council Directive 2000/60/EC);
- UK Statutory EQS (Protection of Aquatic Life) (Council Directive 76/464/EEC);
- UK Non-statutory EQSs (Protection of Aquatic Life) (Council Directive 76/464/EEC) and;
- UK Drinking Water Standard (DWS) (Water Supply (Water Quality) Regulations, 2000).

There are no current UK WQS for TPH; however, a concentration of 0.01 mg/l was used, which is based on the UK DWS in the former 1989 regulations (Water Supply (Water Quality) Regulations, 1989).

It is considered upon further review that the EQS Values for Controlled Water as applied in the earlier Atkins 2017 CWDQRA, still remain appropriate for this site, and therefore have remained unchanged in the current Revision.

4.2 Soil Quality Assessment Methodology

To determine the potential impacts through leachability of the existing insitu Made Ground, derivation of Screening Values (expressed as mg/kg) was undertaken for a range of determinands using the Environment Agency calculation provided in their Remedial Target Worksheet (Level 1 Soils), using, where possible, site specific data. These Screening Values have been utilised in the current RLE assessment. Details as to the methodology utilised are provided in Section 4.2 and Equation 1 of the calculations presented in **Appendix L**. It is recommended that this methodology employed be read in conjunction with the current Report.

4.3 Atkins Earlier Findings from July 2015 to September 2016

A review of the earlier findings obtained by Atkins was carried out as part of the current RLE CWDQRA. For greater detail of these findings, reference should be made here to the earlier Atkins 2017 CWDQRA Report. However, in summary:

4.3.1 Soils

From analyses of 243 (No.) samples of Made Ground recovered from unremediated stockpiles across the site, it was noted, upon comparison, that total concentrations of determinands (which included metals, petroleum hydrocarbons and PAHs), were found in

many of these samples, to exceed their respective calculated Level 1 Soils Screening Values, based upon application of the proposed site specific EQS Values for Controlled Waters. The full results are presented in Appendix B of the earlier Atkins 2017 CWDQRA Report.

4.3.2 Soil Leachates

114 (No.) soil leachates were also generated from samples of Made Ground recovered. It was noted that upon analyses for an appropriate suite of inorganic determinands (mainly metals), and upon comparison with the proposed site specific EQS values, that a number of these (particularly chromium, copper and vanadium), were also found in many of these samples to exceed the respective EQS values. The full results are presented in Appendix B of the earlier Atkins 2017 CWDQRA Report.

4.3.3 Groundwater Samples

Concentrations of a range of metal determinands, consistent with the former usage of the site in the metal production industry, were also analysed in shallow and deep groundwater samples recovered from boreholes installed across the site. The full results are presented in Appendix C of the earlier Atkins 2017 CWSQRA Report. In view of the relative degree of hydraulic isolation of the shallow and deep groundwater horizons present across the site, these findings were considered separately.

4.3.3.1 Shallow Groundwater Horizon Samples

These samples were considered to be representative of groundwater in contact with existing Made Ground present on the site.

A total of 68 (No.) samples were recovered from the shallow groundwater within the Made Ground across 24 locations during May, June and July 2016 based upon a specification presented in an earlier monitoring strategy (Atkins, 2016a). The WQS standards adopted for groundwater quality screening are as outlined in Section 4.1 of the Atkins 2017 CWDQRA Report, and a summary of exceedances is presented in Table 4-3 of the same Report as it was determined that the LoD (limit of detection) was greater than or equal to the WQS for many of the determinands, for screening purposes exceedances were only considered for samples where analytical results were found to be above the LoD.

It was noted that, as expected, the determinands in exceedance of the WQS in the soil samples (consistent with those associated with the metal production industry (DOE, 1995)) are also reflected in the results of analyses of the shallow groundwater samples.

A review and discussion of the results of analyses of shallow groundwater samples is presented below, together with consideration of the results of more recent (post 2017) monitoring and analyses.

4.3.3.2 Deep Groundwater Horizon Samples

A total of 138 (No.) samples were recovered from the deep groundwater within the Tidal Flat Deposits and underlying Mudstone across 47 locations during May, June and July 2016 based upon a specification presented in an earlier monitoring strategy (Atkins, 2016a). Again, as the LoD was greater than or equal to the WQS for many of the determinands, for screening purposes exceedances were only considered for samples above the LoD. A summary of WQS exceedances is presented in Table 4-4 of the Atkins 2017 CWDQRA Report.

4.3.4 Surface Water Quality

It was indicated that surface water quality data was collected monthly from the reens and ponds onsite based upon a specification presented in an earlier monitoring strategy (Atkins, 2016a). A total of 104 (no.) samples were collected from June to November 2016 and were screened as outlined in Section 4.1 of the Atkins 2017 CWDQRA Report. Again, as the LoD was greater than or equal to the WQS for many of the determinands, for screening purposes exceedances were only considered for samples above the LoD.

4.3.4.1 Onsite Surface Water Quality

Of the 104 (No.) samples, 94 (No.) were from onsite. The determinands detected above the WQS within the onsite surface water samples were considered to be broadly consistent with those identified within the soil samples (Table 4-1 of the Atkins 2017 CWDQRA Report). Cyanide, iron, manganese, SVOC and VOCs were in exceedance of the WQS in the surface water, however they were not tested for in the soil samples, so a comparison may not be made.

Upon further review of the results obtained, it may be noted that:

67% exceeded the ammoniacal nitrogen WQS;
6% exceeded the total cyanide WQS;
4.3% samples exceeded the copper WQS, where bioavailable copper is considered only;
5.4% exceeded the vanadium WQS;
6.5% exceeded the nickel WQS.

4.3.4.2. Monks' Ditch Surface Water Quality

Of the 104 (No.) samples recovered, 10 (No.) were from the Monks' Ditch monitoring locations (MD-N and MD-S). The exceedances of the WQS present within Monks' Ditch were presented in Table 4-6 of the Atkins 2017 CWDQRA Report. It was indicated that the exceedances reported were spread across all samples and collection dates. As the Monks' Ditch is understood to be hydraulically isolated as it flows through the Glan Llyn Llanwern Site, then assuming that this is the case, then it may be inferred that where elevated concentrations of contaminant determinands are recorded, then these are likely to have originated from an offsite up-gradient/up-flow source.

4.4 Assessment of Data from 2017 Onwards

4.4.1 Soils

Subsequent soils analyses (post 2017) have been undertaken on samples recovered from across the site, over a period from 01/05/17 to 03/04/19, with a total number of 1806 (No.) samples being analysed. The results of analyses screened against the 40% infiltration value for residential and commercial are provided in **Appendix E**. The locations of the samples are shown on drawing 186669-RLE-22-XX-DR-O-0254 (CWRA Assessment Soil Samples Location Plan) in **Appendix F**. From analyses of 1806 (No.) samples of Made Ground recovered from unremediated ground across the site, it may be noted again, upon comparison, that total concentrations of determinands (which included metals, petroleum hydrocarbons and PAHs), may be found in many of these samples, to exceed their respective calculated Level 1 Soils Screening Values, based upon application of the proposed site specific WQS Values for Controlled Waters.

4.4.2 Soil Leachates

Subsequent soil leachate analyses have been undertaken on samples recovered from across the site, over a period from 01/06/18 to 11/04/19, with a total number of 1121 (No.) samples being analysed for metals. The results of analyses are provided in **Appendix G** of the current Report. Details of specific areas of the site where these samples have been recovered are presented in **Appendix F.** It was noted that upon comparison of metals results with the proposed site specific WQS values, that a number of these, again, particularly; arsenic, chromium, copper, vanadium and to a lesser extent; lead and zinc, were also found in a significant number of these samples to exceed their respective WQS values. It should be recognised, however, that the laboratory preparation of leachate samples produces results which will tend to be conservative and of limited relevance where shallow surface water quality results are available (as in the case of this site), for comparison purposes.

However, it is noted that of the samples analysed:

- 83% exceeded the arsenic WQS;
- 54% exceeded the chromium WQS;
- 86% exceeded the copper WQS;
- 66% exceeded the nickel WQS;
- 76% exceeded the selenium WQS;
- 92% exceeded the vanadium WQS;
- 42% exceeded the lead WQS;
- 66% exceeded the zinc WQS;
- A low to very low number of exceedances for BTEX VOCs were recorded;
- No samples exceeded the respective WQS values for PAHs;
- No samples exceeded the respective WQS values for TPHs.

4.4.3 Groundwater

No additional groundwater monitoring samples have been recovered.

4.4.4 Surface Water Quality

4.4.4.1 Onsite Surface Water Quality

A further significant volume of additional data has been obtained from monitoring of the quality of surface waters across the site, with a total number of 998 samples being recovered over a period from 06/03/2018 to 30/04/19. The results of analyses are provided in **Appendix H** of the current Report. It is noted that of the samples analysed:

- 63% exceeded the ammoniacal nitrogen WQS;
- 3.4% exceed the free cyanide WQS;
- No samples exceeded the copper WQS where bioavailable copper is considered only;
- 25.5% exceeded the vanadium WQS
- No samples exceeded the nickel WQS where bioavailable nickel is considered only;
- 4.3% of samples exceeded the TPH WQS;
- 90% of samples exceeded their WQS for a range of PAHs.

4.4.4.2 Monks' Ditch Surface Water Quality

Of the 104 (No.) samples taken, 48 (No.) were from the Monks' Ditch monitoring locations (MD-N and MD-S). The flow direction is from MD-N to MD-S, in a southerly direction.

It may be noted that for the MD-N location:

- 16% exceeded the ammoniacal nitrogen WQS;
- 4% exceeded the aliphatic TPH (C_{21}-C_{35} aliphatic carbon chain) WQS;
- 88% of samples exceeded their WQS for a range of PAHs;
- Exceedances were noted for a range of metals in unfiltered samples, but did not exceed their respective WQS in filtered samples and corrected for bioavailability;
- pH values recorded ranged between 7.80 and 8.24 and were within the proposed WQS range.

It may be noted that for the MD-S location:

- 39% exceeded the ammoniacal nitrogen WQS;
- 83% of samples exceeded their WQS for a range of PAHs;
- Exceedances were noted for a range of metals in unfiltered samples, but did not exceed their respective WQS in filtered samples and corrected for bioavailability;
- 22% of samples exceeded the proposed WQS range for pH. Values recorded ranged between 7.54 and 9.68.

4.5. Discussion of Results

4.5.1 Surface Waters

4.5.1.1 Inorganics

Compared to earlier data, there appears to be a significant increase in the number of surface water samples analysed which exceed the vanadium WQS concentration. It is known that

vanadium becomes concentrated (between 2-3% mass) in BOF- (basic oxygen furnace slag). This is considered likely to be the vanadium source (particularly vanadium dicalcium silicate phases), with vanadium leaching out into surface waters, as the slag weathers. Vanadium concentrations were noted to be particularly elevated in surface water samples recovered from position R4C, and to extent in R1C. Vanadium concentrations appear to become more diluted/attenuated as surface water drains towards Surface Water Pumping Station No. 2. However, it appears that the vanadium precipitates out, as pH values tend to lower (become more neutral) and some incorporation with iron oxyhydroxides (particularly goethite) which are another slag weathering by-product takes place.

There appears to be no obvious increase or decrease in recorded concentrations of metal determinands within upstream reens and positions downstream within the Kings Wall Reen. However, cyanide concentrations appear to increase downstream within the reen system, possibly as leached contributions are made from deposited wastes associated with the former coking works located within the northern central section of the site. However, there is evidence for decrease again in cyanide concentrations, further downstream, potentially due to complexation with metals such as iron and nickel, particularly in the higher pH conditions which are likely to prevail. There is also noted to be evidence of a possible contribution here from ammoniacal liquors associated with the former coking works.

When iron concentrations are compared, it may be noted that in post 2017 samples analysed, only 0.5% of the samples exceeded WQS values for filtered samples whilst 22% exceeded the WQS in unfiltered samples. This suggests that iron is flocculating/precipitating out as the leached solution becomes more oxygenated. Within the reens, this iron precipitation as an oxi-hydroxide is likely to take place contemporaneously with the dissolved vanadium.

When compared with earlier results obtained by Atkins prior to 2017, the number of WQS exceedance for concentrations of ammoniacal nitrogen remain largely unchanged (63% exceeding WQS) in post-2017 data, although some concentration values were found to be more elevated in recently obtained surface water samples.

The number of WQS exceedances for cyanide in post-2017 data appear comparable to those obtained by Atkins pre-2017.

4.5.1.2 Organics

Although there are a slightly higher proportion of surface water samples recovered from across the site, more generally, that exceed the WQS for PAH concentration (over 90.58% exceed the WQS for fluoranthene), it is also noted that for water samples recovered from the Monks' Ditch, which is understood to be hydraulically isolated from the Glan Llyn Llanwern site, PAH (again; fluoranthene) exceedance of the WQS in up to 88.0% of the samples (Monks' Ditch North MD-N) and 82.6% of samples (Monks' Ditch South MD-S) was noted. The source of these slightly elevated PAH concentrations determined in the Monks' Ditch is unclear, although again, it suggests the presence of an upstream off-site contributing source.

There appears to be no discernible reduction in PAH concentrations generally when comparing the earlier and post-2017 surface water analytical results.

TPH concentrations were exceeded in 4.3% of surface water samples recovered from across the site. These findings are considered to be consistent with TPH impact from isolated hotspots within the Made Ground.

4.5.2 Groundwaters

4.5.2.1 Inorganics

The following discussion is largely an update of previous work, as considered appropriate. Consistent with soil leachate samples, elevations of pH are greatest in the shallow groundwater, with an average of 9.6, and 49% of samples greater than the WQS range of 6-9. In comparison pH values in the deep groundwater are lower; the reported average is 8, and less than 9% of samples are in exceedance. The elevated pH in shallow groundwater samples as compared to deep groundwater samples is likely to be attributable to impacts from weathering of BOF slag, whilst the pH of deeper groundwater samples can be influenced by oxidation of sulphidic minerals which will lower the pH of groundwater in contact with these minerals. However, in this case where an average pH of 8 is reported, the findings would suggest an absence of evidence for impact from weathering BOF slag or significant impact from sulphide oxidation.

Copper, lead, nickel and selenium are present at higher concentrations and produce more exceedances of the WQS within the shallow groundwater. Concentrations of vanadium are also found to be much greater in shallow groundwater; the maximum shallow groundwater value is 485 mg/l (WQS exceedance in 28% of samples) in comparison to the deep groundwater maximum of 157 mg/l (WQS exceedance in 7% of samples). Again, the elevated vanadium concentrations are likely to be attributable to weathering of the BOF slag, which may also be impacting on concentrations of copper, lead, nickel and selenium in shallow groundwater, as compared to the deeper groundwater samples recovered where slag weathering by-products are less likely to impact.

Concentrations of ammoniacal nitrogen are reduced by half in the shallow groundwater in comparison to the deep. Atkins (2015a) suggested that the lower ammoniacal nitrogen concentrations present in the shallow groundwater are the result of upward leakage and that the direction of the groundwater flow from the north west indicates that the elevated concentrations of ammoniacal nitrogen are more likely to be from an off-site diffuse source, such as from infiltrated runoff from agricultural activities.

Maximum and average concentrations of dissolved arsenic are considerably higher in the deep groundwater (220 µg/l and 32.1 µg/l respectively) than in the shallow (40.5 µg/l and 9.2 µg/l respectively). Similarly for total arsenic, 13% of the deep samples but only 3% of shallow samples are in exceedance of the WQS (50 µg/l). Concentrations of iron, cadmium, chromium, manganese are also elevated within the deep groundwater in comparison to the

shallow. The lower concentrations of these metals determined in surface water samples as compared to deeper samples may be due in part to greater dilution of the surface groundwaters, as the results of soil leachate analyses suggests that Made Ground across the site are likely to contain significant leachable concentrations of these metals.

4.5.2.2 Organics

The majority of TPH samples in both shallow and deep groundwater are reported below the LoD, however a few boreholes are proven to be hot spots for TPH contamination. Maximum concentrations of TPH are up to two orders of magnitude greater in shallow groundwater in comparison to deep groundwater. In shallow groundwater, TPH in exceedance of the WQS are limited to less than 15% of the total sample population for each exceeding contaminant. The samples reported in exceedance during the May 2016 sampling round are distributed across nine locations, however samples in the June and July rounds exceeding for three or more contaminants are limited to locations CWWS-04, CWWS-19 and CWWS-11.

In deep groundwater, TPH in exceedance of the WQS are limited to less than 5% of the total sample population for each exceeding contaminant with the exception of aromatic >EC21-EC35 (16.7%). Sample locations with exceedances of two or more TPH in a single sample are locations CBBH04, CBBH05, CWCP- 04, CWCP-19 and CWCP-11.

PAHs are present in both the shallow and deep groundwater; concentrations of contaminants and frequency of exceedances are greater in the shallow groundwater. As for TPH, maximum concentrations within the shallow groundwater are up to two orders of magnitude larger than in the deep. Exceedances are widespread within the shallow groundwater, with a percentage of samples exceeding up to 69%; within deep groundwater exceedances are limited to 14%, with the exception of fluoranthene (29%) and benzo(a)pyrene (28%).

Exceedances of SVOCs and VOCs above the LoD are limited, and remain below 9% of the shallow groundwater and 2.2% of the deep groundwater total sample population for each contaminant.

A wide range of contaminants are found to exceed the WQS in both the shallow and deep groundwater. However, the chemical signatures of each aquifer unit are distinct, and the greatest concentrations and percentages of exceedances are not simply attributed to the shallow groundwater. It is possible that due to the fluctuating upwards and downwards gradients across the site as presented in Section 2.4.2 (Table 2-4) groundwater from either unit may be influencing the other. For example, where deep groundwater levels are lower than shallow, downward migration of water into the Tidal Flat Deposits is possible. Atkins (2015a) calculated that the un-retarded breakthrough of shallow groundwater through the Tidal Flat Deposits is likely to be 9 years. Taking into account conservative partition coefficients for naphthalene (a mobile PAH) and cadmium, the retarded breakthrough of naphthalene and cadmium is likely to be 644 and 1,435 years, respectively. Considering this,

it is unlikely that the contamination identified within the deep groundwater originated within the made ground.

5.0 Detailed Quantitative Risk Assessment and Re-use Assessment

5.1. Overview

The purpose of this assessment was to define, for a set of potential contaminants, the maximum concentration in the soil that does not pose a risk to the Controlled Waters receptor (re-use criteria). Where site soil concentrations, for one or more contaminants are greater than the re-use criteria, then in the absence of soil remediation or water treatment prior to discharge, a risk to Controlled Waters may exist.

5.1.1. Contaminants of Concern

Based on the site contamination status and known contaminants associated with steelworks (DoE, 1995), calculation of re-use criteria are to be undertaken for the Contaminants of Concern (CoCs) outlined in below. The current contamination status of the site is outlined above in Section 4; the assessment highlighted several metals, TPH and PAH that exceed the appropriate criteria. This essentially remains unchanged for the RLE CWDQRA assessment.

Table 5-1: Contaminents of Concern (COCs)

Compound Type	Compounds
Heavy Metals/Metalloids	Arsenic, cadmium, chromium, copper, iron, lead, vanadium, manganese, mercury, nickel, selenium, zinc.
Other Inorganics	Ammoniacal nitrogen, cyanide.
Organics	Ethylbenzene, xylene, PCB, phenol.
TPH Bands	TPH aliphatic >C5-C6, TPH aliphatic >C6-C8, TPH aliphatic >C8-C10, TPH aliphatic >C10-C12, TPH aliphatic >C12-C16, TPH aliphatic >C16-C21, TPH aliphatic >C21-C35, TPH aliphatic >C35-C44, TPH aromatic >C5-C7 (Benzene), TPH aromatic >C7-C8 (Toluene), TPH aromatic >C8-C10, TPH aromatic >C10-C12, TPH aromatic >C12-C16, TPH aromatic >C16-C21, TPH aromatic >C21-C35, TPH aromatic >C35-C44, TPH Aromatic >C40-C44.
PAHs	Acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, di-benz(a,h)anthracene, indeno(1,2,3-cd)pyrene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene.

5.1.2. Compliance Point

In order to be protective of the Controlled Waters receptor outlined in Section 4.5, determination of the site specific compliance point has been undertaken in general accordance with the RTM (Environment Agency, 2006). The compliance point has been assigned to the point of discharge into the receptor (Monks' Ditch). Consistent with the contamination data assessment (Section 4), the WQS (Water Quality Standards) have been

set at the EQS in order to be protective of the principal Controlled Waters receptor (Section 4.1).

5.2. Pore Water Concentration Calculation

5.2.1. Rationale

It was previously indicated that in order to maintain discharge of EQS compliant waters into the Controlled Waters receptor (Monks' Ditch), concentrations within the reens must be retained at or below the EQS. Due to the anthropogenic controls on discharges of water from the on-site reens to Monks' Ditch, in order to calculate the maximum concentration allowable for each contaminant within the excavated and re-compacted Made Ground (re-use criteria) the average annual water balance for the entire site is applied. This is considered appropriate given that EQS values are in relation to the annual average concentration.

Shallow groundwater is known to originate from infiltrating precipitation only, as the Made Ground of the site is hydraulically contained (Section 2.4.2). The remainder of the precipitation is either lost to evapotranspiration/evaporation or constitutes surface water runoff, and is diverted directly to the onsite drainage reens by SuDS (Section 2.5.1). Therefore, contaminant concentrations present in the shallow groundwater within the Made Ground are subject to dilution within the reens by clean SuDS drainage. As outlined in Section 2.3.3, the proportion of proposed impermeable to permeable surface area differs between the residential area and the Celtic Business Park commercial area. Resultantly, individual re-use criteria values were previously produced for each contaminant within each development area due to the differing volumes of water available for dilution.

As indicated in the introduction the intention was, as further site specific information was collected, to update the initial CWDQRA assessment. It was described as the starting point and that the re-use criteria generated were understood to be conservative. An assumption was also made that 100% of the infiltrated rainwater percolated through the construction material and in to the Made Ground.

Since preparation of the initial CWDQRA Report, further consideration has been given (Rodgers Leask Environmental Ltd - Reclamation Performance Specification A – Turnover – Technical Note, dated 14/12/18, Ref: 17480-RLE-18-XX-RP-O-1016), to the pre-construction reclamation methodology to be employed across the site. The particle size distribution of the Made Ground is known to be well graded, and when compacted, the permeability is assessed as having poor drainage potential, with when appropriately placed, expected values in the region of 10^{-7}m/s.

Consideration has also been given to the application of differing standards of compaction of the Made Ground, and as a result, alteration of the rates of incident water infiltration. In order to consider the impacts of reducing infiltration rates into the Made Ground (impacts of which are likely to be greatest in areas of the site proposed for residential reusage where greater areas of soft landscaping will be present), two modelling scenarios have been considered in comparison with the previously assumed 100% infiltration into the underlying Made Ground. These models assume a greater proportion of incident rainwater being directed laterally within the clean surface soils and 6F2 granular blanket, towards the reens. On this basis, the assumption is made that these redirected waters remain uncontaminated

and provide further dilution of the waters passing through the Made Ground and ultimately discharging into the reens. In order to provide values which are likely to be 'typical' , (details of which are outlined in Section 1.2 above, a 40% infiltration rate scenario into the underlying Made Ground has been proposed, which should be easily achievable.

5.2.2. Methodology

The methodology employed in the current RLE CWDQRA is that utilised previously in the initial CWDQRA, which it has been considered currently and remains reasonable and appropriate. The maximum (annual average) contaminant concentration possible within the perched groundwater in the Made Ground is calculated using dilution within the reens onsite as per Equations 3 to 7 below, whilst retaining concentrations at the EQS. Again, no allowance has been made for dilution of discharged water within Monks' Ditch as part of this calculation, as this being the receptor, it is proposed that the WSQ in this Controlled Water be maintained (as far as possible) at EQS values.

A summary of the methodology is provided below:

$$EQS = (Cgw + Qgw)/Qr \quad \text{Equation 3}$$

$$Cgw = (EQS \; x \; Qr)/Qgw \quad \text{Equation 4}$$

- Where:
  - EQS (mg/l) = Environmental Quality Standard
  - C_{gw} (mg/l) = annual average groundwater contaminant concentration
  - Q_{gw} (m^3/a) = groundwater flow
  - Q_r (m^3/a) = reen flow

$$Qr = Qgw + Qol + (RO \; x \; permeable \; surface \; area) \quad \text{Equation 5}$$

$$Qgw = (R - ET - RO) \; x \; permeable \; surface \; area \quad \text{Equation 6}$$

$$Qol = (R - E) \; x \; impermeable \; surface \; area \quad \text{Equation 7}$$

- Where:
  - R (mm/a) = total annual rainfall
  - E (mm/a) = evaporation
  - RO (mm/a) = runoff

The calculated annual average groundwater contaminant concentration Cgw (mg/l) values have been converted to Made Ground solid Cmg (mg/kg) values using Equation 8.

$$Cmg = Cgw \; x \; ((Kd + (\theta w + \theta a \; x \; H))/Pc) \quad \text{Equation 8}$$

- Where:
  - C_{mg} (mg/kg) = annual average Made Ground (solid) concentration
  - Kd (l/kg) = contaminant partition coefficient
  - Θw (-) = water filled porosity
  - Θa (-) = air filled porosity
  - H (-) = Henry's law constant
  - Pc (g/cm^3) = soil bulk density

5.2.3. Parameterisation

A summary of key input parameters is presented in Table 5-2 and Table 5-3 below. The full chemical input parameters and justifications are included in **Appendix I** of the current Report.

Parameter	Unit	Value	Comment/Justification/Source
Average Annual Rainfall	mm/a	953	MAFF, 1976
Evapotranspiration	mm/a	416	MAFF, 1976. Applicable to permeable areas
Evaporation	%	10	Grimmond & Oke, 1999. Evaporation from impermeable surface area as a percentage of total rainfall.
Runoff coefficient	%	55	National Coal Board, 1982 (See Figure E-1)
Residential Permeable Area	m^2	676,000	Rodgers Leask, 2016
Residential Impermeable Area	m^2	1,014,000	Rodgers Leask, 2016
Commercial Permeable Area	m^2	45,000	Rodgers Leask, 2016
Commercial Impermeable Area	m^2	405,000	Rodgers Leask, 2016

Table 5-3 Chemical Parameters

Parameter	Abbreviation	Unit	Value	Comment/Justification/Source
Fraction of Organic Carbon	foc	fraction	0.024	Site specific value - average foc from 243 samples of Made Ground
Air Filled Porosity	θa	fraction	0.0037	Site specific value – average θa from 3 samples of Made Ground
Water Filled Porosity	θw	fraction	0.5	Site specific value – average θw from 3 samples of Made Ground
Dry Bulk Density	Pc	g/cm^3	1.36	Site specific value – average Pc from 3 samples of Made Ground

Table 5-2: Physical Parameters

The specific calculations for 40% infiltration (Residential Area with 60% hardstanding/built areas) and 5% infiltration (Commercial Area with 95% hardstanding/built areas), have been undertaken using the Excel spreadsheets previously produced, where it was assumed that all of the water that was incident upon areas of soft landscaping (permeable areas) that was not lost to runoff and evapotranspiration penetrated into the underlying Made Ground. For the RLE DQRA, this value was reduced to 40% of this infiltration figure for both the residential and commercial assessment based upon the premise of reduced infiltration through the re-engineered Made Ground. The relevant Excel sheets with these working calculations can be supplied, but a PDF (for identification purposes) is appended to the CWDQRA in Appendix L of the current RLE Report. The derived values have been inserted into Table 5.4 (Appendix J).

Values are provided for proposed Residential and Commercial areas, where it is proposed that 5% of incident water is available in the Commercial area (ie 95% hardstanding/impermeable surfaces) and Residential area where 40% of incident water is available to infiltrate, and accounts for the reduced volume of water that could potentially infiltrate into the Made Ground. For modelling purposes, the reduced infiltration is treated as additional runoff volume.

5.2.4. Assumptions and Limitations

The following assumptions and limitations are inherent within the modelling undertaken:

- Dilution calculations produce maximum and likely average concentrations of contaminants (re-use criteria) within the Made Ground;
- Dilution methodology does not account for any dilution within Monks' Ditch at the point of discharge;
- Incident infiltrating rainwater is considered to flow laterally through the capping drainage layer, with varying proportions entering the underlying Made Ground. A 40% infiltration rate into the underlying Made Ground have been modelled;
- No infiltration is assumed to occur within the impermeable area;
- Limited retardation (degradation and/or sorption) of contaminants within the Made Ground is considered given the extensive area of potential source materials across the site:
- Dilution calculations assume simultaneous discharge of the annual volume of surface water runoff and infiltrated water, providing a worst case volume of potentially contaminated shallow groundwater;
- No allowance has been made for additional dilution as a result of inflows to the reen system from the land to the north, as it is understood that these flows are minimal;
- The site geology and hydrogeology are assumed to be homogeneous, and parameter values and contaminant concentrations used are based on site-specific data, where available;
- Where no site-specific data are available, literature sources have been used to develop suitable parameters considered likely to reflect site conditions;
- Made Ground geology by its very nature is likely to be both laterally and vertically variable following finalisation of site development;
- Data presented by third parties has been incorporated into this report. These data have been assumed to be correct for the purposes of this assessment; and
- This assessment has been made considerate of the proposed post-development ground conditions and cover. Should this change, then the site may require re-assessment.
- It should be noted that the assessment undertaken herein and re-use criteria is for protection of Controlled Waters only. The re-use criteria derived are not necessarily protective of risk to Human Health. Re-used materials must also be geotechnically suitable, however this has not been considered as part of this assessment.

5.2.5. Material Re-use Criteria

The calculated maximum concentration of each PCOC (Re-use Criteria) in Made Ground (mg/kg) based upon the scenario of a 40% infiltration rate into underlying Made Ground is presented in Table 5.4 (**Appendix J**) of the current Report.

The calculated re-use criteria specified are intended to be protective of the Controlled Waters receptor with regard to the post-development site, and will, compared to earlier derived values, facilitate the greater re-use of existing on-site Made Ground in general accordance with a Remediation Strategy (Section 6.2). As previously indicated, it should be noted that re-use criteria do not apply where there is evidence of contamination in soil or Made Ground in excess of solubility (i.e. free phase product).

5.3 Contaminant Attenuation Assessment

It may be noted from Table 5.4 **(provided in Appendix J**), that assuming a 40% infiltration of incident rainwater into reengineered Made Ground, there remain exceedances of the respective re-use criteria in both residential and commercial redevelopment scenarios, for manganese (within a residential area reusage only) but particularly for a number of PAH and TPH species, total cyanide and ammoniacal nitrogen within both commercial and residential reusage areas.

Given that it is proposed within the reengineered Made Ground, to achieve a permeability of approximately $1x10^{-7}$ m/s, then it is considered , particularly where organic CoC are assessed (such as TPHs and PAHs), that there is a potential for consideration of attenuation through processes of degradation/biodegradation of these leached species within the Made Ground, in view of their likely significant residence time prior to discharge into a local surface water reen.

However, given that the extent of these residual contaminant sources are likely to be of widespread (albeit of variable contribution) presence within the reengineered Made Ground, then the potential for attenuation of these contaminants within the Made Ground between their source and the designated receptor (surface water reen) will be compromised. This needs to be appreciated within the further assessment undertaken, as outlined below:

5.3.1 EA Remedial Target Worksheet (Level 3 Groundwater) Assessment

At this stage of the CWDQRA, it was proposed, additionally, to carry out an EA P20 Level 3 Groundwater Assessment to provide some indication of how close the re-engineered Made Ground can be placed to the reens and which determinands are likely to be most difficult/unlikely to attenuate. In order to factor in additional conservativity, the source concentration values utilised in this P20 Assessment did not factor in any dilution from incident precipitation. The values were simply determined based upon the 95th percentile values recorded for actual soil concentrations (mg/kg) and using the Level 1 Equation (Page 36 Table 5.2 of RTM Guidance Document) for determining equivalent pore water concentrations (source concentrations), based upon these actual soil concentrations (mg/kg) determined.

Where possible, other site specific/site obtained data was also utilised in the Level 3 Groundwater Assessment, as indicated below:

Table 5.3.1: Site Specific Data Sources Utilised in RT Worksheet Level 3 Groundwater Assessment

Variable	Value Utilised	Data Source
Width of aquifer at source	500m	Site measurements and likely width of each separate redevelopment perpendicular to directed perched groundwater flow towards appropriate reen.
Plume thickness at source	2.0m	Based upon proposed thickness of reengineered Made Ground and assumption that full thickness of Made Ground represents potential contaminant source

Saturated aquifer thickness	1.5m	Based upon typical likely groundwater levels in reengineered Made Ground.
Bulk Density of aquifer materials	1.36g/cm^3	Site specific test data
Effective Porosity of aquifer	0.08	Site specific test data
Hydraulic Gradient	0.0133	Estimation - also based upon an earlier estimation used by Atkins and considered to remain appropriate.
Hydraulic Conductivity of aquifer	8.64E-03m/d (1.0E-7m/s)	Based upon proposed permeability to be achieved following turning and reengineering of Made Ground
Distance to Compliance Point	20m	Assumed to be typical distance to surface water reen. However further dilution of contaminants will take place in reens from uncontaminated runoff from redevelopment

Using site-derived soil analyses concentration data for a range of determinands taken from 2017 onwards, 95th percentile derived concentrations (mg/kg), in each case, were then utilised for the modelled determinands. These data were then input into the equation presented in the EA Table 5.2 – soil-water partitioning of the EA Remedial Targets Methodology Guidance (2006) and a pore-water concentration Cp was determined. Soil/water partition coefficient (Kd) values utilised were site specific, and derived from those generated by Atkins (Table E4 of the Llanwern Controlled Waters Detailed Quantitative Risk Assessment Version 3.0 (February 2017)).

However, issues of uncertainty/potential variability are considered to include:

- The Kd (soil water partition coefficient) – the values used are calculated based upon site specific data. This can be compared against documented typical Kd values to further assess their appropriateness;
- The Plume width, which is currently estimated for modelling purposes as 500m can be reconsidered when more information becomes available on potential flow directions within the different site development Phases;
- Further reassessment of hydraulic gradients and the reasonableness of the value utilised (0.01) within each specific development Phase may be possible, with levels data for reens and standing water levels in the Made Ground becoming available. However, the determination of realistic values for the hydraulic gradient may be difficult to achieve/ hampered by a likely potential lack of hydraulic continuity within the re-engineered Made Ground.

It is therefore proposed that the subsequent RLE Site Validation Report(s) will further consider the findings of site determination/verification of each of the development Phase areas and the implications where significant discrepancies are encountered between the model values utilised and the actual site values determined following Made Ground re-engineering works and the placement of the piling mat. The permeability of the construction materials/ piling mat will be assessed as part validation of the clean cover in accordance with the Technical Note 260 (Remediation Strategy - Appendix F, 18669-RLL-22-XX-RP-0260, CWDQRA Validation Plan June 2022).

Consideration has also been given as to the application in the Level 3 Groundwater Remedial Target Calculation of applying 'degradation of organics in all phases' or whether a 'dissolved pollutants only' variable should be applied. It is considered that there are likely to be different degradation rates for dissolved phase and free product. Evidence for choosing an 'all phases' variable was based upon:

- Site observations made on 09/05/19, where it was noted that hydrocarbon free-product was also present on water surface within some of the recent excavations, albeit mainly as surface iridescence, (together with probable dissolved phase). Therefore, there was considered to be evidence for the presence in site soils of hydrocarbons in both dissolved (laboratory evidence) and free-phase (site observations).

- Given, in this instance, that the scenario being considered is near surface degradation and biodegradation, then oxidation and volatilisation are likely to be fairly important means of loss of both free-product and dissolved phase, and will probably encourage a faster rate of degradation than would be likely at greater depth within a more anaerobic/less oxygenated environment. However, it has been noted that 'applying degradation rate to dissolved pollutants only' appears to add more conservativity to the model, so it has been proposed to utilise this variable.

The calculated pore-water values used were considered to be representative of the initial contaminant concentration in groundwater at the plume core, and utilised in the Level 3 Groundwater Remedial Target Calculation, as provided in the Excel Worksheets (Appendix K)
.

Modelled Potential Contaminants of Concern (PCoC)

The selected determinands chosen for modelling were from within (but not all) of those where soil concentrations were found from chemical analyses carried out to continue to exceed the calculated 40% infiltration scenario reuse criteria. These determinands included metals: iron, manganese and vanadium, PAHs; benzo(a)pyrene, benzo(b)fluoranthene and naphthalene, and Total Petroleum Hydrocarbons (TPHs), total cyanide and ammoniacal nitrogen.

In the case of TPH modelling, where species in the C_{16}-C_{21} carbon chain range generally predominated, modelling for the aliphatic hydrocarbon; n-Eicosane (equivalent carbon number 20), was carried out. As 3 (No.) selected PAHs were also being modelled, it was considered that these species were likely to provide a reasonable indication of aromatic TPH attenuation within the re-engineered Made Ground.

As indicated above, In the case of the Remedial Target modelling carried out no specific consideration of 40% infiltration scenario has taken place, and the assessment was carried out essentially to gauge the potential extent of attenuation of these specific determinands within the ground where these soils may be placed, with receiving surface waters being assumed to be existing reens, which have been taken as the Compliance Points. For initial

calculation purposes, it has been assumed that compliant material proposed to be reused, would be placed no nearer than 20m from these reens.

It is proposed that the calculations may be revisited and updated, should it be considered appropriate, as more detailed information becomes available on the proposed site redevelopment layout.

Calculated values for Potential Contaminants of Concern (PCoC), as derived using the Level 3 Groundwater Excel Worksheets, are as indicated above, provided in **Appendix K** to the current Report. Where determined maximum soil concentrations exceed the calculated 40% infiltration reusage criteria, the initial contaminant porewater concentration in groundwater is calculated based upon the 95th percentile soil concentration recorded for each determinand, utilising the Equation provided in Table 5.2 of the EA Remedial Targets Methodology Guidance.

As indicated above, in selecting the specific determinands for modelling, Level 3 Groundwater calculations have been carried out on determinands where actual concentrations of these have been found from analyses of site soils to exceed the calculated 40% infiltration reusage criteria, rather than only considering contaminants currently determined in the reens which are found to exceed the proposed EQS Values. The reasoning for this is based upon the rationale that existing water quality within the reens may not necessarily be representative of the water quality following excavation and replacement of this Made Ground prior to redevelopment.

Sensitivity Analyses

A sensitivity analyses of the variables and input data utilised in the P20 Level 3 modelling has been undertaken. From this, it has been noted that the principal factors affecting the calculated output values are the; hydraulic conductivity and hydraulic gradient, with the achieving of WQS concentrations or better also being a factor of distance to receptor, selected half-life, and the porosity of the material through which the modelled determinands are migrating through. Although the P20 Level 3 modelling has only been undertaken for general information purposes, and to improve understanding of the potential placement distances of the re-engineered Made Ground to the surface water reens, a sensitivity analyses output has been prepared and presented in Appendix M of the current Report.

Sensitivity analyses has been carried out for selected determinands only, which in this case were outputs for; ammoniacal nitrogen and the PAH: benzo(b)fluoranthene. These were considered to be contrasting examples of determinands modelled in the P20 Level 3 groundwater assessment, where:

- For ammoniacal nitrogen the ratio of calculated 95th percentile porewater concentration and the remedial target concentration (in this case proposed WQS) is relatively low and significant variations in pore-water concentration are made by small changes in the variables of; effective porosity, hydraulic conductivity, hydraulic gradient, and degradation half-life.
- For benzo(b)fluoranthene the ratio of calculated 95th percentile porewater concentration and the remedial target concentration (in this case proposed WQS), is high and only minor variations in pore-water benzo(b)fluoranthene concentrations

are made by changes in the variables of; effective porosity, hydraulic conductivity, hydraulic gradient, and degradation half-life. The least sensitive variables in this case are indicated to be; effective porosity, hydraulic gradient and hydraulic conductivity, with the greatest impacts on the enabling of porewater concentrations of benzo(b)fluoranthene to achieve proposed WQS standards, being, by ensuring that the source soils are placed suitably distant from the receiving water reens.

Discussion of Findings

PAHs

As indicated above, the PAHs modelled have included benzo(a)pyrene, benzo(b)fluoranthene and naphthalene.

Although naphthalene concentrations in some site soils were found to be elevated in concentration, this PAH is readily attenuated, probably mostly through processes of volatilisation and aerobic biodegradation as indicated in the Level 3 Groundwater Excel Worksheets, (**Appendix K**) to the current Report.

It may be noted that the PAHs determined in surface water and shallow groundwater samples recovered, which were found to be most significantly elevated, have included fluoranthene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, Benzo(g,h,i)perylene and Indeno(1,2,3-cd)pyrene. This is consistent with many of the PAH determinands found to exceed the calculated reuse criteria. This suggests that significant leaching of these PAHs into the perched groundwater and subsequently into the receiving surface water reens is currently taking place across the site, and from consideration of the Level 3 Groundwater Excel Worksheets, is likely to continue from re-engineered Made Ground assuming that all of the PAH concentrations determined in shallow groundwaters are dissolved rather than being present in all phases. Where the Level 3 Groundwater Excel Worksheets are modelled to 'apply the degradation rate to all phases', then there is significant attenuation of these PAHs, thereby suggesting that re-engineered Made Ground containing concentrations of these PAHs in excess (up to the maximum determined|) of the soil reuse criteria (**Appendix J**) may be utilised. In reality, it is considered likely (as indicated above), that although attenuation is taking place, and some processes of volatilisation and aerobic oxidation are likely to be experienced, these processes are not significant enough to enable placement of soils with PAH concentrations in excess of the calculated reusage criteria (40% infiltration scenario) very close to the surface water reens.

Metals

It may be noted that based upon scenarios where the 95th percentile iron (255000mg/kg), manganese (32200mg/kg) and vanadium (644mg/kg) concentrations determined in samples of Made Ground at the site are utilised , then soils of this concentration and assuming a 40% infiltration of surface water following re-engineering and placement of this material show a potential to impact on the quality of a Compliance Point (taken as the nearest reen) located at a distance of approximately 20m away. **Phenols**

Compared to calculated re-use criteria for 40% infiltration scenarios, no exceedances for phenols were determined. In addition, the maximum phenol concentration previously reported in shallow groundwater (0.83 mg/l) is compliant with the 40% infiltration scenario

Cgw for the commercial (13.10 mg/l) and residential areas (3.32.25 mg/l). As further comparison, a maximum phenol concentration of 0.04mg/l was determined in surface water samples recovered, post 2017.

Petroleum Hydrocarbons:

Exceedances of the re-use criteria are present for several TPH species with respect to the maximum soil concentration within the aromatic C_{10}-C_{21} range for residential reusage and C_{12}-C_{21} range for commercial reusage. However, where average concentrations are considered, it may be noted that these values are all found to be significantly lower than their respective calculated re-use criteria. Where a 95th percentile concentration has been further modelled using a P20 Level 3 Groundwater Assessment, it may be noted that the calculated leachable concentration for an aliphatic C_{20} carbon chain species (modelled on n-Eicosane), was found to be less than the proposed WSQ for TPH of; 0.01mg/l. This finding is generally consistent with actual soil leachate results obtained, over a period from 2018 to 2019, where it was determined that none of the soil leachate samples tested contained TPH concentrations which exceeded the proposed WQS for petroleum hydrocarbons.

Total Cyanide

Exceedances for total cyanide in soils were noted in the calculated re-use criteria for both residential and commercial re-use scenarios. However, the results of Level 3 Groundwater P20 modelling using the porewater leachate equivalent of the 95th percentile cyanide concentration in site soils has indicated the relatively rapid attenuation of cyanide concentrations within the re-engineered Made Ground, with these results suggesting that placement of such material within a 20m distance of the receiving water reens is unlikely to cause discernible impact. This finding is generally consistent with the site sampling findings, where approximately 3.4% of on-site surface waters were found to contain cyanide concentrations in excess of the proposed WQS. However, it has been noted that there appears to a slight increase in cyanide concentrations within the reen system, possibly as leached contributions are made from deposited materials associated with the former coking works located within the northern central section of the site.

Ammoniacal Nitrogen

Exceedances for ammoniacal nitrogen in soils were noted in the calculated re-use criteria for both residential and commercial re-use scenarios. The results of Level 3 Groundwater P20 modelling using the porewater leachate equivalent of the 95th percentile ammoniacal nitrogen concentration in site soils has indicated a slight exceedance of the EQS at a distance of 20m from the receiving water reens. However, if this material is placed at a minimum distance of approximately 30m from receiving water reens, then these soils are unlikely to cause discernible impact. As remedial works are taking place in the area of the site previously occupied by the coking works, then this should have a positive impact on the reduction of ammoniacal and cyanide leachates, which appear to be currently entering the surface water reen drainage system from this source area.

5.4.1. DQRA Discussion

The previous re-use criteria produced by Atkins and provided in their 2017 CWDQRA Report (Version: 3 and dated February 2017), were purposely presented as conservative values. A principal conservativity was indicated to be the dilution assessment assumption of a simultaneous discharge of the annual volume of surface water runoff and infiltrated water (Section 5.4). It was indicated that in actual fact, the infiltrated water is subject to storage within the Made Ground and travel times are anticipated to be elongated. Applying Darcy's Law (Darcy flux (q) = Ki where K = hydraulic conductivity (m/s) and i = hydraulic gradient (-) (change in groundwater level/travel distance) and using a hydraulic conductivity $1x10^{-7}$ m/s, travel distance of 10 m and hydraulic gradient of 0.013 (assuming 2 m thick Made Ground is fully saturated), the un-retarded travel time within the Western Sub-Area is likely to be 238 years (at a flux of 0.04 m/year). With the current CWDQRA Revision, and additional assessment using EA P20 Level 3 Groundwater RT Worksheet modelling, these parameters have been incorporated and the re-engineered Made Ground has been predicted as presenting a hydraulic conductivity of $1x10^{-7}$ m/s.

The earlier assumption which has been shown to have significant impact on the value of the re-use criteria, has been the degree of infiltration of the incident water into the re-engineered Made Ground. The initial assessment assumed that 100% of this water (taking into consideration losses from run-off and evapotranspiration), would penetrate into the Made Ground. However, given the proposed reduced hydraulic conductivity ($1x10^{-7}$ m/s) of this re-engineered material, and the introduction of an overlying 6F2 piling mat/drainage blanket (estimated permeability of $1x10^{-3}$ m/s) beneath clean imported topsoils and subsoils, then a significant proportion of this infiltrating water is considered unlikely to penetrate the re-engineered Made Ground. In order to further encourage lateral movement of this incident water toward the nearest reens prior to penetration into the underlying Made Ground, it has been proposed to create a shallow gradient across the surface of the Made Ground within the development plots sloping downwards towards the reens. On this basis, it has been estimated that water infiltration, rates, provided Made Ground re-engineering works are suitably undertaken, may potentially be reduced to 5% penetration.

It was previously indicated in the initial CWDQRA Report that maximum contaminant soil concentrations were present up to two orders of magnitude larger than the commercial area re-use criteria for several TPH and PAH. In view of this, it was proposed that the poorest quality Made Ground material would be relocated to beneath the commercial area, where infiltration is lowest. It was also indicated that where onsite concentrations are greater than the re-use criteria, remediation or disposal of material offsite may be required. The current revision of the re-use criteria has indicated that provided this material is appropriately re-engineered, then a greater proportion of existing Made Ground may potentially be re-used beneath sections of the site proposed for residential redevelopment. The results of additional EA P20 Level 3 Groundwater RT Worksheet modelling, has also suggested that material which contains concentrations of PAHs in excess of the re-use criteria (Table 5.4 (**Appendix J**)), may also (subject to verification) be suitable for placement across most areas of the site provided that a suitably thick buffer zone of uncontaminated materials is placed between the redeveloped plots and the surface water receptors (reens and ponds). Based upon EA P20 Level 3 Groundwater RT Worksheet modelling, it would appear necessary that the width of this buffer zone between this material and existing surface water reens, will need to be in excess of 20m and potentially closer to 200m. The nature of materials utilised in these buffer zones will need further consideration, in order to optimise the potential for biodegradation of organic contaminants, attenuation of dissolved metals and lowering of pH

values prior to discharge of these waters into the reens, within which it is proposed to further encourage fauna and flora colonisation.

It was previously considered by Atkins that reported exceedances of the WQS in the onsite surface water samples are a reflection of the current site condition. This is considered to remain an important point with post-development conditions significantly reducing surface water infiltration by reducing the permeability of the Made Ground and increasing the impermeable surface area across the site, causing increased surface water runoff and subsequently, dilution within the reens. Concentrations of ammoniacal nitrogen released from Made Ground are considered likely to deplete over time in surface waters across the site as this component is leached from the residual sources associated with the former coking works. However, there are known to be other potential off-site sources (mainly agriculturally related), which will continue to impact on the quality particularly of the Monks' Ditch. However, surface water reens across the site which are hydraulically isolated from the main river Monk's Ditch but receive inflow from upstream off-site, surface waters including agricultural land, may also be impacted by atmospheric contribution of ammoniacal nitrogen, again largely from agriculturally related sources.

As indicated above, fluids passing through the weathering BOF (basic oxygen furnace slag) which will be incorporated within the re-engineered Made Ground will potentially provide an ongoing source of dissolved metals and high pH discharge into the surface water reens. However, reducing the permeability of this Made Ground by reengineering, and placement of a greater proportion of impermeable surface cover following redevelopment should reduce contributions from the present (likely) worst case levels.

6. Conclusions and Recommendations

6.1. Conclusions

Rodgers Leask Environmental Ltd (RLE) has been commissioned by St Modwen Developments Ltd (St Modwen) to update and further develop a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) of the potential risk to Controlled Waters for the Glan Llyn development at Llanwern, Newport. A Conceptual Site Model (CSM) for the site has been further developed and updated based on the contamination data assessment. Screening analysis of recent soil, soil leachate, groundwater and surface water data revealed potential moderate to low levels of inorganic and organic contamination present onsite in line with contaminants associated with former steelworks sites (DoE, 1995). Made Ground comprising clayey sandy gravels with local slag, burnt shale, tarmac, concrete, brick and mudstone was found to be a potential source of contamination. Contaminants in the unsaturated zone and shallow groundwater attenuate along the transport pathway, including within the onsite drainage ditches (reens), where groundwater seepage combines with onsite water from the SuDS system before being discharged to the Controlled Waters receptor (Monks' Ditch).

There appears to be no obvious increase or decrease in recorded concentrations of metal determinands within upstream reens and positions downstream within the Kings Wall Reen. However, cyanide concentrations appear to increase downstream within the reen system, possibly as leached contributions are made from deposited materials associated with the former coking works located within the northern central section of the site. However, there is evidence for decrease again in cyanide concentrations, further downstream, potentially due to complexation with metals such as iron and nickel, particularly in the higher pH (alkaline) conditions which are likely to prevail. There is also noted to be evidence of a possible contribution here from ammoniacal liquors associated with the former coking works, although pervasive, slightly elevated concentrations of ammoniacal nitrogen have been recorded in surface waters more widely across the site and, from what appear to be, sources upstream of the study site.

It is considered that following the undertaking specific remedial works within the area of the site previously occupied by the coking works, then this should have a positive impact on the reduction of ammoniacal and cyanide leachates which appear to be currently entering the surface water reen drainage system.

Calculation of conservative re-use criteria was undertaken using a pore water concentration calculation based on the site-wide water balance and has now incorporated permeability and infiltration parameters which it is considered are more representative of the redeveloped site. Comparison of re-use criteria against available information regarding the current composition of the Made Ground established that the much of Made Ground is likely to be suitable for re-use onsite, however localised source materials containing high concentration material (particularly elevated concentrations of iron, manganese and vanadium), and ammoniacal and cyanide components, may require remediation, or offsite disposal.

Where materials contain PAH concentrations in excess of the calculated reuse criteria for 40% infiltration scenario are to be used within areas of the site proposed for residential and

commercial reusage, then it concluded that this material should, as a precaution, be placed no closer than 150m-200m from the surface water reens into which infiltrated waters are likely to discharge and materials placed within the 'buffer zone' be engineered to provide a dissolved hydrocarbons and metals (principally iron and manganese), attenuating capability.

6.2. Recommendations

The following recommendations are proposed based on the outcomes of the assessment:

- The current programme of long-term monthly surface water monitoring should be continued at the established current sampling locations to monitor the quality of the reen system during and post-development until it is established that water quality is stable and compliant;
- Discharges into Monks' Ditch from the reens onsite are not to occur until specified quality criteria and quality control systems have been established and are met; and
- The sitewide MMP sets out the overall approach to materials management within the development and is a live document to be updated as the development progresses. In order to appropriately mitigate the risk to Controlled Waters, a Remediation Strategy has been produced which will, in conjunction with updates to the Materials Management Plan (MMP), as required, on a Phase by Phase basis, enable a regulation of the application of the re-use criteria and establish more specific remediation requirements for any localised source zones.
- As additional sampling of pore waters and testing of permeability is undertaken from boreholes installed as part of site validation works, then these site obtained data should be compared against the calculated values utilised with refinement of the P20 Level 3 Groundwater modelling as necessary.

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Drawings

GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT RCHITECTS AND ENGINEER'S DRAWINGS

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY

Key

Redline boundary



RLRE

CLIENT

ST. MODWEN DEVELOPMENTS

PROJECT

LLANWERN SITE LOCATION PLAN

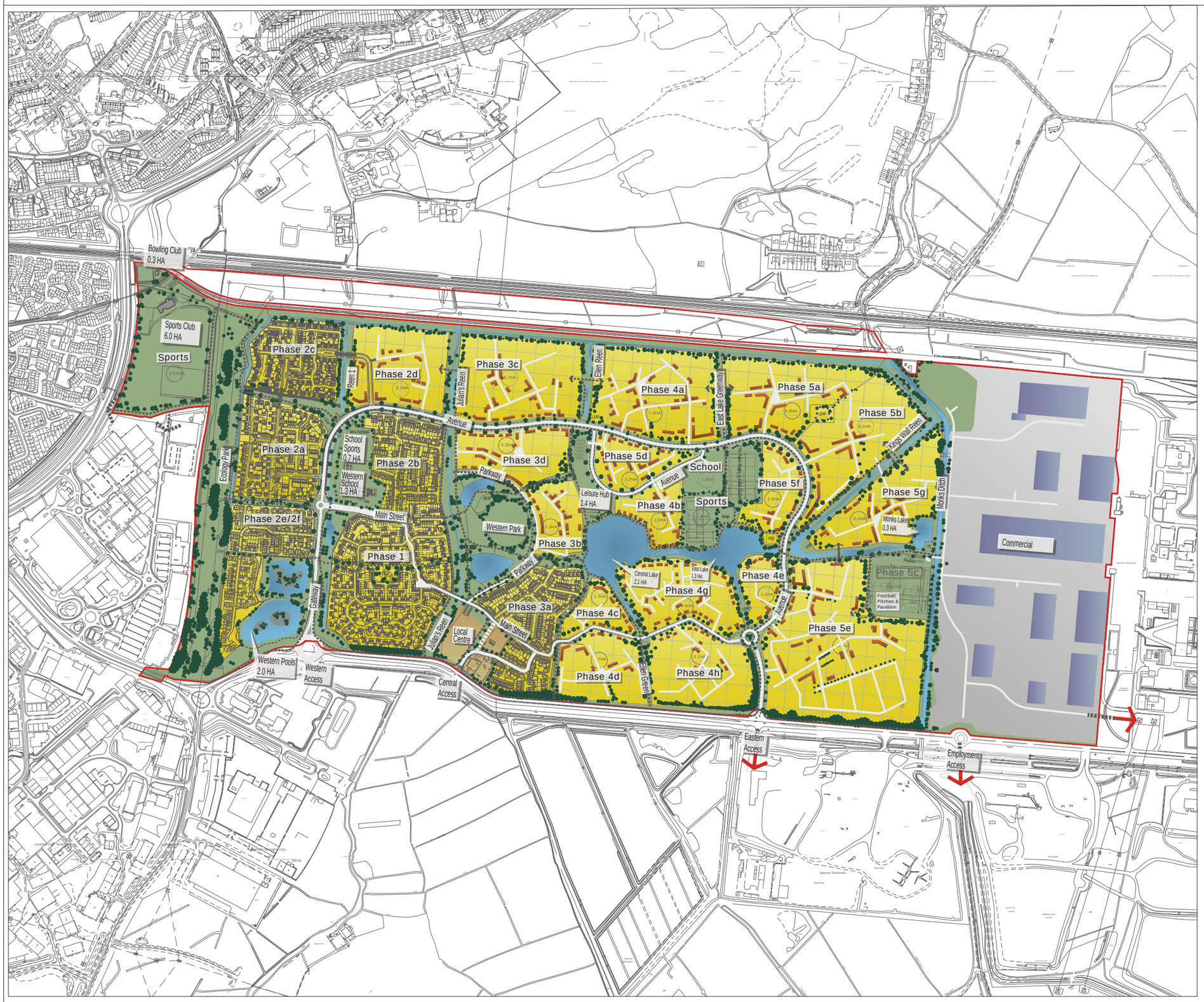
STATUS

FOR INFORMATION

DRAWN	CHECKED	DATE
ET	CW	19/08/2019

PROJECT NUMBER	DRAWING NUMBER	REV.
P18-669	18669-RLE-19-XX-DR-O-0004	

Glan Llyn -ESAMP Indicative Masterplan



Glan Llyn Residential Numbers (based on existing masterplan)					
Phase/Plot	Outlet	Area (HA)	Area (Acres)	Density (HA)	Total Units
1	Persimmon	**9.77**	**24.15**	31.4	307
2/a	Bellway	5.20	12.84	35	182
2/b	SMH	4.06	10.02	35	142
2/c	Bellway	4.30	10.62	35.3	152
2/d	Persimmon	4.98	12.30	35	174
2/e&f	SMH	5.10	12.61	29.8	152
1 and 2/Total		**33.40**	**82.54**		**1109**
3a		5.86	14.49	35	205
3b		2.32	5.74	35	81
3c		6.72	16.60	38.1	256
3d		3.45	8.53	35	121
3 Total		18.36	45.36		663
4a		7.19	17.78	34.8	250
4b		2.04	5.04	35	71
4c		1.53	3.78	35	54
4d		3.65	9.03	35	128
4e		1.49	3.68	35	52
4f		-	-	-	-
4g		4.64	11.46	35	162
4h		5.15	12.73	35	180
5a		5.65	13.95	35	198
5b		6.23	15.41	35	218
5c	Sports	2.67	6.60	35	93
5d		2.24	5.53	35	78
5e		13.72	33.90	35	480
5f		2.49	6.15	35	87
5g		5.06	12.50	35	177
4 and 5/Total		**63.75**	**157.53**		**2230**
1,2,3,4,5 Total		**115.51**	**285.44**		**4002**

NOTE: Areas and housing numbers assume that plot 5c sports is moved to CBP and converted to resi

SGP
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SGP File Ref: 8111-08-A011
Project No: 8111-08
Drawn By: NV
Date: 10/04/2019

Drawing No: 8111-08-A011
Rev: Rev P09
Scale: 1:5000 @A1

Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastructure

Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastructlayture

0 50 100 200 250 300 400 500
Metres at scale 1:5000

ST.MODWEN

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5111373-LLA-DWG-EG-0295

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- S□ALL□W A□D DEEP M□□□□□□G WELL
- S□ALL□W □□L□ M□□□□□□G WELL
- E□S□□G B□□E□□LE

REVISIONS	Drawn By	Checked By	Date

PURPOSE OF ISSUE	Rev.	Authorised for issue	Date

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ST.MODWEN

PROJECT

Llanwern

DRAWING TITLE

CW□A B□□E□□LE L□CA□□□□ PLA□

Scales	DRAWN	CHECKED	CO-ORD CHECK
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DRAWING NO	REV
5111373-LLA-DWG-EG-0295	B

DO NOT SCALE

Millimetres 0 10 100

KEY:

- SURFACE WATER MONITORING LOCATION
- SURFACE WATER
- FLOW DIRECTION

D0-N/R1-W, R1-C, R1-E, R2-W, R2-C, R2-E, R3-W, R3-C, R3-E, R4-W, R4-C, R4-E, R5-W, R5-C, R5-E, KW-N, KW-CN, D1-N, D2-N, D3-N, D5-N4, D5-N3, D5-N1, D5-N2, MD-N, D0-C, D1-C, D2-C, D0-S, D1-S, D2-S, D3-S, D5-C1, KW-S, D5-C2, D5-S1, D5-S2, D5-S4, D5-S3, MD-S

REEN 1

REEN 0

JULIAN'S REEN

EXISTING DRAIN 3

INDICATIVE LOCATION OF REEN 4

KING'S WALL REEN

MONK'S DITCH

SURFACE WATER PUMPING STATION NO.1

SURFACE WATER PUMPING STATION NO.2

Caldicot Level

Spencer Steelworks

Rev.	Date	Description	By	Chk'd	App'd

Drawing Status: FOR INFORMATION

Suitability: S2

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Client: ST.MODWEN

Project Title: LLANWERN

Drawing Title: NORTHERN EAST WEST REEN MONITORING

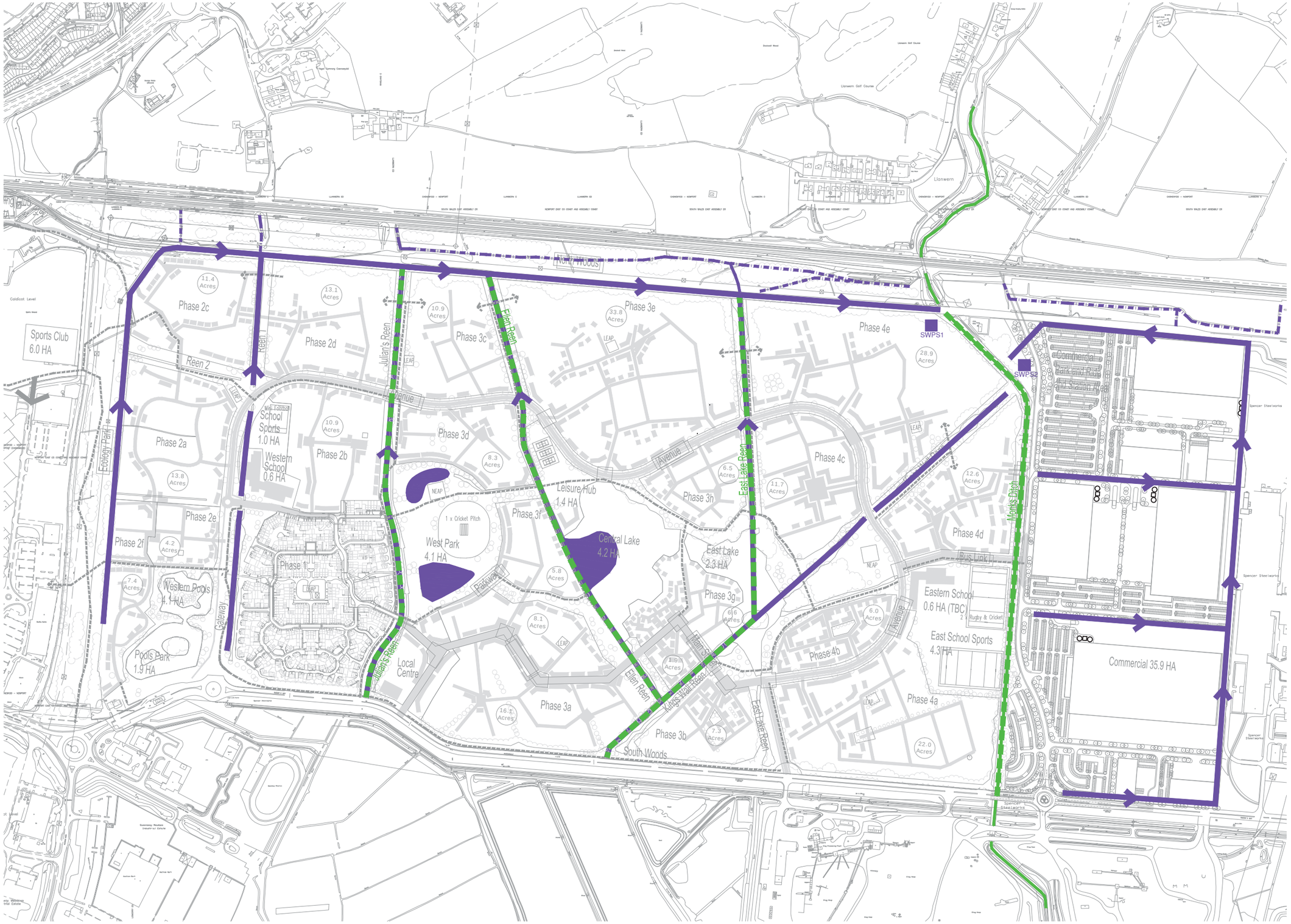
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Drawing Number: 5111373-LLA-DWG-EG-0408

Revision: P 1

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A3



Notes:

- Monks Ditch
- Existing Reen/Ditch
- New/Upgrade on Site Reen
- Existing off site Reen

Rev.	Date	Amendments	By	Chk

RODGERS LEASK
Consulting Civil & Structural Engineers

Client
St Modwen

Project
Llanwern

Drawing Title
Overall Surface Water Drainage Strategy

Status
Information

Scale	Drawn	Checked	Date
A3@ 1:7500	CB	AC	11/03/15

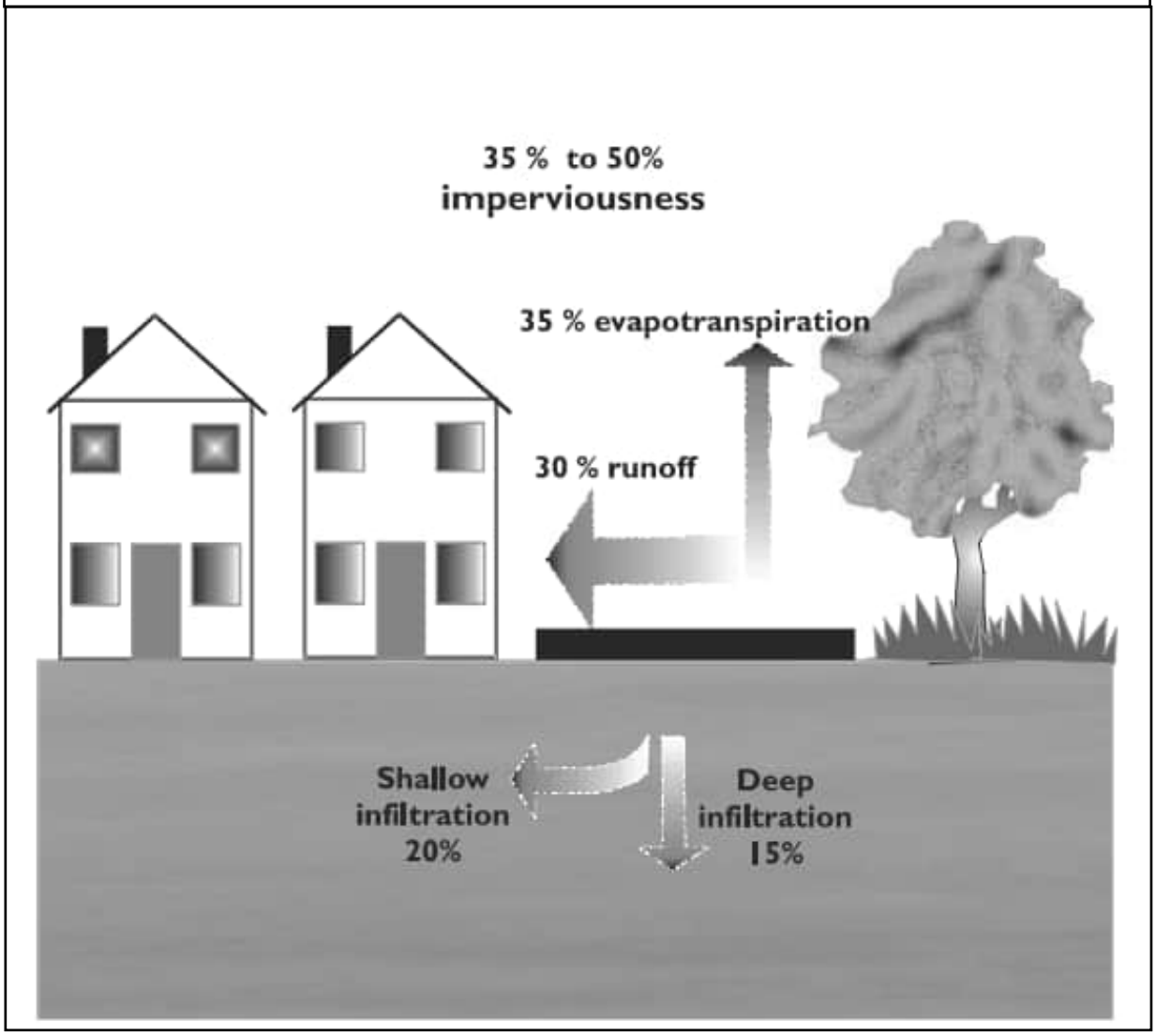
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D12-084	512	

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Figure 4.2: CIRIA Document C609: Sustainable Drainage Systems, Hydraulic, Structural and Water Quality Advice – London 2004, fig 4.2



Appendices

Appendix A: RLEs Reclamation Performance Specification.

Technical Note

Project:	Glan Llyn
Subject:	Reclamation Performance Specification A Turnover - Final
Document Reference:	17480-RLE-18-XX-RP-O-1016
Date:	14/12/2018
Prepared by:	Howel Morris - *Associate* BSc (Hons), MSc, CGeol
Reviewed by:	Neil Fraser - Principal Geotechnical Engineer BSc (Hons) MSc FICE

1. Introduction

Rodgers Leask Environmental Ltd (RLE) has been asked by St. Modwen Developments Ltd to prepare a Reclamation Performance Specification for the turnover to reclaim the reens, 15 acres of the Business Park, the proposed Marshalls factory footprint and thirteen residential phases (3b, 3c, 3d, 4a, 4b, 4c, 4e, 4g, 5a, 5b, 5c, 5d, 5g) of the Glan Llyn development.

This specification is intended to develop reclaimed plots that maintain surface compliant water quality, can satisfy the requirements of the contaminated land planning conditions and provide a stable reengineered platform with an accurate record of retained features to support, as far as practical, a site suitable for the proposed development.

2. Reclamation Strategy

The key points of the strategy for reclaiming the site are listed as follows:

- Pre sample each phase of site,
- Review and update site specific Controlled Waters Risk Assessment criteria,
- Designate areas to receive unsuitable material (both chemically and geotechnically unsuitable) – estimated to be 10% of the volume (eg 200,000m^3 for 2 million m^3 turnover) comprising park & ride plots, business park, sport pitches and noise bunds,
- Designate phases where engineering (small 1m clay bunds to promote protection of primary water routes by increasing residency within plots and reducing contamination loading near to site discharge) is required to further protect surface water,
- Sequence turnover and placement to suit direct placement approach to support chemical and geotechnical compliance,
- Agree proposed placement with Monitoring Engineer
- Turnover of the ground to natural deposits and reengineer the site to a minimum of 5.7mAOD (600mm below the minimum flood level),
- Compact material in accordance with the backfill specification to reduce permeability to limit infiltration and air voids to reduce leachability and conditions for potential expansion of Made Ground containing slag,

- Prepare geotechnical and chemical validation report for each phase.

3. Pre Reclamation Sampling

Prior to the commencement of reclamation works each phase will be trial pitted on a 25m grid sampled in accordance with the following:

- One composite chemical sample every exploratory hole to represent how it will be excavated and placed, (current testing is 1 per metre depth for each trial pit location)
- One composite geotechnical sample every exploratory hole and,
- One composite BRE expansion test (at least one per 2000m3).

The sequencing of the reclamation will need to follow the sampling programme. Pre validated material within stockpiles may require some testing to improve frequency to the required ratio.

The Contractor needs to allow in the programme sufficient time for the receipt and assessment of the contamination results and the slag expansion tests which require a 28-day test but there may be limited capacity. Areas where the Made Ground contains high proportions of slag may be reused in the designated open space or commercial areas rather than reuse within the residential phases.

4. Material Suitability – Chemical

The risk driver for the remediation of site is the controlled waters (water quality within site reens prior to discharge into Monk's Ditch). Therefore compliance with the Environmental Quality Standards (EQS) in the surface waters on site is the primary objective. The soil material placed within the plots will be assessed against the site specific criteria derived within the Controlled Waters Risk Assessment for the site and will use these criteria as guideline for compliance. Initial work will be undertaken to review the CWRA criteria to see if improvements are appropriate based on more recent site specific monitoring data and these will be submitted to the NRW for approval.

It is anticipated that the provision of clean cover will be sufficiently protective of human health providing the retained material complies with CWRA criteria.

In addition to chemical compliance reasonable engineering methods (creation of clay bunds below ground level) shall be employed to lengthen the contaminant travel time and direct the perched water discharge to a suitable point within the surface water system on site. This approach shall aim to use of cleaner material nearer the points of discharge.

Material with exceedances of the CWRA criteria may be retained within the plot if the overall profile of the placed material is assessed to be sufficiently protective of the water quality and human health (with the use of clean cover).

Material not suitable for reuse within the residential phases but suitable for public open space or commercial use shall be reused within commercial plots, park and ride areas, sports pitches and noise bunds.

Material assessed as requiring treatment will be investigated to delineate extent of contamination, excavated for treatment as required to permit reuse within one of the designated areas for lower threshold material. This is likely to apply to areas of gross contamination including but not limited to the coking works and the bitmac plant.

A programme of water quality monitoring shall be undertaken, either an existing agreed monitoring regime and/ or a dynamic monitoring programme to support the reclamation works, for the duration of the reclamation works to assess the developing water quality.

A mechanical method (scrubbing) and/ or natural method (reed beds) of water quality improvement may be deployed as mitigation prior to discharge into Monk's Ditch in the event of non-compliance of the EQS. This action shall be supported by monitored natural improvement in water quality within the reens as the development progresses so that mechanical improvement is a short term measure to mitigate the interim state of a reclaimed site without the rainfall interception of the full redevelopment.

The Contractor's method of working in close proximity of to the reen shall protect the watercourse. This shall also include potential run off from surface water or perched water levels. Chemical testing in accordance with EQS at a frequency approved by Natural Resources Wales. It is anticipated that an approach for monitoring the on site surface waters has been developed by Atkins and agreed with NRW.

The Contractor will manage the perched water as required and will provide compliant test results prior to discharge into the surface water course.

5. Material Suitability – Geotechnical

The following material types or physical properties shall be regarded as suitable for immediate placement with appropriate testing:

- Made Ground containing slag,
- Natural strata
- Crushed concrete
- The above materials, less than 300mm in size

The following material types or physical properties shall be regarded as unsuitable for immediate placement and should be deposited within the one the defined areas for unsuitable material:

- Colliery spoil and / or burnt shale
- Pure slag
- Material with obvious evidence visual & olfactory contamination
- Oversize material

- Scrap metals
- Organic material
- Plastics
- Voided areas
- Alluvium

The material visually regarded as not suitable for immediate reuse within the Site may either be retained until test results confirm the suitability for reuse or moved to one of the designated areas.

6. Formation Embankment Details

Where it is necessary to form an embankment an assessment will be undertaken to assess a minimum factor of stability for the slope. The assessment will take into account available land, characteristics of the material to be used and potential for post construction works to maintain stability. In the absence of detail reen volume/ layout/ profile requirements a minimum slope of 1:2 shall be assumed.

7. Levels

The phases within the site, following turn over to natural geology, will be backfilled with site won material to a minimum level of 5.7mAOD.

8. Turnover & Backfill

Within the boundaries of the site, the property will undergo reclamation to a depth where the natural underlying Tidal Flat Deposits can be confirmed. Known obstructions shall be removed, where they are unsuitable for retention within a normal piling layout, to a depth of 2m below minimum ground level in accordance with the flood mitigation requirements. Material within the site will undergo chemical and geotechnical testing.

Reclamation and subsequent backfill will be undertaken in accordance with the 600 Series (Earthworks) of the Specification for Highway Work (SHW) and each phase-specific Reclamation and Backfill Specification. The location and level of identified obstructions remaining in situ shall be accurately surveyed to the base of excavation and the positions recorded on a drawing.

In situ compaction testing of the placed layers shall be undertaken in compliance with the requirements of the 600 Series (Earthworks) of the Specification for Highway Work (SHW) and results provided to the developer. The backfilled material shall be reengineered to a target of 95% compaction. It will be at the discretion of the monitoring engineer to accept results below 95% to a minimum of 90%. The surface of each compacted layer shall be tested to ensure it meets the requirements of the SHW and a minimum CBR value of 2.5% at the surface.

9. Removal of Obstructions in Site Excavation Area

Shallow foundations and other man made obstructions encountered within the Made Ground and above the level of the underlying natural strata shall be entirely removed. Where isolated structures are encountered below 4.3mAOD that extend into the natural strata and measure less than 2.5m by 2.5m these may be retained on agreement with the engineer to reduce unnecessary excavation and support a nominal 3m grid for future piles. Where other obstructions are encountered which extend below the level of the underlying natural strata (e.g. slag in slag pits) these shall be removed unless otherwise agreed in writing by the Engineer.

Where redundant foundation piles or sheet piles are encountered these shall be cut down to the level of 4.3mAOD, and their location accurately surveyed for a future developer.

10. Grading

Fill material shall satisfy grading requirements for SHW Class 1 or Class 2 material except that a maximum particle size of 300mm shall apply and the maximum particle thickness shall not exceed two thirds of proposed compaction layer thickness.

Oversized material shall be removed, during the process of direct turnover, by visual assessment during excavation of existing ground and during the blade placement, by bulldozer, of the excavated ground prior to compaction. Removed oversize material not viable for crushing may be used in the sports pitches or park and ride areas, stored for an alternative suitable use or processed and tested to confirm material acceptability.

Incidental break up of material during the excavation and reengineering process is acceptable. Under no circumstances shall the crushing, as a specific operation, of slag bearing fill to achieve the required grading be permitted.

11. Reuse of Made Ground Containing Slag

Using the pre testing information the average risk of expansion will be managed as the layers of material are placed. Following the reclamation, surface monitoring points will be installed to monitor and validate stability of the reclaimed plot over a defined period to confirm the plot is within expansion tolerance prior to construction. BRE test results will be used to assess the suitability of material for reuse. A target expansion average for the accumulated material within the plot of 2.5% with a maximum of 5% being adopted. This may be amended based on practical mitigation measures and the proposed criteria will be subject to approval by the NHBC.

Where used as a reengineered material, Made Ground containing slag will be placed at a likely average thickness of 2m. A piled foundation solution with incorporated void (nominally 100mm, beam and block) would mitigate the risk of expansion to the building and the reengineered material is unlikely to cause unstable conditions for roads, services and gardens as the reclaimed plot will comprise weathered, well graded and well mixed layers.

Where there are areas of very slag rich made ground, with a potential for substantial expansion (as measured by the slag expansion results), the Contractor will have to regard this material as suitable for use in a public open space area.

12. Settlement & Stability Monitoring

Existing ground levels, on average, are within 300mm of the minimum ground level for flood requirements, therefore the increase in ground loading is not anticipated to be greater than 1m from the existing ground levels to incorporate an appropriate drainage system. Assuming a piled foundation solution, primary consolidation settlement from an increase in ground levels of 1m is likely to be acceptable for the stability of roads, services and gardens without surcharge given the time between reclamation and final development. An appropriate number of floor level monitoring points will be installed on pads of suitable material (5m x 5m) at the likely finished floor level, approximately 600mm above the reclaimed level, to reasonably replicate the final ground loading.

The floor level monitoring points will be monitored for a period to confirm stability of the site with regard to primary consolidation settlement but will also provide information relating heave stability prior to construction.

13. Land Quality Statement

A Land Quality Statement (LQS) will be prepared by St. Modwen Developments' Environmental Consultant which shall include a factual description of the site and its environs, the geo-environmental works carried out and describe the geo-environmental condition of the site following the completion of the agreed works. The LQS will provide a statement by the Environmental Consultant that planning conditions PC27 and PC28 of outline planning permission 06/0471 have been discharged by Newport City Council prior to final construction for the proposed residential end use. Amendments to existing CWRA criteria, which are relevant to the contaminated land planning conditions, will require approval by the NRW and local authority.

14. Notes for Intended Use

The developers and occupiers of the residential phases and reens, where this specification shall be applied, should consider the following:

- The site is underlain by soft organic rich Tidal Flat Deposits which according to historical information have been in part loaded by the former processes on the site. The site will continue to undergo unavoidable long-term creep settlement; this is normal for such sites.
- The buildings with piled foundations will not undergo creep settlement and therefore maintenance may be required where piled buildings meet ground bearing external areas due to the potential for differential settlement. Consideration should be given to boundary fences rather than brick walls. Extensions/ conservatories will require separate assessment to ensure settlement is considered prior to design of foundations.

- The storm water drainage of shall be constructed appropriately so that it does not leak into the underlying Made Ground. Poorly constructed drainage with headwalls into surface water features have the potential to generate leachate through infiltration into the Made Ground and then provide a pathway directly into the surface water.
- The external areas (roads, pavements, open space) have not been designed for the prolonged parking of HGVs, storage of materials, new buildings etc as these activities have the potential to cause settlement.
- The external areas may require maintenance due to creep settlement in the underlying Tidal Deposits.
- Flexible connections should be considered for services entering the piled buildings.
- Dewatering may result in localised reduction in groundwater level, which would induce localised consolidation settlement.

Appendix B: Atkins Permeability Technical Note

Technical Note

ATKINS

Subject:	Glan Llyn, Newport - Engineering Measures to Reduce Permeability & Infiltration		
Reference:	5111373-LLA-OUT-0256	**Revision:**	-
Author:	Howel Morris	**Checker:**	Chris Wilson
Issued to:	Craig Tidyman (Prosurv)	**Reviewer:**	Mark Williams
Date:	15th December 2016	**Authoriser:**	Howel Morris

Introduction

The Made Ground within the Glan Llyn site is generally compliant with residential, open space and commercial human health soil screening criteria. It is recognised that human health criteria is not intended to protect controlled waters but this note has been prepared to support the re-engineering of the onsite Made Ground material as a remediation measure in order to support parameters adopted within the Controlled Water Risk Assessment (Ref.1 5111373-OUT-RPT-0275). This is to be achieved by reducing the permeability of the shallow Made Ground soils by excavation and re-compaction, and providing a fall across its upper surface; as well as the placement of an overlying granular material to create a preferential pathway to minimise the potential for infiltration of precipitation into the underlying re-engineered Made Ground. The reduction in the permeability of the re-engineered Made Ground will attenuate the flow of precipitation through the Made Ground. This will have the intended benefit of increasing the volume intercepted rainwater against water infiltrating through the Made Ground within the surface water drainage system. Thus improving the surface water quality within the reens at the perimeters of the development plots.

It is worth noting that the re-use criteria developed within the CWRA report are protective of the surface water quality in the event that the full annual amount of water infiltrated and intercepted by the site be discharged to the reen system instantaneously. This technical note has been prepared to record the rationale of the chosen values for the permeability parameters used within the Controlled Waters Risk Assessment.

Site Permeability

The interception rates (where precipitation is intercepted by various development surfaces and flows into the surface water drainage system) and infiltration rates (where precipitation infiltrates through permeable gardens or landscaped areas into the underlying material) have been based on the figures provided in the drainage strategy prepared by Rodgers Leask (Rodgers Leask, 2016. Site Wide Surface Water Drainage Strategy Addendum for St Modwen Ltd. Rev 4 D12/084). The report provides figures for impermeable areas within the residential land and when this is compared with the total residential area a ratio of 60:40 is produced in favour of interception. The residential area includes all ancillary land including roads, landscaping features, drainage features, gardens and parks. The commercial area produces a ratio of 90:10 in favour of interception. The ratio provided within the drainage strategy does not account for the permeability of the percentage listed as permeable.

The respective adopted permeable values of 40% and 10% assume free draining material where the precipitation may freely percolate through the underlying materials. However, there are a number of factors resulting from the re-engineering of the development plots that significantly reduce the potential for infiltration of precipitation into the underlying Made Ground. The specification for the re-engineering of the Made Ground (Ref.2 5111373-LLA-OUT-225 Guidance for the Reuse of Made Ground Containing Slag, Dec 2016) requires compaction to a minimum 95% of maximum dry density and a minimum 5% CBR at finished levels to be achieved. The re-engineering of the plots into a stable platform with a fall from the centre to the periphery, and the materials used, will produce a preferential pathway. Based on soakaway tests carried out in the re-engineered Made Ground, and the results of Particle Size Distribution (PSD) laboratory tests carried out on the material, the site won re-engineered Made Ground within the plots is assessed as having a permeability of approximately 1 x 10^{-7} m/s (i.e. poor permeability). The properties of the re-engineered Made Ground are shown in Table 1 below.

Table 1: Properties of the Re-engineered Made Ground

Made Ground	PSD No./ Average	BRE Soakaway Test Result	Adopted Permeability(k)
Test 1	102 No./ 11% fines, 22% sand, 62% gravel, 5% cobbles	Fell 4mm in 3hrs	1 x 10^{-7} m/s
Test 2		Fell 20mm in 2hrs	1 x 10^{-7} m/s

* Unable to calculate an infiltration rate as the amount of infiltration was minimal during the test period indicating low permeability.

The PSD test samples were taken from existing stockpiles of site-won material. The soakaway tests were carried out on a re-engineered development plot within the site using typical stockpiled site-won Made Ground. The permeability of the re-engineered Made Ground was based on the values included within Soil Mechanics Principles & Practice, 3rd Edition, Table 3.3 (Ref.3) for a material with poor drainage characteristics.

The overlying gravel layer to be placed above the re-engineered Made Ground is expected to have a permeability of 1 x10^{-3} m/s (good) based on the values for a material on the boundary between a clean gravel and a clean sand provided in Soil Mechanics Principles & Practice, 3rd Edition, Table 3.3 (Ref.3).

The permeability will be validated on a plot by plot basis by undertaking soakaway tests. The designed fall at the top of the re-engineered Made Ground will promote flow within the more permeable granular layer and the infiltrated water will seek the course of least resistance, potentially flowing within the layer until it daylights at the reens at the periphery of the plot.

Landscaping/ Drainage & Public Open Space

The green areas of the site (including landscaped areas, parks & gardens) have been included within the permeable ratio for the residential areas. The green areas will have a minimum subsoil thickness of 450mm and in this region of south Wales red marl is a readily available subsoil which has already been used in some areas of the Glan Llyn development and which has a low permeability. The reduced permeability of areas assumed to allow free downward migration of rain water will further reduce the volume of rainwater able to infiltrate the re-engineered Made Ground. It is considered that a placed / un-compacted marl will have a permeability of 1 x 10^{-8} m/s, consistent with a stratified clay material (Ref.3). The reduced permeability of the green areas will also help improve the water quality within the drainage system.

Conclusion

The reduction in the permeability of the re-engineered Made Ground is intended to further improve surface water quality by attenuating the flow of infiltrated precipitation through the material. The reduced permeability of the Made Ground dramatically increases the transport time of the rainwater through the material, in contrast, a large volume of intercepted rainwater is able to reach the surface water reen system rapidly via the storm water drainage system. Therefore it is anticipated that the composition of surface waters will be dominated by intercepted clean rainwater. In reality, the large volume of intercepted precipitation and contrasting low volume of infiltrated seepage entering the reens annually will contribute to further improving water quality in a system already designed to maintain a compliant water quality within the surface water reens of the development.

References

1. 5111373-LLA-OUT- 0275, Glan Llyn, Site Wide Controlled Water Risk Assessment Atkins, December 2016.
2. 5111373-LLA-OUT-225 Guidance for the Reuse of Made Ground Containing Slag, Atkins, December 2016.
3. Soil Mechanics Principles & Practice, 3rd Edition, September 2010 (by G.E.Barnes).

Appendix C: Groundwater Levels Monitoring

Table A-1 Summary of 2016 Deep Monitored Groundwater Levels (mAOD)

Borehole	Easting	Northing	Ground Level (mAOD)	Count	Min (mAOD)	Max (mAOD)	Range (m)	Screened Unit*
2DBH-01	335405	187196	5.56	7	4.03	5.05	1.02	MMG
2DBH-02	335331	187310	5.94	7	4.58	5.20	0.62	MMG
2DCP-01	335475	187320	5.555	7	4.65	5.09	0.44	MMG
2DWS-05	335330	187336	5.957	7	3.76	5.60	1.84	TFD (BS)
CBP BH03	337064	186432	5.275	7	3.69	4.38	0.69	TFD (BS)
CBP BH04	337138	186342	4.833	7	4.15	4.63	0.48	TFD (BS)
CBP BH05	337014	186536	5.767	7	3.97	4.60	0.63	TFD (BS)
CBP BH06	336792	186392	5.081	7	4.18	4.70	0.52	TFD (BS)
CL2CB	335141	187332	6.008	5	4.32	4.81	0.49	Unknown
CWCP-01	335335	187278	5.65	7	4.20	4.89	0.69	MMG
CWCP-02	335279	187202	6.014	7	3.34	4.75	1.41	MMG
CWCP-03	334877	187364	6.159	6	4.87	5.49	0.62	MMG
CWCP-04	335186	187385	6.925	7	4.53	5.28	0.75	TFD (BS)
CWCP-05	335177	187153	5.877	7	4.16	5.20	1.04	TFD (BS)
CWCP-06	335381	187371	6.729	7	4.70	5.28	0.58	TFD (BS)
CWCP-07	335670	187347	6.759	7	4.52	6.16	1.64	TFD (BS)
CWCP-08	335941	187323	6.771	7	4.54	5.09	0.55	MMG
CWCP-09	336187	187302	5.699	7	3.65	4.86	1.21	TFD (BS)
CWCP-10	336505	187260	5.523	7	4.30	4.65	0.35	TFD(BS)/MMG
CWCP-11	336961	187241	6.26	7	4.37	4.64	0.27	TFD (BS)
CWCP-12	337225	187195	6.193	6	4.02	4.24	0.22	TFD (BS)
CWCP-13	336734	186782	7.15	7	4.22	4.60	0.38	TFD(BS)/MMG
CWCP-14	337203	186849	4.636	7	4.14	4.40	0.26	MMG
CWCP-15	337152	186553	4.014	7	3.68	4.01	0.33	TFD (BS)
CWCP-18	336343	186382	6.478	7	3.92	4.67	0.75	MMG
CWCP-19	336080	186401	6.5	7	4.59	4.90	0.31	TFD (BS)
CWCP-20	335760	186426	6.357	7	4.10	5.20	1.1	TFD(BS)/MMG
CWCP-21	334931	186510	5.945	6	4.12	5.26	1.14	TFD (BS)
CWCP-22	334919	186641	6.046	7	4.11	4.79	0.68	MMG
CWCP-23	334975	187134	6.335	7	4.72	5.21	0.49	TFD (BS)
CWCP-24	334857	187224	5.951	6	4.81	5.56	0.75	TFD (BS)
CWCP-25	335044	186908	7.288	7	4.35	5.03	0.68	TFD (BS)
CWCP-26-e	336825	187078	6.065	7	4.11	4.71	0.6	TFD(BS)/MMG
CWCP-26-w	335815	187129	6.084	7	4.22	4.96	0.74	TFD(BS)/MMG
CWCP-27	335732	186807	6.185	7	4.39	4.85	0.46	TFD (BS)
CWCP-28	335967	186642	6.452	7	4.68	4.99	0.31	TFD(BS)/MMG
CWCP-29	336132	186981	6.115	7	4.40	5.63	1.23	MMG
CWCP-30	336402	187007	6.068	7	4.42	4.77	0.35	MMG
CWCP-31	336299	186602	5.913	7	3.46	4.78	1.32	MMG
CWCP-32	336512	187099	5.583	7	4.29	4.68	0.39	MMG
CWCP-35	336969	186980	6.5	7	4.21	5.22	1.01	MMG
CWCP-36	337032	186762	5.321	7	4.06	4.34	0.28	TFD (BS)

LCBH2	335618	186555	5.729	7	4.63	4.79	0.16	TFD (BS)

*MMG – Mercia Mudstone Group, TFD (BS) – Tidal Flat Deposit Basal Sands

Table A-2 Summary of 2016 Shallow Monitored Groundwater Levels (mAOD)

Borehole	Easting	Northing	Ground Level (mAOD)	Count	Min (mAOD)	Max (mAOD)	Range (m)	Screened Unit
2DWS-01	335460	187331	5.471	7	3.44	5.37	1.93	TFD
2DWS-02	335453	187179	5.455	7	3.56	4.96	1.4	TFD
2DWS-03	335402	187253	5.619	6	5.12	5.47	0.35	TFD
2DWS-04	335288	187235	6.106	7	5.04	5.31	0.27	MG/TFD
CWWS-03	334876	187368	6.134	6	4.98	5.36	0.38	TFD
CWWS-04	335184	187384	6.969	6	5.13	5.54	0.41	Unknown
CWWS-05	335176	187152	5.936	6	4.98	5.49	0.51	MG
CWWS-06	335382	187372	6.665	2	5.23	5.95	0.72	MG
CWWS-07	335670	187348	6.791	0	Dry	Dry	n/a	MG
CWWS-08	335940	187325	6.784	0	Dry	Dry	n/a	MG
CWWS-09	336187	187301	5.601	6	4.08	5.60	1.52	MG
CWWS-10	336506	187260	5.522	5	4.69	4.86	0.17	MG/TFD
CWWS-11	336962	187240	6.262	7	3.66	4.62	0.96	MG
CWWS-13	336735	186782	7.194	7	5.09	5.46	0.37	MG
CWWS-14	337197	186847	4.708	7	4.14	4.42	0.28	MG
CWWS-15	337134	186552	4.976	7	3.35	4.05	0.7	MG/TFD
CWWS-16	337162	186301	5.021	4	4.24	4.80	0.56	Unknown
CWWS-17	336709	186340	6.982	4	5.35	5.51	0.16	MG
CWWS-19	336080	186398	6.672	7	4.77	4.98	0.21	MG
CWWS-20	335760	186423	6.247	0	Dry	Dry	n/a	MG
CWWS-21	334915	186527	5.805	7	4.92	5.39	0.47	TFD
CWWS-22	334927	186756	5.734	7	4.06	5.40	1.34	MG/TFD
CWWS-23	334957	187010	5.589	7	3.92	4.89	0.97	TFD
CWWS-24	334856	187228	5.904	6	4.78	5.06	0.28	TFD
CWWS-25	335049	186908	6.735	7	4.18	5.65	1.47	MG/TFD
CWWS-26-	336824	187074	6.151	7	4.31	5.90	1.59	MG
CWWS-26-	335817	187135	5.279	7	3.55	4.88	1.33	MG
CWWS-27	335731	186807	6.225	6	4.67	4.92	0.25	TFD
CWWS-28	335967	186643	6.473	7	4.67	4.86	0.19	MG
CWWS-29	336131	186980	6.128	7	4.88	5.14	0.26	MG/TFD
CWWS-30	336402	187010	6.068	7	4.29	5.44	1.15	MG
CWWS-31	336296	186605	6.031	6	4.55	5.08	0.53	MG
CWWS-32	336512	187099	5.585	7	4.94	5.25	0.31	MG
CWWS-33	336612	186991	6.48	7	4.99	5.34	0.35	TFD
CWWS-34	336656	186622	6.148	2	5.41	5.47	0.06	MG
CWWS-35	336968	186977	6.46	7	4.62	4.91	0.29	MG
CWWS-36	337027	186755	5.806	3	4.46	4.50	0.04	MG

*TFD – Tidal Flat Deposits (Clay), MG – Made Ground

Table A-3 Groundwater Level Data

Borehole	Deep/Shallow	Easting	Northing	Ground Level (mAOD)	Count	Min (mAOD)	Max (mAOD)	Range (m)	Depth of Base (mAOD)	10/05/2016	06/06/2016	07/07/2016	02/08/2016	01/09/2016	05/10/2016	03/11/2016
2DBH-01	Deep	335405	187196	5.56	7	4.03	5.05	1.02	-13.14	5.05	4.76	4.88	4.78	4.65	4.81	4.03
2DBH-02	Deep	335331	187310	5.94	7	4.58	5.20	0.62	-12.69	5.2	4.91	5.09	4.92	4.72	4.87	4.58
2DCP-01	Deep	335475	187320	5.555	7	4.65	5.09	0.44	-3.375	5.085	4.795	4.915	4.785	4.755	4.805	4.645
2DWS-05	Deep	335330	187336	5.957	7	3.76	5.60	1.84	2.997	4.017	3.757	4.767	4.727	5.387	5.597	5.557
CBP BH03	Deep	337064	186432	5.275	7	3.69	4.38	0.69	-5.495	4.375	4.295	4.195	4.155	4.115	4.145	3.685
CBP BH04	Deep	337138	186342	4.833	7	4.15	4.63	0.48	-2.057	4.633	4.153	4.413	4.193	4.303	4.493	4.513
CBP BH05	Deep	337014	186536	5.767	7	3.97	4.60	0.63	-4.323	4.357	4.237	4.257	4.597	3.967	4.177	4.057
CBP BH06	Deep	336792	186392	5.081	7	4.18	4.70	0.52	-4.159	4.701	4.601	4.621	4.181	4.201	4.701	4.531
CL2B	Deep	335141	187332	6.008	5	4.32	4.81	0.49	-4.892	-	4.678	4.808	4.668	4.508	-	4.318
CWCP-01	Deep	335335	187278	5.65	7	4.20	4.89	0.69	-3.25	4.89	4.41	4.81	4.71	4.48	4.63	4.2
CWCP-02	Deep	335279	187202	6.014	7	3.34	4.75	1.41	-3.136	4.714	4.134	4.754	3.684	3.564	3.634	3.344
CWCP-03	Deep	334877	187364	6.159	6	4.87	5.49	0.62	-2.951	5.489	5.159	5.219	5.049	4.959	-	4.869
CWCP-04	Deep	335186	187385	6.925	7	4.53	5.28	0.75	-2.485	5.275	4.685	4.815	4.545	4.725	4.785	4.525
CWCP-05	Deep	335177	187153	5.877	7	4.16	5.20	1.04	4.687	5.197	4.157	4.757	4.827	4.717	4.717	4.377
CWCP-06	Deep	335381	187371	6.729	7	4.70	5.28	0.58	-2.521	5.279	4.909	5.009	4.889	4.699	4.909	4.759

CWCP-07	Deep	335670	187347	6.759	7	4.52	6.16	1.64	-2.501	5.029	4.719	4.749	4.659	4.519	6.159	4.859
CWCP-08	Deep	335941	187323	6.771	7	4.54	5.09	0.55	-2.079	5.091	4.811	4.671	4.571	4.541	4.771	4.771
CWCP-09	Deep	336187	187302	5.699	7	3.65	4.86	1.21	-1.641	4.859	4.639	4.619	4.579	4.429	4.439	3.649
CWCP-10	Deep	336505	187260	5.523	7	4.30	4.65	0.35	-3.477	4.653	4.533	4.473	4.423	4.303	4.463	4.373
CWCP-11	Deep	336961	187241	6.26	7	4.37	4.64	0.27	0.33	4.57	4.64	4.59	4.37	4.48	4.63	4.45
CWCP-12	Deep	337225	187195	6.193	6	4.02	4.24	0.22	Unknown	-	4.143	4.243	4.083	4.023	4.133	4.093
CWCP-13	Deep	336734	186782	7.15	7	4.22	4.60	0.38	-4.76	4.56	4.6	4.41	4.31	4.22	4.33	4.23
CWCP-14	Deep	337203	186849	4.636	7	4.14	4.40	0.26	-4.904	4.396	4.366	4.306	4.186	4.136	4.206	4.136
CWCP-15	Deep	337152	186553	4.014	7	3.68	4.01	0.33	-5.116	4.014	4.014	4.014	4.014	4.014	3.684	4.014
CWCP-18	Deep	336343	186382	6.478	7	3.92	4.67	0.75	-5.442	4.668	4.518	4.408	4.578	4.188	3.918	4.168
CWCP-19	Deep	336080	186401	6.5	7	4.59	4.90	0.31	-2.51	4.82	4.9	4.75	4.75	4.59	4.69	4.7
CWCP-20	Deep	335760	186426	6.357	7	4.10	5.20	1.1	-5.513	4.707	4.777	4.247	5.197	4.097	4.177	5.067
CWCP-21	Deep	334931	186510	5.945	6	4.12	5.26	1.14	-4.635	4.455	4.425	4.295	5.255	4.115	4.125	-
CWCP-22	Deep	334919	186641	6.046	7	4.11	4.79	0.68	-5.554	4.586	4.526	4.356	4.786	4.296	4.246	4.106
CWCP-23	Deep	334975	187134	6.335	7	4.72	5.21	0.49	-3.895	5.205	4.865	4.775	4.715	4.785	4.925	4.715
CWCP-24	Deep	334857	187224	5.951	6	4.81	5.56	0.75	-3.509	5.561	5.061	5.131	5.011	4.911	-	4.811
CWCP-25	Deep	335044	186908	7.288	7	4.35	5.03	0.68	-4.532	5.028	4.738	4.778	4.688	4.638	4.728	4.348
CWCP-26-e	Deep	336825	187078	6.065	7	4.11	4.71	0.6	-4.345	4.475	4.525	4.395	4.325	4.155	4.705	4.105
CWCP-26-w	Deep	335815	187129	6.084	7	4.22	4.96	0.74	-4.276	4.964	4.784	4.794	4.744	4.604	4.224	4.574

CWCP-27	Deep	335732	186807	6.185	7	4.39	4.85	0.46	-5.325	4.845	4.665	4.665	4.555	4.515	4.605	4.385
CWCP-28	Deep	335967	186642	6.452	7	4.68	4.99	0.31	-5.308	4.992	4.892	4.862	4.682	4.902	4.932	4.892
CWCP-29	Deep	336132	186981	6.115	7	4.40	5.63	1.23	-4.585	4.945	4.725	4.725	4.615	4.525	5.625	4.395
CWCP-30	Deep	336402	187007	6.068	7	4.42	4.77	0.35	-5.372	4.768	4.638	4.528	4.528	4.438	4.518	4.418
CWCP-31	Deep	336299	186602	5.913	7	3.46	4.78	1.32	-4.247	4.783	4.663	4.623	4.603	3.463	4.563	4.313
CWCP-32	Deep	336512	187099	5.583	7	4.29	4.68	0.39	-4.637	4.683	4.593	4.503	4.373	4.293	4.483	4.383
CWCP-35	Deep	336969	186980	6.5	7	4.21	5.22	1.01	-5.54	4.52	4.44	4.39	4.32	5.22	4.33	4.21
CWCP-36	Deep	337032	186762	5.321	7	4.06	4.34	0.28	-3.889	4.341	4.331	4.191	4.141	4.071	4.151	4.061
LCBH2	Deep	335618	186555	5.729	7	4.63	4.79	0.16	-4.251	4.629	4.709	4.689	4.789	4.689	4.639	4.629
2DWS-01	Shallow	335460	187331	5.471	7	3.44	5.37	1.93	2.491	3.441	3.761	4.801	4.681	5.231	5.371	5.181
2DWS-02	Shallow	335453	187179	5.455	7	3.56	4.96	1.4	2.435	3.555	4.835	4.895	4.775	4.905	4.955	4.685
2DWS-03	Shallow	335402	187253	5.619	6	5.12	5.47	0.35	2.729	5.119	5.219	5.349	5.369	5.179	5.469	-
2DWS-04	Shallow	335288	187235	6.106	7	5.04	5.31	0.27	3.476	5.186	5.036	5.096	5.126	5.146	5.306	5.056
CWWS-03	Shallow	334876	187368	6.134	6	4.98	5.36	0.38	3.204	5.294	5.154	5.364	5.014	4.984	-	5.174
CWWS-04	Shallow	335184	187384	6.969	6	5.13	5.54	0.41	4.439	5.539	5.449	5.479	5.129	5.269	Dry	5.299
CWWS-05	Shallow	335176	187152	5.936	6	4.98	5.49	0.51	-3.244	5.016	4.976	Dry	5.256	5.376	5.486	5.446
CWWS-06	Shallow	335382	187372	6.665	2	5.23	5.95	0.72	Unknown	Dry	Dry	Dry	5.225	Dry	-	5.945
CWWS-07	Shallow	335670	187348	6.791	0	0.00	0.00	0	Unknown	Dry	Dry	Dry	Dry	Dry	Dry	Dry
CWWS-08	Shallow	335940	187325	6.784	0	0.00	0.00	0	Unknown	Dry	Dry	Dry	Dry	Dry	-	-

CWWS-09	Shallow	336187	187301	5.601	6	4.08	5.60	1.52	4.431	4.841	5.321	5.601	4.511	4.591	4.561	4.081
CWWS-10	Shallow	336506	187260	5.522	5	4.69	4.86	0.17	4.402	4.742	Dry	Dry	4.702	4.692	4.862	4.792
CWWS-11	Shallow	336962	187240	6.262	7	3.66	4.62	0.96	3.252	4.522	4.622	4.602	4.462	4.462	3.662	4.462
CWWS-13	Shallow	336735	186782	7.194	7	5.09	5.46	0.37	4.454	5.464	5.434	5.394	5.154	5.114	5.104	5.094
CWWS-14	Shallow	337197	186847	4.708	7	4.14	4.42	0.28	3.228	4.388	4.288	4.328	4.298	4.138	4.418	4.268
CWWS-15	Shallow	337134	186552	4.976	7	3.35	4.05	0.7	2.396	3.936	3.896	3.346	4.046	3.836	3.926	3.906
CWWS-16	Shallow	337162	186301	5.021	4	4.24	4.80	0.56	4.191	4.331	4.241	4.801	Dry	Dry	4.661	Dry
CWWS-17	Shallow	336709	186340	6.982	4	5.35	5.51	0.16	5.282	5.352	5.392	5.492	Dry	Dry	5.512	Dry
CWWS-19	Shallow	336080	186398	6.672	7	4.77	4.98	0.21	3.932	4.932	4.972	4.982	4.832	4.772	4.942	4.812
CWWS-20	Shallow	335760	186423	6.247	0	0.00	0.00	0	5.287	Dry	Dry	Dry	Dry	Dry	Dry	Dry
CWWS-21	Shallow	334915	186527	5.805	7	4.92	5.39	0.47	4.515	5.385	5.195	5.355	4.915	4.935	5.305	5.205
CWWS-22	Shallow	334927	186756	5.734	7	4.06	5.40	1.34	4.294	5.404	4.374	4.354	4.104	4.064	4.334	4.154
CWWS-23	Shallow	334957	187010	5.589	7	3.92	4.89	0.97	3.569	4.679	4.269	3.919	4.569	4.749	4.889	4.689
CWWS-24	Shallow	334856	187228	5.904	6	4.78	5.06	0.28	2.994	4.954	4.934	5.014	5.024	4.784	-	5.064
CWWS-25	Shallow	335049	186908	6.735	7	4.18	5.65	1.47	4.095	5.645	4.995	5.025	5.085	4.975	4.175	4.985
CWWS-26-e	Shallow	336824	187074	6.151	7	4.31	5.90	1.59	3.411	4.481	4.511	4.591	4.441	4.311	5.901	4.311
CWWS-26-w	Shallow	335817	187135	5.279	7	3.55	4.88	1.33	3.689	4.439	4.419	4.449	4.419	4.449	3.549	4.879
CWWS-27	Shallow	335731	186807	6.225	6	4.67	4.92	0.25	4.475	Dry	4.755	4.765	4.725	4.665	4.915	4.745
CWWS-28	Shallow	335967	186643	6.473	7	4.67	4.86	0.19	3.573	4.803	4.823	4.823	4.703	4.723	4.863	4.673

CWWS-29	Shallow	336131	186980	6.128	7	4.88	5.14	0.26	3.528	5.138	5.088	5.138	4.878	4.908	5.138	4.948
CWWS-30	Shallow	336402	187010	6.068	7	4.29	5.44	1.15	3.758	4.388	4.468	4.378	4.328	5.438	4.518	4.288
CWWS-31	Shallow	336296	186605	6.031	6	4.55	5.08	0.53	4.111	5.081	4.991	5.021	Dry	4.551	4.951	4.821
CWWS-32	Shallow	336512	187099	5.585	7	4.94	5.25	0.31	4.085	5.245	5.045	5.055	5.075	4.995	5.045	4.935
CWWS-33	Shallow	336612	186991	6.48	7	4.99	5.34	0.35	4.53	5.34	5.27	5.24	5.07	4.99	5.19	5.08
CWWS-34	Shallow	336656	186622	6.148	2	5.41	5.47	0.06		Dry	Dry	5.408	Dry	Dry	5.468	Dry
CWWS-35	Shallow	336968	186977	6.46	7	4.62	4.91	0.29	2.82	4.79	4.91	4.86	4.68	4.62	4.84	4.65
CWWS-36	Shallow	337027	186755	5.806	3	4.46	4.50	0.04	4.386	Dry	4.496	4.486	Dry	4.456	Dry	Dry

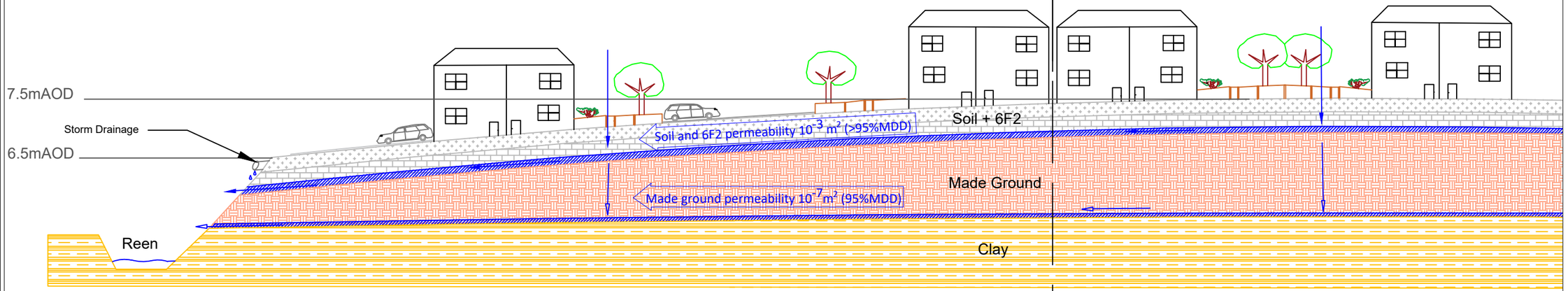
Appendix D: Glan Llyn Diagrammatic CSM



Area covered by landscaping = 23.8%

40% Infiltration into made ground

5% Infiltration
Increased distance from surface water



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY

Water movement within Soil and 6F2

Water movement within Made ground

Rev	Date	Amendments	By	Chk

St Modwen

Project
Llanwern

Drawing Title
Glan Llyn Diagrammatic CSM

Status
Information

Drawn	Checked	Date
ET	CW	05.07.19

Drawing Ref. Rev
18669-RLE-19-XX-DR-O-0005

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Appendix E: Soils Analysis

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	3ATPGR02	3ATPGR03	3ATPGR03	3ATPGR04	3ATPGR04	3ATPGR02 CL	3ATPGR03 CL	TP3AA5V	TP3AB4V	TP3AB5V	TP3AC401	TP3AC402
Depth	1.2	0.7	1.2	0.4	1.3	2.2	2.7	0	0	0	0.5	1.5
Sampled Date	03/01/2018	03/01/2018	03/01/2018	03/01/2018	03/01/2018	03/01/2018	03/01/2018	04/01/2018	05/01/2018	05/01/2018	15/12/2017	15/12/2017
Carbon												
Soil Organic Matter (SOM)	1.72	0.536	2.93	0.507	0.35	5.1	1.16	1.56	1.13	10.4	20.7	10.4
Metals (Solids)												
Arsenic	9.42	3.34	6	2.51	6	14.7	11.4	13.1	15.8	32.3	5.86	9.74
Cadmium	1.64	0.27	0.2	0.289	0.2	0.478	0.02	0.0899	0.02	0.841	0.02	0.869
Chromium	358	9.41	695	4.87	1030	30.3	18.1	32	19.2	42.8	4.22	53.7
Copper	36.4	7.32	24.6	7.82	14.9	18.2	10.8	11.1	9.55	19.1	20.1	49.4
Lead	208	11.3	24.4	11.1	16.5	49.2	26.4	24.7	21.9	52.5	91.1	184
Mercury	1.4	0.14	1.4	0.14	1.4	1.4	0.918	0.14	0.386	0.14	1.05	1.98
Nickel	23.9	6.55	18.8	2.69	4.67	35.1	38.2	40.9	33.9	27	15.1	40.4
Selenium	14.4	1	19.9	1	22.4	10	1.47	1	1.98	1	2.03	10
Vanadium	302	8	442	3.8	578	59	60.4	54.7	49.8	71.7	33.1	101
Zinc	1030	28.4	70.5	35	25.6	160	151	118	98.5	160	351	652
TPH Criteria Working Group (TPH CWG)												
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.002	0.008	0.0151	0.008	0.0173
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.003	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.0598	0.0564
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0571	0.0506	0.392
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0622	0.04	0.04
Aliphatics >C12-C16	3.03	0.1	6.01	0.1	0.714	0.1	0.1	0.1	0.1	0.1	2.74	1.79
Aliphatics >C16-C21	21.3	1.3	29.4	0.526	2.83	1.12	0.1	0.1	0.1	0.1	23	14.9
Aliphatics >C21-C35	90.5	7.16	154	2.9	23.8	9.7	4.4	0.524	0.1	12.1	115	64.1
Aliphatics >C35-C44	14.7	0.928	49	0.926	3.76	1.39	0.1	0.1	0.1	0.1	33.5	19
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.061	0.284
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0403	0.04	0.04
Aromatics >EC12-EC16	1.04	0.1	2.26	0.1	0.1	0.727	0.1	0.1	0.1	0.1	2.25	1.89
Aromatics >EC16-EC21	6.01	0.1	20	0.1	0.846	1.87	0.774	0.1	0.1	1.59	13.2	12.9
Aromatics >EC21-EC35	26.4	1.28	107	0.1	8.02	25	10.6	2.66	0.748	49.7	72.6	63.7
Aromatics >EC35-EC44	8.73	0.1	48.6	0.1	3.81	7.63	5.5	0.969	0.92	9.91	40.8	31.1
Aromatics >EC40-EC44	3.67	0.1	19	0.1	1.46	3.15	2.03	0.1	0.1	3.71	16.6	11.4
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	30.3	12	12	12	12	12	12	12	12	12	119	121
Acenaphthene	8	8	262	8	8	8	8	8	8	8	48.5	40.2
Anthracene	37.9	16	304	16	16	16	16	16	16	16	287	330
Benz(a)anthracene	125	14	2920	14	14	51.4	14	14	14	87.9	1190	835
Benzo(a)pyrene	118	18.2	3610	19.2	20.1	56.6	15	15	15	65.9	1250	732
Benzo(b)fluoranthene	235	23.8	5000	29.7	36.5	105	15	15	15	152	1860	976
Benzo(k)fluoranthene	91.5	14	1910	14	17.5	37.4	14	14	14	35.3	660	509
Benzo(g,h,i)perylene	171	24	2670	24	24	61.1	24	24	24	53.1	1050	678
Chrysene	148	13.3	2640	23.8	18.2	68.7	10	10	10	80.5	1310	901
Dibenzo(a,h)anthracene	0.023	0.023	732	0.023	0.023	0.023	0.023	0.023	0.023	0.023	277	177
Indeno(1,2,3-cd)pyrene	133	0.018	2420	0.018	0.018	46.2	0.018	0.018	0.018	46.5	877	530
Fluoranthene	197	22.4	3730	31.4	43	172	0.017	0.017	0.017	173	2160	1790
Fluorene	10	10	96	10	10	10	10	10	10	10	104	137
Naphthalene	95.4	12.4	233	13.8	11	19	9	9	9	28.6	397	291
Phenanthrene	145	27.2	2110	29.1	33.6	166	15	15	15	111	1090	1090
Pyrene												
PAH, Total Detected USEPA 16	1.7	0.137	31.8	0.174	0.214	0.913	0.118	0.118	0.118	0.955	14.4	10.5
Naphthalene-d8 % recovery**	101	98.9	98.1	98.6	101	125	85	93.8	108	105	107	94.3
Acenaphthene-d10 % recovery**	98.2	96.6	97.1	96.3	97.1	123	79.4	86.3	106	100	105	91.2
Phenanthrene-d10 % recovery**	98.4	96.9	99.2	96.1	96.6	121	75.9	79.2	104	95.9	104	91.1
Chrysene-d12 % recovery**	96.9	92.8	107	90.1	93.1	117	68.3	83.6	94.6	85.3	103	88.1
Perylene-d12 % recovery**	95.7	100	121	90.5	91.2	121	69.4	85.9	94.8	86.4	107	87.2
Total Aliphatics >C12-C44	130	9.39	239	4.35	31.1	12.2	4.4	0.524	0.1	12.1	174	99.8
Total Aromatics >EC12-EC44	42.2	1.28	178	0.1	12.7	35.2	16.9	3.63	1.67	61.2	129	110
Total Aliphatics & Aromatics >C5-C44												
Metals - (Solid)												
Iron	149000	7870	170000	3220	149000	40000	45500	40300	35300	28600	53000	131000
Manganese	19700	376	29500	140	35700	609	698	583	1320	231	2660	7720
Metals - (Liquid)												
Calcium	224000	396000	236000	398000	343000	-	-	-	-	-	156000	135000
Magnesium	28900	3100	13800	1990	14300	-	-	-	-	-	24900	21400
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.011	0.01	0.0112	0.01	0.01	0.01	0.01	0.01	0.01	0.0168	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	0.0901	-	0.004	0.0694	-	-	-	-	-	-	0.17	0.117
pH	12.3	10.6	12.4	8.88	12.7	7.73	8.09	7.33	8.23	7.11	11	11.1
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.12	-	0.0407	0.0712	-	-	-	-	-	-	0.375	0.237
Sulphate, Total potential	0.36	-	0.122	0.214	-	-	-	-	-	-	1.13	0.711
Sulphate, acid soluble (total)	0.215	-	0.325	0.0987	-	-	-	-	-	-	0.533	0.417
Cyanide, Total	2.62	1	1	1	1	1	1	1	1	1	1.23	1
Exchangeable Ammonia as N	12	12	12	12	12	276	176	147	97.1	184	12	12
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	0.0052	-
Date of Analysis	05/01/2018	05/01/2018	-	-	05/01/2018	-	-	-	-	-	04/01/2018	04/01/2018
Analysed By	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	-	-	Barbara Urbanek-Walsh	-	-	-	-	-	Barbara Urbanek-Walsh	Neville Mann
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	0.001	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	Chrysotile	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	Loose fibres in soil	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	0.0052	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Detected	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected
Comments	0	0	-	-	0	-	-	-	-	-	Fibre bundles in soil.	--
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-	-	-	-	-	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AC501	TP3AC502	TP3AC503	TP3AC601	TP3AC602	TP3AC603	TP3AC4V	TP3AC5V	TP3AC6V	TP3AD10	TP3AD10	TP3AD11
Depth	0.5	1	1.5	0.5	1	2	2.1	2.1	2.4	0.5	1.5	1
Sampled Date	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	19/01/2018	19/01/2018	19/01/2018
Carbon												
Soil Organic Matter (SOM)	10.3	1.84	8.33	3.72	6.03	8.91	2.12	0.765	1.07	1.9	2.62	0.995
Metals (Solids)												
Arsenic	10.9	7.89	6	6	6	9.82	20.2	9.9	11.4	13.7	7.35	6
Cadmium	0.265	0.2	0.2	0.792	2.01	0.838	0.02	0.162	0.02	0.194	0.2	0.2
Chromium	27	260	9	104	318	138	10.9	19.3	24.3	24.9	179	116
Copper	31.3	19	15.5	14	14	20.9	12.7	10.7	12.2	19.1	28.8	14
Lead	97.5	24.6	83.9	71.8	229	125	19	22.9	28	57	159	34.6
Mercury	1.4	1.4	1.82	1.4	1.4	1.4	0.752	0.654	0.72	0.14	1.4	1.4
Nickel	24.9	24.8	34.3	15.4	13.8	26.1	27	28.4	33.2	32.7	24.4	13.6
Selenium	10	10	10	10	10	10	1.27	1.22	1.25	1.41	10	10
Vanadium	47.9	274	56.8	123	250	291	41.1	44	51.2	44.9	203	412
Zinc	187	105	296	225	869	348	100	113	114	169	450	97.8
TPH Criteria Working Group (TPH CWG)												
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	3.34	0.1	2.03	1.2	2.5	3.71	0.14	0.1	0.1	0.1	4.94	3.43
Aliphatics >C16-C21	13.8	0.1	11.6	6.74	11.3	12	4.53	0.1	0.1	0.1	15.3	13.1
Aliphatics >C21-C35	70.1	3.47	74.1	53.9	170	64.1	18.6	0.1	1.73	2.33	57.5	51.6
Aliphatics >C35-C44	29.7	0.1	33.2	29	99.7	24.4	1.32	0.1	0.822	0.1	19.5	24.7
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	2.41	0.1	2.08	2.16	3.33	3.94	1.29	0.1	0.1	0.1	1.71	1.84
Aromatics >EC16-EC21	15.3	1.12	13.4	24.2	27.5	18.6	7.03	0.1	0.1	0.952	6.74	15.2
Aromatics >EC21-EC35	86.3	7.04	68.5	88	193	83.4	40.4	5.54	2.03	6.36	37.7	50.5
Aromatics >EC35-EC44	53.7	0.727	40.2	49	122	42.4	14.1	1.27	1.33	1.51	22.3	19.6
Aromatics >EC40-EC44	22.6	0.1	15.7	19.1	43.4	16.5	4.69	0.1	0.1	0.1	9.3	7.43
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	152	22.6	152	190	334	150	12	12	12	12	38.9	98.5
Acenaphthene	65.4	8	98.4	27.2	32	22.3	52.5	8	8	21.5	38.5	42.7
Anthracene	320	79.2	322	292	792	231	80	16	16	52.7	104	203
Benz(a)anthracene	1100	169	926	1560	2560	1240	234	14	42.8	282	324	817
Benzo(a)pyrene	1110	120	799	1610	2470	1290	182	15	31.5	243	312	730
Benzo(b)fluoranthene	1540	177	1220	2330	3670	1800	246	15	47.6	433	492	1220
Benzo(k)fluoranthene	662	78	497	749	1530	682	110	14	21.4	160	181	506
Benzo(g,h,i)perylene	934	81.2	703	1170	1840	831	160	24	24	180	276	594
Chrysene	1210	124	1020	1100	2810	827	237	10	35.1	302	367	1000
Dibenzo(a,h)anthracene	263	0.023	210	351	529	268	44.6	0.023	0.023	60.3	66.8	154
Indeno(1,2,3-cd)pyrene	784	73.8	582	1150	1680	824	121	0.018	0.018	153	216	511
Fluoranthene	2140	342	2060	1760	4890	1390	479	0.017	64.7	419	625	1470
Fluorene	136	25.3	237	96.8	146	74.9	45.7	10	10	24.2	38.5	78
Naphthalene	404	25.7	963	616	533	259	79	9	16.3	33.3	205	282
Phenanthrene	1130	191	1660	896	1650	694	313	15	55.5	185	389	893
Pyrene												
PAH, Total Detected USEPA 16	13.6	1.76	13	15.4	29.3	11.7	2.8	0.118	0.368	2.85	4.18	9.7
Naphthalene-d8 % recovery**	104	95.2	105	93.6	104	94	113	111	109	96.1	108	100
Acenaphthene-d10 % recovery**	101	90.2	102	91.8	101	92.6	108	111	106	87.9	103	94.7
Phenanthrene-d10 % recovery**	101	86.1	102	86.5	99.1	86.7	104	103	102	83.7	103	94.3
Chrysene-d12 % recovery**	99.5	87	98.5	97.4	100	95.6	94.4	106	91.8	80	107	94.7
Perylene-d12 % recovery**	104	91.3	99.1	111	103	110	92	115	85.2	83.5	115	97.2
Total Aliphatics >C12-C44	117	3.47	121	90.9	284	104	24.6	0.1	2.55	2.33	97.1	92.8
Total Aromatics >EC12-EC44	158	8.88	124	163	345	148	62.8	6.8	3.37	8.81	68.4	87.1
Total Aliphatics & Aromatics >C5-C44												
Metals - (Solid)												
Iron	65100	135000	153000	65800	119000	95600	43200	35500	37400	37100	195000	86800
Manganese	2220	17100	3660	8100	16300	7510	941	966	384	2470	8820	9810
Metals - (Liquid)												
Calcium	77700	137000	77700	146000	161000	83300	57300	49700	4950	22300	116000	171000
Magnesium	15800	13600	7340	18300	17000	10500	10700	10200	10100	7250	12100	27700
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0761
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0109
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.087
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	0.0663	-	0.0946	0.221	-	0.0996	-	-	-	-	0.205	0.004
pH	10.5	9.07	10.8	10.2	10.9	10.5	8.69	8.17	8.27	10.5	11.4	11.4
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.115	-	0.138	0.352	-	0.137	-	-	-	-	0.314	0.23
Sulphate, Total potential	0.345	-	0.414	1.06	-	0.411	-	-	-	-	0.942	0.69
Sulphate, acid soluble (total)	0.123	-	0.138	0.934	-	0.199	-	-	-	-	0.552	0.439
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	23.1	28	12	12	12	12
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	0.001	-	-	-	-	-	-	-	-	-
Date of Analysis	03/01/2018	23/12/2017	04/01/2018	03/01/2018	04/01/2018	23/12/2017	-	-	-	-	23/01/2018	-
Analysed By	James Richards	Neville Mann	Marcin Magdziarek	Renata Bozhkov	Renata Bozhkov	Neville Mann	-	-	-	-	Eva Guerra	-
Asbestos Quantification - PCOM Evaluation - %	-	-	0.001	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	None	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	N/A	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	0.001	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	Not Detected	Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-
Comments	0	0	Loose fibres in soil	0	0	0	-	-	-	-	0	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.157	0.13	0.313	0.13	0.13	0.13	-	-	-	0.13	0.13	0.0555
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AD11	TP3AD13	TP3AD13	TP3AD301	TP3AD501	TP3AD502	TP3AD601	TP3AD602	TP3AD603	TP3AD701	TP3AD702	TP3AD703
Depth	2	0.5	1	0.7	0.3	1	0.5	1	2	0.5	1	2
Sampled Date	19/01/2018	19/01/2018	19/01/2018	26/09/2017	26/09/2017	26/09/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017
Carbon												
Soil Organic Matter (SOM)	1.53	3.72	3.62	11.2	22.8	5.14	9.95	5.52	13.2	2.5	2.6	1.32
Metals (Solids)												
Arsenic	6	10.3	12.9	11.4	7.12	12.3	7.09	13.8	11.7	8.88	11.4	7.85
Cadmium	0.2	1.07	0.545	0.321	0.17	0.74	0.2	0.456	0.204	1.64	1.14	1.22
Chromium	50.9	49.2	142	40.1	13.3	7.24	15.1	16.8	0.9	37.9	237	15.6
Copper	16.4	22.6	27	16.5	5.49	33.9	17.8	28.5	34.8	23.3	28	18.8
Lead	83	190	151	53.1	17.4	52.6	46.5	78.2	320	544	103	100
Mercury	1.4	1.4	1.4	0.384	0.509	0.398	0.622	0.528	0.706	1.4	1.4	0.532
Nickel	13.3	16	24.9	11.5	10.4	19.2	14.7	18	15.8	29.2	28.2	16.6
Selenium	10	10	10	1	1.13	1	1.03	1.21	1.71	10	10	2.79
Vanadium	92.7	38.1	96.3	36.1	31.9	26.9	24.4	28.4	25.7	86.5	292	80.1
Zinc	104	491	466	155	63.4	136	136	158	136	308	224	152
TPH Criteria Working Group (TPH CWG)												
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.00875	0.00944	0.0092	0.008	0.0633	0.008	0.008	0.00912	0.008	0.00831	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.0172	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.113	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.124	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.0464	0.0697	0.0534	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.0712	0.0697	0.058	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	3.18	4.65	4.48	3.44	4.14	1.19	2.24	2.26	3.16	1.8	1.63	1.58
Aliphatics >C16-C21	14.1	14.2	13.6	10.9	21	6.38	14.8	9.5	13.2	6.21	4.54	3.5
Aliphatics >C21-C35	55.8	52.5	49	54.7	112	21.2	64.6	47.1	99.1	32.4	24.3	14.1
Aliphatics >C35-C44	19.3	17.2	14.8	21.5	40.6	5.92	24.8	17.1	52.1	7.13	2.84	2.63
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.0633	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.0421	0.176	0.0452	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.0475	0.0461	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	2.86	1.94	1.53	2.85	6.63	1.49	4.64	2.77	4.45	1.98	1.53	1.46
Aromatics >EC16-EC21	18.2	9.54	8.31	15.8	40.6	12	29.7	15.9	24.5	8.55	6.68	4.58
Aromatics >EC21-EC35	64.1	44.8	40.2	77.5	123	51.2	102	76.9	148	34.6	25.7	17.6
Aromatics >EC35-EC44	26.9	22.2	19.7	40	42.2	19.2	47	38.5	89.1	13.5	8.39	6.29
Aromatics >EC40-EC44	9.73	8.75	7.77	17	15.1	7.72	16.7	14.2	34.2	4.69	2.81	2.31
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	522	106	98.4	99.5	492	107	591	215	123	62.9	58.1	19
Acenaphthene	67.2	53.7	30.6	106	77.5	109	104	124	77.5	32.5	41.1	19.5
Anthracene	1230	289	195	269	1510	284	1870	557	330	140	155	45.9
Benz(a)anthracene	3190	880	768	602	4900	1580	3860	3210	1170	492	475	103
Benzo(a)pyrene	2500	862	792	613	4610	1550	3460	2890	1090	438	397	77.3
Benzo(b)fluoranthene	3740	1350	1310	881	5930	2730	4650	4010	1720	663	647	130
Benzo(k)fluoranthene	1420	496	437	358	2690	801	2010	1490	638	240	217	56
Benzo(g,h,i)perylene	1610	626	609	532	4150	1120	2530	1900	824	294	275	76.4
Chrysene	3050	817	739	745	4670	1500	3830	3130	809	344	364	133
Dibenzo(a,h)anthracene	477	180	176	132	965	354	761	686	255	98.6	86.4	24.2
Indeno(1,2,3-cd)pyrene	1600	527	516	396	3250	905	2320	1680	758	287	262	53.5
Fluoranthene	7760	1860	1330	1340	11200	2340	8640	5580	1500	574	680	199
Fluorene	772	102	107	172	516	136	1110	250	217	56.9	90.6	28.7
Naphthalene	620	257	496	376	2140	304	1320	496	425	186	215	99.2
Phenanthrene	6040	1090	806	914	8060	854	6350	1760	1220	473	613	272
Pyrene												
PAH, Total Detected USEPA 16	39.4	11.1	9.53	8.63	63.8	16.5	49.5	32.2	12.3	4.81	5.07	1.49
Naphthalene-d8 % recovery**	92.9	92	113	107	109	103	103	110	85	92.6	91.9	99.2
Acenaphthene-d10 % recovery**	87.9	88.8	109	93.6	101	98.3	100	107	81.6	91.9	89.4	95.2
Phenanthrene-d10 % recovery**	88.6	88.1	107	93.2	102	95	100	105	76.7	87.1	84.2	93.8
Chrysene-d12 % recovery**	94.5	89.4	108	84.6	108	97.3	103	108	84.9	96.4	90.9	86.7
Perylene-d12 % recovery**	97.4	97.5	117	78.3	104	99.4	107	113	92.3	111	98.1	84.7
Total Aliphatics >C12-C44	92.4	88.5	81.9	90.5	178	34.7	106	76	168	47.5	33.3	21.8
Total Aromatics >EC12-EC44	112	78.5	69.8	136	212	83.9	183	134	266	58.6	42.3	29.9
Total Aliphatics & Aromatics >C5-C44												
Metals - (Solid)												
Iron	141000	87200	137000	23400	28600	26500	38300	34100	46300	61200	67600	51000
Manganese	5990	4210	4370	2160	2760	1610	1370	1410	1580	3250	6010	3240
Metals - (Liquid)												
Calcium	127000	110000	94800	119000	146000	57700	115000	87300	61100	86500	91000	93800
Magnesium	23700	28400	15900	17900	19100	21100	7600	23500	6950	13900	16600	22600
Phenols												
Phenol	0.109	0.0118	0.01	0.01	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.0109	0.0236	0.0115	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.12	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.136	-	0.0882	0.103	0.0534	0.134	-	0.113	0.261	-	0.116
pH	11.9	10.7	10.7	10.5	11.1	8.45	9.67	9.36	9.78	10.2	10.4	9.3
Sulphate, Total	-	-	-	9500	7110	800	-	-	-	-	-	-
Sulphur, Total	-	0.178	-	-	-	-	0.174	-	0.195	0.158	-	0.116
Sulphate, Total potential	-	0.534	-	-	-	-	0.522	-	0.585	0.474	-	0.348
Sulphate, acid soluble (total)	-	0.139	-	0.95	0.711	0.08	0.127	-	0.253	0.194	-	0.155
Cyanide, Total	1	1	1	1	1.15	1	1.1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	21.4	12	12	18.5	12	12	12	12	12	12
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	23/01/2018	23/01/2018	-	06/10/2017	06/10/17	-	03/01/2018	03/01/2018	03/01/2018	04/01/2018	04/01/2018	04/01/2018
Analysed By	Christian Hallam	Christian Hallam	-	Neville Mann	Christian Hallam	-	Marcin Magdziarek	Marcin Magdziarek	Renata Bozhkov	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Comments	0	0	-	0	0	-	0	0	0	0	0	n
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.13	-	-	-	0.294	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AD704	TP3AD13V	TP3AD14V	TP3AD3V	TP3AD3V	TP3AD4V	TP3AD5V	TP3AD5V	TP3AD6V	TP3AD7V	TP3AE10	TP3AE10
Depth	3	0	0	0	1.8	0	0	1.4	2.9	3.9	0.5	1.5
Sampled Date	15/12/2017	26/02/2018	26/02/2018	12/01/2018	26/09/2017	12/01/2018	12/01/2018	26/09/2017	15/12/2017	15/12/2017	19/01/2018	19/01/2018
Carbon												
Soil Organic Matter (SOM)	3.29	3.4	1.7	2.59	2.12	0.974	3.21	1.08	2.4	3.69	1.27	2.52
Metals (Solids)												
Arsenic	9.78	13.8	16.8	9.86	9.44	14.6	11.6	11.8	10.9	14.6	8.26	8.48
Cadmium	1.47	0.02	0.02	0.02	0.241	0.02	0.145	0.161	0.02	0.02	0.2	0.2
Chromium	89	30.4	31.1	28	28.1	18.2	30.4	22.9	30.7	14.4	327	92
Copper	15	12.6	11.7	14.5	12	8.45	14.8	8.72	14.8	11.2	19.1	21
Lead	122	34.3	28.7	25.8	28.8	19	32.7	21.8	25.2	17.1	41.2	62.6
Mercury	1.4	0.14	0.14	0.14	0.676	0.14	0.14	0.634	0.801	0.671	1.4	1.4
Nickel	28.4	32	40.6	38.5	34.3	30.2	28.4	30.9	34.8	26.1	16.9	22
Selenium	10	1	1	1.14	1	1.44	1	1	1.27	1.27	11.4	10
Vanadium	118	58.9	55.8	52.1	57.2	42	49	49.6	59.2	38.7	314	171
Zinc	280	117	108	112	118	89.6	120	94.8	110	96.1	95.1	159
TPH Criteria Working Group (TPH CWG)												
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.0153	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	1.94	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.0966	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	1.27	0.747	0.1	0.1	0.1	0.1	0.1	0.1	0.101	3.27	2.19	1.95
Aliphatics >C16-C21	7.6	1.43	0.1	0.1	0.252	0.1	0.1	0.1	0.527	7.07	10.7	8.6
Aliphatics >C21-C35	37.1	18.3	1.42	1.42	2.89	0.956	0.1	1.91	5.2	17.8	69.5	49.3
Aliphatics >C35-C44	7.68	3.16	0.1	0.1	0.281	0.1	0.1	0.1	0.1	3.77	33.9	25.4
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	1.29	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.0649	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	2.35	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.29	1.11	0.888
Aromatics >EC16-EC21	12.8	4.94	0.1	0.1	0.1	0.605	0.1	0.1	0.376	2.61	8.49	6.83
Aromatics >EC21-EC35	41.4	19.1	2.15	4.17	4.14	2.78	4.52	1.7	9.01	32.2	65.6	49.1
Aromatics >EC35-EC44	16.8	12.1	0.771	1.21	1.3	0.684	3.45	0.933	7.08	15.6	47	33.5
Aromatics >EC40-EC44	6.09	3.91	0.1	0.1	0.233	0.1	1.75	0.1	2.77	4.06	20.6	14.2
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	165	12	12	12	12	12	12	12	12	12	21.3	64.6
Acenaphthene	36.5	8	8	8	8	8	8	8	8	13.9	39.1	39.3
Anthracene	270	16	16	16	16	16	16	16	16	42.6	91.4	144
Benz(a)anthracene	824	14	14	14	14	14	14	14	53.6	31.1	658	686
Benzo(a)pyrene	739	29.7	15	15	15	15	15	15	50	54.2	697	753
Benzo(b)fluoranthene	1260	45.2	15	15	15	15	15	15	61.8	87.2	1110	1150
Benzo(k)fluoranthene	452	14	14	14	14	14	14	14	31.9	40.9	396	417
Benzo(g,h,i)perylene	515	43.2	24	24	24	24	24	24	45.3	67.9	542	559
Chrysene	756	37.5	10	10	10	10	10	10	55.8	61.4	788	691
Dibenzo(a,h)anthracene	134	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	142	147
Indeno(1,2,3-cd)pyrene	458	28.9	0.018	0.018	0.018	0.018	0.018	0.018	35.1	47.2	422	468
Fluoranthene	1640	53.9	0.017	0.017	0.017	0.017	0.017	0.017	115	142	959	1140
Fluorene	98.7	10	10	10	10	10	10	10	10	30.9	25.6	54
Naphthalene	518	9	9	9	9	9	9	9	9	47.4	97.4	261
Phenanthrene	1190	38.2	15	15	15	15	15	15	67.1	147	437	579
Pyrene												
PAH, Total Detected USEPA 16	10.3	0.313	0.118	0.118	0.118	0.118	0.118	0.118	0.591	0.912	7.28	8.1
Naphthalene-d8 % recovery**	99.9	99.9	93.7	98.5	108	94.9	107	114	109	126	93.2	101
Acenaphthene-d10 % recovery**	95.9	99.5	93.9	92.1	104	90.5	103	105	106	123	88.3	96
Phenanthrene-d10 % recovery**	95.3	90.2	85.4	90.9	99.9	88.1	98.8	103	103	121	86.9	94.7
Chrysene-d12 % recovery**	99.2	91	84.8	86.4	94.9	84	100	97.5	93.7	114	90.6	94.1
Perylene-d12 % recovery**	103	87.9	77.3	90.9	96.7	86.7	94.1	92.3	91.2	119	95.8	103
Total Aliphatics >C12-C44	53.7	23.7	1.42	1.42	3.42	0.956	0.1	1.91	5.83	31.9	116	85.3
Total Aromatics >EC12-EC44	73.4	36.2	2.93	5.37	5.44	4.06	7.98	2.64	16.5	51.7	122	90.4
Total Aliphatics & Aromatics >C5-C44												
Metals - (Solid)												
Iron	88700	35800	34200	34000	39800	33900	37200	35700	33100	40700	156000	163000
Manganese	6650	1300	329	1500	538	2400	969	683	260	1020	14900	5450
Metals - (Liquid)												
Calcium	93300	-	-	-	-	-	-	-	5570	50600	184000	95600
Magnesium	15300	-	-	-	-	-	-	-	10400	9820	4510	14300
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0146	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	0.214	-	-	-	-	-	-	-	-	-	-	0.107
pH	10.7	7.65	7.4	7.49	7.64	8.28	7.4	8.47	8.14	7.93	11.3	10.8
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.175	-	-	-	-	-	-	-	-	-	-	0.172
Sulphate, Total potential	0.525	-	-	-	-	-	-	-	-	-	-	0.516
Sulphate, acid soluble (total)	0.256	-	-	-	-	-	-	-	-	-	-	0.303
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	175	47.1	145	213	78.3	237	65.6	52.3	12	12	12
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	04/01/2018	-	-	-	-	-	-	-	-	-	-	23/01/2018
Analysed By	Marcin Magdziarek	-	-	-	-	-	-	-	-	-	-	Paul Poynton
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected
Fibrous Tremolite	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected
Fibrous Actinolite	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected
Non-Asbestos Fibre	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected
Comments	0	-	-	-	-	-	-	-	-	-	-	0
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.201	-	-	-	-	-	-	-	-	-	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	TP3AE11	TP3AE11	TP3AE12	TP3AE13	TP3AE701	TP3AE9	TP3AE901	TP3AE902	TP3AE401	TP3AE402	TP3AE601	TP3AE602	TP3AE603	TP3AE801	TP3AE802	TP3AE803	TP3AE11V
Depth	1	2	1	0.3	0.5	0.8	0.4	1	0.4	0.8	0.5	1	1.5	0.3	0.6	0.9	0
Sampled Date	19/01/2018	19/01/2018	19/01/2018	19/01/2018	26/09/2017	19/01/2018	26/09/2017	26/09/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	05/03/2018
Carbon																	
Soil Organic Matter (SOM)	0.612	1.79	2.22	3.14	2.95	1.47	1.03	0.35	16.2	6.43	3.48	2.84	1.38	5.74	1.9	3.86	3.15
Metals (Solids)																	
Arsenic	6	6	6.79	6	7.85	6.32	3.2	24.1	9.62	11.9	4.65	7.5	6.19	11.6	7.79	12.7	12
Cadmium	0.2	0.2	0.2	0.2	0.823	0.2	0.259	0.2	0.171	0.143	0.02	0.966	0.358	0.202	0.02	0.2	0.136
Chromium	988	612	744	287	16.8	56.1	0.9	9	14.1	13.8	92.9	5.1	12.3	12.2	7.26	9	35.9
Copper	20.7	20.3	84.7	20.1	15.7	19.3	1.4	14	27.7	31.5	12.2	12.6	11.4	29	18.3	26.3	12.4
Lead	18.4	24	35.5	57.7	175	35.4	11.4	8.36	27.1	27.3	32.6	137	46.3	55.7	37.8	28.7	30.1
Mercury	1.4	1.4	1.4	1.4	0.159	1.4	0.726	1.68	0.661	0.973	0.541	0.516	0.676	1.4	0.747	1.4	0.14
Nickel	10.8	33.6	34.8	13.3	19.4	21.4	7.19	2	25.2	31.8	11.9	18.1	11.8	29.7	17	32	30
Selenium	16	13.4	15.9	10.8	1.82	10	1	12.2	1	1	3.07	2.25	1	10	2.12	10	1
Vanadium	502	341	577	383	45.5	88.9	24.2	33.4	26.2	36.8	480	32	56.1	54.8	38.4	31.9	58.3
Zinc	49.1	85.4	100	117	145	97.6	54.8	22.1	74.5	104	120	122	143	129	105	54.4	115
TPH Criteria Working Group (TPH CWG)																	
Benzene	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.00222	0.008	0.008	0.008	0.008	0.008	0.0119	0.008	0.008	0.008	0.0229	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.003	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.081	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.123	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.138	0.0487	0.04	0.0479	0.04	0.189	0.0418	0.04
Aliphatics >C12-C16	1.46	1.79	4.55	0.785	0.833	1.62	0.736	0.1	12.4	85.1	1.34	1.47	0.519	4.04	2.86	2.18	0.644
Aliphatics >C16-C21	8.07	10.5	28.5	3.46	6.93	4.88	3.47	0.399	84.2	213	4.34	2.5	4.15	17	11.7	4.9	2.41
Aliphatics >C21-C35	61.1	73.8	199	26.3	24.9	27.7	43.4	7.85	50.1	80.7	25.8	12.1	25.9	37.2	42.2	13	19.6
Aliphatics >C35-C44	18.1	17.5	116	7.75	5.42	13.4	24.8	1.28	1.22	0.1	7.95	1.73	10.5	7.35	14.2	1.75	3.75
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0945	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.0915	0.04	0.04	0.04	0.04	0.127	0.04	0.04
Aromatics >EC12-EC16	0.6	1.11	2.12	0.954	1.34	0.542	0.375	0.1	8.59	12.1	1.31	1.51	1.47	5.43	1.79	4.32	1.01
Aromatics >EC16-EC21	6.31	8.9	15.8	4.77	6.13	3.13	4.03	0.1	33	72.3	11.2	4.85	5.84	42.5	7.6	7.87	3.7
Aromatics >EC21-EC35	37.8	47	64.8	25.2	25.9	23.6	52.2	1.28	50.5	73.7	40.9	19.2	29.6	86.1	43.6	20.8	51.2
Aromatics >EC35-EC44	14.9	17.1	34.5	13.2	9.61	15.5	38.3	0.253	8.48	9.37	17.6	7.28	18.6	33.9	25.7	8.66	16.1
Aromatics >EC40-EC44	5.53	6.39	14.8	5.33	3.53	6.49	16.1	0.1	3.2	3.87	7.04	2.72	6.94	13.2	10.6	3.56	5.7
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	12	239	145	77.8	39.9	21.5	42	12	16.3	20.9	68.8	29	35.4	81	92.4	12	12
Acenaphthene	30.9	59.1	44.8	19	26.1	33.1	15.8	8	30.6	31	15.7	10.8	8	16.2	25.9	11.4	8
Anthracene	72.9	477	274	168	104	121	194	16	71.7	60.4	139	65.8	52.5	134	155	24.2	16
Benz(a)anthracene	619	1510	1300	555	275	555	1300	14	187	176	653	255	157	441	833	48	14
Benzo(a)pyrene	647	1350	1280	492	232	582	1430	15	157	169	589	202	118	441	829	36.6	15
Benzo(b)fluoranthene	1130	2120	1930	764	455	839	1880	15	242	215	886	316	203	640	1170	56.6	15
Benzo(k)fluoranthene	395	768	845	241	149	308	740	14	102	94.6	294	117	77.6	246	376	24.9	14
Benzo(g,h,i)perylene	536	933	880	403	223	430	1040	24	116	110	358	140	121	377	557	39.8	24
Chrysene	725	1670	1340	540	275	618	1140	10	188	165	451	167	172	462	487	74.3	24.8
Dibenzo(a,h)anthracene	140	229	232	111	58.1	128	267	0.023	31	26.8	120	43.6	39	104	185	0.023	0.023
Indeno(1,2,3-cd)pyrene	443	833	826	336	158	354	811	0.018	89.2	83.7	343	132	92.3	309	553	29.3	0.018
Fluoranthene	1230	3190	2210	1310	495	926	1720	0.017	311	247	773	312	309	809	895	96.3	36.1
Fluorene	12.3	473	95.2	55.1	57	38.6	26.7	10	84.5	109	56.6	33.4	36.2	49.5	56.5	16.7	10
Naphthalene	57.1	178	274	203	186	74.1	65.3	9	245	245	136	98.9	80.1	156	149	94.7	9
Phenanthrene	687	3020	959	541	471	396	683	15	481	399	459	255	213	375	502	192	28.4
Pyrene																	
PAH, Total Detected USEPA 16	7.73	19.3	14.3	6.82	3.56	6.18	12.8	0.118	2.62	2.42	5.94	2.41	1.94	5.3	7.56	0.833	0.118
Naphthalene-d8 % recovery**	95.5	93.4	92.4	98.9	95.9	95.9	96.9	94.6	96.5	96.3	94.7	95.7	105	108	97.5	104	90.6
Acenaphthene-d10 % recovery**	90.9	87.7	87.1	98	91.7	89.8	92.1	91.3	93.1	94.4	92.5	92.4	102	103	96.1	101	92.8
Phenanthrene-d10 % recovery**	91.4	87.8	87.6	94.2	89.6	87	90.8	89.7	93.2	92.3	85.9	85.5	100	102	91.1	98.8	85.2
Chrysene-d12 % recovery**	92.5	92.6	92.8	96.7	91.7	87.5	95.3	86.3	95.8	97.2	92.4	91.5	91.3	98.1	98.5	90.3	87.6
Perylene-d12 % recovery**	100	95.9	97.7	93.5	91.6	93	96.7	90.8	97.7	102	105	100	87.1	99.3	111	87.7	85.3
Total Aliphatics >C12-C44	88.7	104	349	38.3	38.1	47.6	72.4	9.53	148	379	39.4	17.8	41	65.6	71	21.8	26.4
Total Aromatics >EC12-EC44	59.6	74.1	117	44.1	43	42.8	94.9	1.53	101	167	71.1	32.8	55.5	168	78.7	41.6	72
Total Aliphatics & Aromatics >C5-C44																	
Metals - (Solid)																	
Iron	162000	219000	213000	130000	50700	74900	37400	370000	24400	39600	58800	39800	38900	66100	55600	71000	28300
Manganese	26900	22500	24900	14200	2990	3680	2860	12000	638	1310	5650	2560	2100	2500	2750	1850	261
Metals - (Liquid)																	
Calcium	198000	217000	206000	171000	86100	91800	150000	4140	12400	17100	139000	91400	94200	70400	60400	12700	-
Magnesium	20500	19400	1870	17700	25400	14900	29500	520	3970	3720	37100	13500	27500	11500	10700	2580	-
Phenols																	
Phenol	0.01	0.01	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0104	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.004	0.004	0.147	0.144	0.0679	0.409	0.177	0.487	0.367	0.466	-	0.211	0.175	-	0.06	-
pH	12.7	12.6	12.5	11.5	10.3	10.5	10.7	9.89	8.33	8.08	8.63	8.59	9.4	9.26	8.62	8.54	7.22
Sulphate, Total	-	-	-	-	5490	-	22900	788	-	-	-	-	-	-	-	-	-
Sulphur, Total	-	0.26	0.195	0.34	-	0.131	-	-	0.0923	0.0946	0.199	-	0.188	0.121	-	0.115	-
Sulphate, Total potential	-	0.78	0.585	1.02	-	0.393	-	-	0.277	0.284	0.597	-	0.564	0.363	-	0.345	-
Sulphate, acid soluble (total)	-	0.348	0.286	0.549	0.549	0.246	2.29	0.0788	0.195	0.176	0.357	-	0.248	0.127	-	0.0677	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	229
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-
Date of Analysis	-	23/01/2018	-	23/01/2018	06/10/2017	23/01/2018	-	06/10/2017	04/01/2018	03/01/2018	04/01/2018	04/01/2018	04/01/2018	03/01/2018	04/01/2018	04/01/2018	-
Analysed By	-	Paul Poynton	-	Paul Poynton	Neville Mann	Christian Hallam	-	Neville Mann	Marcin Magdziarek	Renata Bozhkov	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	Neville Mann	James Richards	Barbara Urbanek-Walsh	Neville Mann	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Detected	Not Detected	-
Amosite (Brown) Asbestos	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Fibrous Tremolite	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Fibrous Actinolite	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Comments	-	0	-	0	0	0	-	0	0	0	0	0	0	0	Loose fibres in soil.	--	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.0199	0.13	-	0.13	-	-	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AE12V	TP3AE14V	TP3AE3V	TP3AE5V	TP3AE7V	TP3AE9V	TP3AE9V	TP3AE4V	TP3AE6V	TP3AE8V	TP3AF10	TP3AF10	TP3AF101	TP3AF102	TP3AF103	TP3AF11	TP3AF11
Depth	0	0	0	0	0	0	2	1	2	1.1	1	1.5	0.1	0.2	1	1	1.5
Sampled Date	27/02/2018	26/02/2018	12/01/2018	12/01/2018	12/01/2018	09/03/2018	26/09/2017	15/12/2017	15/12/2017	15/12/2017	19/01/2018	19/01/2018	26/09/2017	26/09/2017	26/09/2017	19/01/2018	19/01/2018
Carbon																	
Soil Organic Matter (SOM)	1.53	2.31	1.88	1.97	2.6	2.57	10.1	0.907	0.909	15.9	2.4	0.679	3.72	3.45	2.22	3.5	4.1
Metals (Solids)																	
Arsenic	13.3	14.9	11.1	11.3	10.3	14.3	18	14.2	6.51	37	9.63	6	7.11	36.9	7.18	10.3	6
Cadmium	0.02	0.02	0.0275	0.0739	0.0759	0.408	0.68	0.2	0.02	0.362	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Chromium	26.8	28.8	28.3	30.6	31.7	33.7	32.2	23.3	22.7	12.9	107	537	71.2	54.8	84.9	129	124
Copper	9.74	9.43	12.9	11.7	16.9	13	17.9	11.1	9.84	34.6	20.6	24.8	14	46.3	21.9	44.3	21.8
Lead	27.8	32.2	27	30.2	31	32.1	51.5	37.3	19.2	25.9	38.9	21.7	62.9	60.8	93.8	12.4	28.5
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.657	0.83	0.741	0.517	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Nickel	36.7	31.6	36.7	37	29.5	36.6	25.1	33.4	29.7	32.6	39.2	17	18.6	53.2	41.5	67.6	76.7
Selenium	1	1	1	1.31	1	1.25	1	1.04	1	6.62	10	22.1	10	10	10	10	10
Vanadium	55.5	54.7	53.1	47.4	51.9	64.5	60.5	45.9	45.6	60.8	423	552	119	294	732	155	161
Zinc	109	118	115	117	122	144	156	111	104	63.4	127	39.1	183	164	211	104	150
TPH Criteria Working Group (TPH CWG)																	
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.00974	0.008	0.008	0.008	0.00858	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0408	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0762	0.04	0.04
Aliphatics >C12-C16	0.1	0.1	0.1	0.1	0.1	0.1	1.59	0.1	0.1	0.708	2.36	0.748	0.416	9.03	2.88	6.48	7.07
Aliphatics >C16-C21	0.1	0.1	0.1	0.1	0.898	0.1	0.272	0.1	0.998	1.58	13.5	5.21	5.46	19.3	16.1	35.3	33.9
Aliphatics >C21-C35	0.1	0.1	1.41	0.1	0.902	0.1	9.67	0.1	2.87	13.2	120	47.8	29.1	54.5	104	228	147
Aliphatics >C35-C44	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.11	38.9	17.5	6.7	14.4	33.2	59.7	18.8
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0515	0.04	0.04
Aromatics >EC12-EC16	0.1	0.1	0.1	0.1	0.1	0.1	0.778	0.1	0.1	0.1	1.61	0.1	0.947	1.7	1.16	2.35	4.21
Aromatics >EC16-EC21	0.1	0.1	0.1	0.1	0.1	0.1	2.27	1.08	1.34	0.1	8.15	6.68	7.55	3.34	6.52	15.7	31
Aromatics >EC21-EC35	1.42	4.89	3.67	2.21	3.24	4.27	58.3	4.85	5.19	3.11	63.3	54.1	46.9	17.6	41.7	92.6	173
Aromatics >EC35-EC44	1.04	0.903	0.935	4.16	3.28	0.493	13.1	0.361	1.08	1.11	35.8	19.9	15.9	7.9	19.2	30.5	37.5
Aromatics >EC40-EC44	0.1	0.1	0.1	2.04	1.65	0.1	3.92	0.1	0.1	0.1	14.6	7.46	5.88	2.95	7.09	12.2	14.2
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	12	12	12	12	12	12	12	12	12	12	33	13.6	59	22.6	32.4	24.5	26.2
Acenaphthene	8	8	8	8	8	8	8	8	8	8	51	102	10.9	14.6	94.2	15.4	29.5
Anthracene	16	16	16	16	16	16	16	16	16	16	108	198	128	50.2	177	77.4	111
Benz(a)anthracene	14	14	14	14	14	14	119	14	14	14	569	2160	471	197	796	579	807
Benzo(a)pyrene	15	15	20.3	15	15	15	106	15	15	15	610	2590	511	206	919	410	623
Benzo(b)fluoranthene	15	15	15	15	15	15	215	15	15	15	1070	3770	801	350	1500	614	920
Benzo(k)fluoranthene	14	14	14	14	14	14	63.5	14	14	14	325	1330	260	110	550	175	264
Benzo(g,h,i)perylene	24	24	48.5	24	24	24	136	24	24	24	617	1860	506	201	838	478	775
Chrysene	10	10	10	10	10	10	116	10	10	10	707	2560	485	232	909	715	1100
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	154	460	109	39.2	171	100	154
Indeno(1,2,3-cd)pyrene	0.018	0.018	31.5	0.018	0.018	0.018	100	0.018	0.018	0.018	477	1410	364	134	605	197	320
Fluoranthene	0.017	0.017	0.017	0.017	0.017	0.017	195	0.017	0.017	0.017	1030	2920	848	395	1940	711	959
Fluorene	10	10	10	10	10	10	10	10	10	10	41.6	36.3	29.5	21.2	58.2	15.8	27.6
Naphthalene	9	9	9	9	9	9	29.6	9	9	34.7	174	94.6	218	134	307	259	181
Phenanthrene	15	15	15	15	15	15	130	15	15	23	585	994	395	279	2320	704	1210
Pyrene																	
PAH, Total Detected USEPA 16	0.118	0.118	0.118	0.118	0.118	0.118	1.35	0.118	0.118	0.118	7.48	23.2	5.84	2.69	12.7	6.35	9.4
Naphthalene-d8 % recovery**	97.2	100	87.2	106	109	106	117	102	108	95.5	99	97.9	93.9	94.6	95.5	98.3	90.7
Acenaphthene-d10 % recovery**	101	107	81.5	104	106	103	109	99.3	104	92.8	96.9	93.7	88.6	88.7	93.6	93.9	86.5
Phenanthrene-d10 % recovery**	93.7	89.7	78	99.5	101	97.6	109	92.7	102	74.9	93.9	92.5	86.7	87.2	91.6	95.2	88.1
Chrysene-d12 % recovery**	95.4	87.5	75.6	102	103	90.7	108	95.8	91.6	18.7	96.3	99.6	88.1	87.6	94.6	98.3	96.3
Perylene-d12 % recovery**	92.8	96.9	78.9	97.6	97.5	89.2	111	108	85.3	4.38	92.3	106	89.4	89	100	108	104
Total Aliphatics >C12-C44	0.1	0.1	1.41	0.1	1.8	0.1	11.5	0.1	3.87	17.6	175	71.2	41.7	97.2	156	329	206
Total Aromatics >EC12-EC44	2.46	5.79	4.6	6.37	6.52	4.77	74.5	6.29	7.61	4.22	109	80.7	71.3	30.5	68.6	141	246
Total Aliphatics & Aromatics >C5-C44																	
Metals - (Solid)																	
Iron	39300	32100	28800	37800	37000	43700	34200	41100	35200	15800	166000	191000	114000	295000	209000	247000	163000
Manganese	578	492	771	1560	695	842	373	313	457	233	8890	32100	7540	10800	13100	8430	7460
Metals - (Liquid)																	
Calcium	-	-	-	-	-	-	-	4150	32500	9770	105000	226000	119000	117000	158000	87600	115000
Magnesium	-	-	-	-	-	-	-	9590	10700	2090	12100	7690	21400	15600	22800	14400	26800
Phenols																	
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0298	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-	-	-	-	0.135	-	0.127	0.105	0.0347	-	0.0487
pH	7.28	7.26	7.82	7.7	7.64	7.05	7.21	8.23	8.69	6.54	11.7	11.9	9.89	12	12.6	12.3	12.2
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	3750	2070	8810	-	-
Sulphur, Total	-	-	-	-	-	-	-	-	-	-	0.167	-	-	-	-	-	0.165
Sulphate, Total potential	-	-	-	-	-	-	-	-	-	-	0.501	-	-	-	-	-	0.495
Sulphate, acid soluble (total)	-	-	-	-	-	-	-	-	-	-	0.299	-	0.375	0.207	0.881	-	0.249
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.26	1	1
Exchangeable Ammonia as N	225	86.3	129	134	171	274	260	12	19.9	12	12	12	19.4	12	12	12	12
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-	-	-	-	23/01/2018	-	06/10/2017	06/10/2017	-	23/01/2018
Analysed By	-	-	-	-	-	-	-	-	-	-	-	Christian Hallam	-	Neville Mann	Neville Mann	-	Paul Poynton
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Comments	-	-	-	-	-	-	-	-	-	-	-	0	-	0	0	-	0
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-	-	-	-	-	0.13	0.13	-	-	-	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AF1101	TP3AF12	TP3AF12	TP3AF13	TP3AF13	TP3AF301	TP3AF302	TP3AF9	TP3AF9	TP3AF501	TP3AF502	TP3AF601	TP3AF602	TP3AF603	TP3AF701	TP3AF702
Depth	0.2	0.7	1.5	0.8	1.5	0.3	1.2	0.5	1	0.5	1	0.5	1	1.5	0.5	1
Sampled Date	26/09/2017	19/01/2018	19/01/2018	19/01/2018	19/01/2018	26/09/2017	26/09/2017	19/01/2018	19/01/2018	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017
Carbon																
Soil Organic Matter (SOM)	1.58	5.65	1.68	6.1	5.9	1.53	2.29	0.912	0.436	0.641	0.772	2.4	2.97	3.52	4.9	2.6
Metals (Solids)																
Arsenic	8.98	46.6	57.3	6	10.2	6	6	6.77	5.89	2.82	6	9.47	7.53	7.39	10.5	6.98
Cadmium	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.02	0.02	0.02	0.2	0.995	0.185	0.0301	0.67	0.871
Chromium	117	258	259	320	113	197	229	20	45.9	0.9	9	0.9	44	28.5	7.44	25.7
Copper	19.6	320	370	25.8	34.1	61.8	17.6	33.3	35.2	2.35	14	16.8	15.4	16.5	20.5	17.3
Lead	34	183	172	68.2	95	31.6	99.1	28.1	23.1	3.24	16.1	44.2	51	66.2	80.9	77.2
Mercury	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	1.18	3.2	0.804	0.633	0.728	0.605	0.685
Nickel	11	169	222	16.7	20.6	75.1	31.2	28.9	28.7	1.34	4.17	20.6	16.3	16.6	20	19.1
Selenium	10	10	10	10.7	10	17.2	14	1	1	4.05	10	1.05	3.41	2.78	2.36	3.29
Vanadium	184	10.9	113	533	585	801	1090	30.7	64	30.3	37.3	25.4	127	170	39.6	67.1
Zinc	123	743	749	154	304	104	308	117	84.1	29.3	37.1	131	170	144	148	187
TPH Criteria Working Group (TPH CWG)																
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.00852	0.008	0.0105	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.0204
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.0407	0.04	0.0467	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.0935	0.04	0.0913	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0403	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.0616	0.04	0.235	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0456	0.04
Aliphatics >C12-C16	0.747	3.06	2.76	0.1	2.12	10.5	5.26	0.1	0.287	0.1	0.1	0.765	0.624	1.92	1.61	0.83
Aliphatics >C16-C21	7.35	17.3	20.2	1.4	8.7	60.6	28.6	0.371	0.156	0.1	1.77	2.18	4.75	4.85	4.57	4.73
Aliphatics >C21-C35	73.8	146	171	5.68	39.9	465	216	8.72	3.55	10.8	10.5	9.69	38.4	31.5	23.6	25.6
Aliphatics >C35-C44	16.9	70.9	101	0.1	10.7	176	75	4.42	0.1	4.77	3.98	0.1	7.03	7.98	3.64	7.18
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.0726	0.04	0.0754	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0449
Aromatics >EC10-EC12	0.04	0.04	0.04	0.0407	0.04	0.156	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.355	1.3	1.42	0.1	1.54	4.82	2.14	0.1	0.1	0.1	0.339	4.7	1.56	0.899	1.64	1.95
Aromatics >EC16-EC21	3.07	6.13	6.15	2	12.7	25.6	44.6	0.442	0.1	1.09	0.999	29.4	7.33	5.15	5.08	9.33
Aromatics >EC21-EC35	21.7	35.7	41.6	5.7	51.8	132	96.3	6.32	1.05	12.1	8.41	60.2	34.5	26.6	19.7	33.1
Aromatics >EC35-EC44	8.3	18.1	27.4	1.12	17	70.4	39.3	5	0.526	11.9	6.21	17.7	12.9	11	8.44	14.7
Aromatics >EC40-EC44	3.24	7.65	12.5	0.1	5.13	29.6	15.6	2.17	0.1	5.2	2.47	6.59	5.06	4.05	3.15	6.58
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	31.5	22.7	193	215	24.7	12	21.8	12	12	12	78.1	92.8	59.9	45	56.8
Acenaphthene	16.1	8	8	29.3	48	77.1	73.8	25.4	8	8	8	144	38.2	17.1	30.7	30.7
Anthracene	31.5	77	113	318	482	114	212	83.5	16	16	16	259	167	127	112	117
Benz(a)anthracene	198	236	246	1110	1620	928	2300	322	14	32.8	23.9	739	642	577	369	453
Benzo(a)pyrene	179	240	195	1030	1610	965	1630	131	15	30.4	23.1	597	544	549	325	379
Benzo(b)fluoranthene	430	375	308	1680	2570	1970	4240	264	15	44.8	35.2	1080	1010	761	460	560
Benzo(k)fluoranthene	125	145	142	599	906	657	1110	110	14	21.2	16.8	386	324	336	175	188
Benzo(g,h,i)perylene	224	184	141	741	1180	998	1470	99.9	24	36.3	25.5	383	401	356	212	223
Chrysene	216	229	273	1060	1600	1120	3110	306	10	40.6	34.1	680	591	520	262	281
Dibenzo(a,h)anthracene	47.8	50.3	36.6	211	334	222	319	42.3	0.023	0.023	0.023	121	103	87.9	66.9	74.2
Indeno(1,2,3-cd)pyrene	160	153	122	646	1050	743	1000	88.4	0.018	23.2	0.018	349	361	304	198	230
Fluoranthene	337	483	500	2140	3470	2000	5920	824	0.017	55.5	39.7	1180	934	883	498	554
Fluorene	10	26.3	38.5	93.6	140	46	30.8	50.3	10	10	10	222	88.3	41.1	63.2	66.6
Naphthalene	47.8	116	62.4	592	612	158	330	33.4	9	35.3	26.5	172	414	165	164	202
Phenanthrene	197	376	402	1060	1760	1740	3900	250	15	53.6	39.5	973	742	545	435	481
Pyrene																
PAH, Total Detected USEPA 16	2.5	3.11	2.96	13.1	20.2	13.3	30.5	3.18	0.118	0.414	0.296	8.19	7.18	6.07	3.77	4.3
Naphthalene-d8 % recovery**	94.8	90.8	93.8	82.1	89.3	101	96.1	87.3	86.3	101	97.9	101	111	96	93	93.9
Acenaphthene-d10 % recovery**	91.1	86.7	88.7	73	82.8	96.4	93.8	82.6	79.4	97.5	94.8	99.6	108	94.1	91.3	91.8
Phenanthrene-d10 % recovery**	90.4	86.3	89.3	68.4	80.6	95.9	93.1	80.3	75.7	96.1	93	96	105	90.9	85.5	86.6
Chrysene-d12 % recovery**	91.7	86.8	91.7	66.5	78.6	104	98.3	80.9	74.7	87.7	85.7	105	109	96.3	92.6	94.4
Perylene-d12 % recovery**	99	95.2	95	68.1	83.7	113	104	83.8	82.1	85.6	84.6	108	117	103	102	107
Total Aliphatics >C12-C44	98.8	238	295	7.07	61.5	712	325	13.5	3.99	15.5	16.2	12.6	50.8	46.2	33.4	38.4
Total Aromatics >EC12-EC44	33.4	61.3	76.5	8.82	83.1	233	182	11.8	1.58	25.1	16	112	56.2	43.7	34.8	59.1
Total Aliphatics & Aromatics >C5-C44																
Metals - (Solid)																
Iron	276000	232000	149000	184000	<100000	347000	221000	30700	35100	61800	301000	45800	62200	68800	44600	57500
Manganese	10900	10000	3860	16600	8760	28200	23400	1070	2010	5840	3310	2300	7200	6020	1920	3710
Metals - (Liquid)																
Calcium	102000	85200	196000	197000	118000	142000	190000	41000	35600	183000	50600	84100	124000	131000	48100	68400
Magnesium	7120	7590	6920	11700	15300	10200	24100	18200	18500	23700	6090	30100	14600	32900	9940	14500
Phenols																
Phenol	0.01	0.0108	0.0107	0.01	0.01	0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0106	0.0102
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	0.0862	-	0.0628	0.004	-	0.004	0.0246	0.0273	-	0.0941	0.109	0.268	-	0.114	0.299	-
pH	12	11.6	11.2	11.5	11.8	12.7	12.7	9.78	8.45	9.53	9.26	8.84	9.51	9.1	9.94	10.5
Sulphate, Total	4030	-	-	-	-	2510	5470	-	-	-	-	-	-	-	-	-
Sulphur, Total	-	-	0.127	0.252	-	-	-	0.02	-	0.229	0.101	0.125	-	0.058	0.155	-
Sulphate, Total potential	-	-	0.381	0.756	-			0.06	-	0.687	0.303	0.375	-	0.174	0.465	-
Sulphate, acid soluble (total)	0.403	-	0.102	0.34	-	0.251	0.547	0.02	-	1.05	0.196	0.242	-	0.238	0.406	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	44.1	12	12	12	12	12	12	12	12	12	12
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	06/10/2017	23/01/2018	-	-	23/01/2018	-	06/10/2017	-	23/01/2018	04/01/2018	23/12/2017	04/01/2018	23/12/2017	04/01/2018	04/01/2018	04/01/2018
Analysed By	Neville Mann	Paul Poynton	-	-	Christian Hallam	-	Neville Mann	-	Christian Hallam	Renata Bozhkov	Neville Mann	Barbara Urbanek-Walsh	Neville Mann	James Richards	Renata Bozhkov	Barbara Urbanek-Walsh
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Comments	0	0	-	-	0	-	0	-	0	0	0	0	0	0	0	0
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	0.13	0.13	0.13	0.13	-	-	0.013	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	TP3AF703	TP3AF801	TP3AF802	TP3AF803	TP3AF10V	TP3AF11V	TP3AF12V	TP3AF14V	TP3AF1V	TP3AF9V	TP3AF5V	TP3AF6V	TP3AF7V	TP3AF8V
Depth	1.5	0.25	0.5	0.75	0	0	0	0	2.7	0	1.4	2.1	2.5	1
Sampled Date	15/12/2017	15/12/2017	15/12/2017	15/12/2017	05/03/2018	05/03/2018	27/02/2018	26/02/2018	26/09/2017	09/03/2018	15/12/2017	15/12/2017	15/12/2017	15/12/2017
Carbon														
Soil Organic Matter (SOM)	2.03	1.95	3.95	3.07	1.66	1.51	1.95	2	10.5	2.14	2.21	7.98	2.81	8.98
Metals (Solids)														
Arsenic	14.5	19.1	11.6	9.73	11.9	12.2	14.5	10.8	7.57	13	9.97	32	11.9	33.8
Cadmium	0.848	0.669	0.316	0.209	0.216	0.218	0.02	0.02	0.923	0.362	0.02	0.623	0.02	0.288
Chromium	41.1	18.7	9	9	33.5	34	27.7	25.7	21.1	36.3	23.6	23.2	21.5	24.4
Copper	14.3	64.9	26.3	23.9	11.8	15.8	11.6	9.85	18.6	12.1	14.4	21.1	12.7	21
Lead	85.1	34.8	62.9	68.6	29.6	29.7	30.2	27.2	53	30.8	24.7	44.5	25	32.8
Mercury	0.57	1.4	1.4	1.58	0.14	0.14	0.14	0.14	0.659	0.14	0.828	0.963	0.729	0.844
Nickel	18.5	24.9	26.4	24.5	38.4	36.8	33	26.5	20.2	39.4	33	30.4	30.8	29.7
Selenium	2.67	10	10	10	1	1.15	1	1	4.13	1	1.45	1	1.69	1.11
Vanadium	170	92.8	55.6	84.6	60.1	59.7	56.1	52.8	44.8	65.8	52.6	53.3	49	61.2
Zinc	155	112	155	173	131	134	111	101	156	134	126	183	112	138
TPH Criteria Working Group (TPH CWG)														
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.118
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.0648
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.0533	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.0666	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0473	0.04	0.04	0.04	0.04	0.0418
Aliphatics >C10-C12	0.0966	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0718	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	1.15	2.1	1.01	1.98	0.1	0.1	2.63	0.1	0.1	0.1	0.1	0.1	3.55	0.1
Aliphatics >C16-C21	3.25	7.68	2.72	8.33	0.1	0.1	0.1	0.1	0.856	0.1	0.1	0.609	10	1.38
Aliphatics >C21-C35	19.6	31	13.2	29.1	0.1	2.59	2.91	1.63	12.7	0.487	0.171	10.7	7.42	11.5
Aliphatics >C35-C44	10.7	6.34	2.34	8.11	0.1	0.1	0.1	0.1	0.881	0.1	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.118
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0648
Aromatics >EC8-EC10	0.0555	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0403
Aromatics >EC10-EC12	0.0644	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0473	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.97	4.21	1.73	1.45	0.1	0.791	0.1	0.1	2.03	0.1	0.1	1.26	0.734	0.1
Aromatics >EC16-EC21	3.64	16.6	4	6.17	0.1	1.62	0.1	0.683	4.35	0.1	0.1	3.9	3.84	1.11
Aromatics >EC21-EC35	17.1	52.7	14.7	26.8	8.53	18.6	13.8	6.64	42.1	1.38	13.3	47.4	13.7	58.6
Aromatics >EC35-EC44	14.9	23.4	6.36	13.9	2.06	7.66	3.04	2.98	8.08	0.1	1.4	7.69	1.53	6.02
Aromatics >EC40-EC44	6.38	9.51	2.43	5.59	0.548	3.59	1.26	1.22	2.38	0.1	0.254	1.44	0.1	1.69
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	34.1	38.9	22.3	60.4	12	12	12	12	12	12	12	12	12	12
Acenaphthene	30.9	16.5	8	11.6	8	8	8	8	161	8	8	8	8	8
Anthracene	90.1	60.9	63.2	91.3	16	16	16	16	53.4	16	16	16	16	16
Benz(a)anthracene	215	293	167	315	14	14	14	14	133	14	14	31.2	14	27.9
Benzo(a)pyrene	173	312	127	289	15	15	15	15	142	15	15	61	15	26.4
Benzo(b)fluoranthene	297	472	208	449	15	15	15	15	349	15	15	62.8	30.7	51.1
Benzo(k)fluoranthene	118	175	83.4	178	14	14	14	14	86.8	14	14	39.4	14	14
Benzo(g,h,i)perylene	141	212	129	266	24	24	24	24	183	24	24	77.5	24	24
Chrysene	221	200	217	353	10	10	10	10	202	10	10	68.8	10	23.7
Dibenzo(a,h)anthracene	35.4	64.8	0.023	78.5	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	114	204	95.3	202	0.018	0.018	0.018	0.018	130	0.018	0.018	54.7	0.018	0.018
Fluoranthene	383	368	321	536	0.017	0.017	0.017	0.017	349	0.017	0.017	107	50	41
Fluorene	40.9	25.6	16.6	41.4	10	10	10	10	134	10	10	14.5	10	10
Naphthalene	122	92.6	76.9	148	9	9	9	9	845	9	9	19.8	20.3	17.1
Phenanthrene	353	235	218	345	15	15	15	15	660	15	15	81.1	59.4	37.5
Pyrene														
PAH, Total Detected USEPA 16	2.67	3.06	1.99	3.77	0.118	0.118	0.118	0.118	3.65	0.118	0.118	0.7	0.201	0.257
Naphthalene-d8 % recovery**	97.2	92.7	105	104	102	89	96.8	91.7	109	103	125	96.1	104	104
Acenaphthene-d10 % recovery**	94.7	89.8	102	99.9	111	92.3	101	102	104	101	116	90.3	101	104
Phenanthrene-d10 % recovery**	92.8	84.9	99.7	99	103	87.1	93.6	91.5	100	96.7	112	88.9	96.7	94.6
Chrysene-d12 % recovery**	94.9	87.1	91.5	93.9	100	88.7	94.9	83.2	99.2	91.2	110	85.1	97.1	91.4
Perylene-d12 % recovery**	98.6	99.3	88.6	94.9	86	81.5	90.5	94.1	104	90.8	114	88.9	99.6	88.9
Total Aliphatics >C12-C44	34.7	47.1	19.3	47.5	0.1	2.59	5.55	1.63	14.4	0.487	0.171	11.3	21	12.9
Total Aromatics >EC12-EC44	36.6	96.9	26.8	48.3	10.6	28.7	16.8	10.3	56.5	1.38	14.7	60.2	19.8	65.7
Total Aliphatics & Aromatics >C5-C44														
Metals - (Solid)														
Iron	56300	88000	79800	118000	35600	34500	41200	41600	26100	36600	41400	36900	42000	27800
Manganese	4890	3330	2880	3430	740	915	468	347	740	513	693	350	1150	205
Metals - (Liquid)														
Calcium	76600	66400	55400	69900	-	-	-	-	-	-	4220	8320	17900	-
Magnesium	13000	12400	10400	8670	-	-	-	-	-	-	8870	7640	9030	-
Phenols														
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0567	0.01	0.01	0.05	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0756	0.01	0.01	0.05	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.075	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.132	0.035	0.035	0.035	0.035	0.035
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE	0.125	0.0444	-	0.11	-	-	-	-	-	-	-	-	-	-
pH	9.83	9.81	9.13	9.62	7.65	7.33	7.27	7.2	10.6	7.07	7.32	7.44	7.77	6.88
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.131	0.118	-	0.284	-	-	-	-	-	-	-	-	-	-
Sulphate, Total potential	0.393	0.354	-	0.852	-	-	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	0.115	0.0969	-	0.244	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	212	238	206	173	24.7	270	183	150	223	60
Asbestos														
Asbestos Quantification - Gravimetric - %	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	04/01/2018	03/01/2018	03/01/2018	04/01/2018	-	-	-	-	-	-	-	-	-	-
Analysed By	James Richards	James Richards	Renata Bozhkov	Barbara Urbanek-Walsh	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	None	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	N/C	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Comments	0	Fibre bundles in soil	0	0	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.13	0.13	-	-	-	-	-	-	-	-	-	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AG10	TP3AG10	TP3AG11	TP3AG13	TP3AG13	TP3AG501	TP3AG9	TP3AG901	TP3AG902
Depth	1	1.5	0.8	0.8	1.2	0.5	1.5	0.3	0.9
Sampled Date	########	19/01/2018	19/01/2018	19/01/2018	19/01/2018	26/09/2017	19/01/2018	26/09/2017	26/09/2017
Carbon									
Soil Organic Matter (SOM)	3.36	2.59	1.9	1.67	2.03	1.16	3.67	1.68	0.35
Metals (Solids)									
Arsenic	8.08	6	13.4	6	6.31	6	7.36	6	27.6
Cadmium	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Chromium	303	319	380	391	187	9	79.6	126	9
Copper	45.2	32.7	69.8	14.5	14.8	16.3	20.7	14	14
Lead	28	35.3	35.6	32.5	41.5	17.3	73.4	42.6	11.4
Mercury	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Nickel	39.5	32.9	36.4	11.1	6.8	11.2	40.4	9.43	6.85
Selenium	10	10	12.5	10	10	10	10	10	22.2
Vanadium	310	370	512	344	223	105	197	173	23.5
Zinc	116	131	107	87.5	108	55.6	241	135	36.1
TPH Criteria Working Group (TPH CWG)									
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	2.96	2.7	2.22	1.57	0.737	2.81	1.54	1.96	1.34
Aliphatics >C16-C21	23.4	19.5	17.8	11.9	3.52	9.69	11.4	10.8	1.96
Aliphatics >C21-C35	238	184	167	38	24.5	52.9	69.5	93.1	3
Aliphatics >C35-C44	81.2	62.1	54.9	7.65	6.41	26.6	33.4	89.6	0.698
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	1.13	1.15	1.1	0.463	0.1	0.321	1.05	1.02	0.1
Aromatics >EC16-EC21	5.97	5.47	5.3	6.92	1.71	0.75	6.12	4.57	0.1
Aromatics >EC21-EC35	53.1	45.6	42.8	28.7	11.2	33.2	58	82.4	0.1
Aromatics >EC35-EC44	28.2	24.9	22	7.42	3.36	25.7	49.7	115	0.1
Aromatics >EC40-EC44	11.7	10.3	8.92	2.61	1.21	10	21.6	55	0.1
Polyaromatic Hydrocarbons (PAHs)									
Acenaphthylene	30.6	110	23.6	28.4	44	12	101	40.6	12
Acenaphthene	14.3	23	13.7	10.5	13.5	12	19.2	44.2	8
Anthracene	68.4	218	48.8	62.3	68.7	39.6	149	69.8	16
Benz(a)anthracene	262	913	241	271	366	359	560	316	40.6
Benzo(a)pyrene	268	920	266	268	382	359	705	208	34.9
Benzo(b)fluoranthene	495	1370	507	427	596	679	811	342	65.9
Benzo(k)fluoranthene	137	492	218	198	210	236	368	136	18.5
Benzo(g,h,i)perylene	253	658	298	231	295	330	619	171	36.7
Chrysene	319	860	327	301	358	366	587	310	22.1
Dibenzo(a,h)anthracene	59.4	162	67.8	57	81.3	80.4	143	41.8	0.023
Indeno(1,2,3-cd)pyrene	193	572	230	197	256	260	499	127	25.3
Fluoranthene	479	2000	536	415	609	492	920	352	68.2
Fluorene	20.7	54.7	15.8	21.3	21.7	10	46.6	27.6	10
Naphthalene	239	239	149	87.7	81.6	45.5	356	220	40.3
Phenanthrene	379	1010	381	239	260	182	478	220	61.4
Pyrene									
PAH, Total Detected USEPA 16	3.6	11.1	3.71	3.14	4.13	4	7.22	3.52	0.466
Naphthalene-d8 % recovery**	85.1	96.6	103	91	93.3	101	95.8	102	94.4
Acenaphthene-d10 % recovery**	82.2	92.3	97.2	85.8	90.1	96.3	91.8	97.9	89.4
Phenanthrene-d10 % recovery**	81.8	90.5	96.8	85.6	88	95	91.1	96.2	87.1
Chrysene-d12 % recovery**	86.8	95.3	101	86.8	86.9	96.4	91.9	99.1	85.5
Perylene-d12 % recovery**	95.8	105	110	91	96.1	104	101	106	85.8
Total Aliphatics >C12-C44	345	269	241	59.2	35.2	92	116	195	7
Total Aromatics >EC12-EC44	88.4	77.2	71.3	43.5	16.2	59.9	115	203	0.1
Total Aliphatics & Aromatics >C5-C44									
Metals - (Solid)									
Iron	197000	234000	173000	229000	180000	186000	139000	111000	362000
Manganese	11800	11200	20100	14700	8370	5170	5800	13500	32800
Metals - (Liquid)									
Calcium	123000	146000	146000	139000	75200	119000	178000	180000	1750
Magnesium	14100	13100	15100	4970	6880	18200	18600	17700	635
Phenols									
Phenol	0.01	0.01	0.01	0.0111	0.011	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics									
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.042	0.004	0.004	-	0.131	0.109	0.136	0.0676
pH	11.9	12.4	12.6	12.4	12.3	11.3	9.93	11.4	10.6
Sulphate, Total	-	-	-	-	-	11700	-	6490	518
Sulphur, Total	-	0.208	0.215	0.16	-	-	0.184	-	-
Sulphate, Total potential	-	0.624	0.645	0.48	-	-	0.552	-	-
Sulphate, acid soluble (total)	-	0.351	0.35	0.297	-	1.17	0.287	0.649	0.0518
Cyanide, Total	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12
Asbestos									
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-
Date of Analysis	-	23/01/2018	-	-	24/01/2018	06/10/17	-	06/10/17	-
Analysed By	-	Eva Guerra	-	-	Christian Hallam	Christian Hallam	-	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	-	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	-	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-
Fibrous Tremolite	-	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-
Fibrous Actinolite	-	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	-	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-
Comments	-	0	-	-	0	0	-	0	-
Volatile Organic Compounds (VOCs)									
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.13	0.13	0.013	-	0.13	-	-
Sum of BTEX	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics									
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-

Sample ID	TP3AG10V	TP3AG11V	TP3AG12V	TP3AG13V	TP3AG14V	TP3AG1V	TP3AG2V	TP3AG3V	TP3AG4V	TP3AG5V	TP3AG6V	TP3AG7V	TP3AG8V	TP3AG9V
Depth	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Sampled Date	05/03/2018	05/03/2018	27/02/2018	27/02/2018	26/02/2018	23/01/2018	23/01/2018	24/01/2018	29/01/2018	26/09/2017	30/01/2018	30/01/2018	30/01/2018	09/03/2018
Carbon														
Soil Organic Matter (SOM)	2.98	3.1	3.62	2.12	3.03	2.1	1.26	0.841	1.02	1.91	0.852	4.83	1.34	2.34
Metals (Solids)														
Arsenic	13.4	12.3	13.4	15.7	12.8	14.8	13	14.4	15.9	10.6	11.4	13.5	15	12.6
Cadmium	0.313	0.193	0.02	0.02	0.02	0.146	0.2	0.274	0.122	0.18	0.02	0.186	0.0415	0.021
Chromium	34.9	34	30.7	27.1	25.3	36.9	34	26.1	31.8	28.3	32.3	33.5	31	30.3
Copper	13.9	11.7	11.4	11.4	10.2	14.1	14	9.99	10.6	10.8	8.78	12.9	10	11
Lead	40.2	30.3	33.6	28.5	29.7	23.2	35.5	25.8	28.8	28.1	28	34.3	27.9	29.3
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.694	0.14	0.14	0.14	0.14
Nickel	33.7	27.3	29.6	28.8	24.1	32.2	43.6	37.1	40.6	37.6	38	24.2	39	35.1
Selenium	1	1	1	1	1	1	10	1	1.11	1	1	1	1	1
Vanadium	62.9	55.5	57.1	55.5	52.3	53.7	57.8	49.8	59.8	65.5	58.5	53.3	57.3	60.1
Zinc	155	120	115	108	102	112	120	104	124	109	122	118	114	126
TPH Criteria Working Group (TPH CWG)														
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.002
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.003
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0584	0.04	0.01
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0949	0.04	0.01
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01
Aliphatics >C12-C16	0.139	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.56	0.1	0.1	0.242	0.1
Aliphatics >C16-C21	0.363	0.1	0.349	0.1	0.1	0.1	0.1	0.1	0.1	2.74	0.1	1.24	0.1	0.1
Aliphatics >C21-C35	5.24	7.92	7.58	3.63	2.23	1.29	0.855	0.1	1.09	3.57	0.1	3.74	1.47	0.1
Aliphatics >C35-C44	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	12.9	0.1	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0642	0.04	0.01
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01
Aromatics >EC12-EC16	0.767	0.591	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.37	1.24	0.1	0.1	0.409
Aromatics >EC16-EC21	2.17	1.58	1.03	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.63	0.393	0.1	0.656
Aromatics >EC21-EC35	33.4	44	32.6	15.1	6.09	2.99	1.48	2.43	1.36	0.1	0.1	10.3	2.94	10.9
Aromatics >EC35-EC44	9.04	10.2	10.6	7.63	1.19	3.25	0.341	0.726	1.33	0.481	17.9	2.39	1.23	19.3
Aromatics >EC40-EC44	3.24	3.16	4.1	2.15	0.1	1.99	0.1	0.1	0.627	0.1	11.6	0.477	0.1	9.63
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Acenaphthene	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Anthracene	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Benz(a)anthracene	14	14	14	14	14	14	14	14	14	24	14	32.6	14	14
Benzo(a)pyrene	15	15	15	15	15	15	15	15	15	26.4	15	15	15	15
Benzo(b)fluoranthene	15	15	22.5	15	15	15	15	15	15	43.2	15	15	15	15
Benzo(k)fluoranthene	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Benzo(g,h,i)perylene	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Chrysene	10	10	10	10	10	10	10	10	10	16.6	10	10	10	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
Fluoranthene	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	37.8	0.017	0.017	0.017	0.017
Fluorene	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Naphthalene	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Phenanthrene	15	15	24.6	15	15	15	15	15	15	23.1	15	15	15	15
Pyrene														
PAH, Total Detected USEPA 16	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.22	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	130	95.7	105	101	95	103	107	103	97.9	106	106	110	105	88
Acenaphthene-d10 % recovery**	130	94	111	106	108	98.8	102	100	93.4	102	99.9	97.7	98.9	94.5
Phenanthrene-d10 % recovery**	120	89.5	102	97.9	94.6	96	99.3	95	90.9	99.8	95.3	81.5	95	82.9
Chrysene-d12 % recovery**	120	87.7	105	99.8	86.4	84.4	96.2	110	90.4	98.1	91.2	72.8	90.5	80.7
Perylene-d12 % recovery**	130	85.4	103	101	93.7	78.7	102	103	91.5	103	93.3	73.9	92.7	80.2
Total Aliphatics >C12-C44	5.74	7.92	7.93	3.63	2.23	1.29	0.855	0.1	1.09	7.87	12.9	4.99	1.71	0.1
Total Aromatics >EC12-EC44	45.4	56.4	44.2	22.7	7.28	6.24	1.82	3.15	2.69	0.851	19.8	13	4.17	31.3
Total Aliphatics & Aromatics >C5-C44														
Metals - (Solid)														
Iron	30100	28100	34600	39300	38300	40500	40500	35000	34200	49800	32800	30100	36900	41000
Manganese	661	207	375	412	268	287	542	961	451	1310	439	220	395	500
Metals - (Liquid)														
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols														
Phenol	0.01	0.0138	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	7.52	7.58	7.39	7.59	7.33	8.01	8.24	-	-	7.86	-	-	-	7.16
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, Total potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	233	225	242	247	172	101	87.5	110	71.1	123	121	260	188	277
Asbestos														
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysed By	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AH10	TP3AH101	TP3AH11	TP3AH9	TP3AH901	TP3AH902	TP3AH1001	TP3AH1002	TP3AH1003	TP3AH1101	TP3AH1102	TP3AH1103	TP3AH1201	TP3AH1202	TP3AH1203	TP3AH11V
Depth	0.8	0.2	1	1	0.5	1.5	0.3	1	2	0.5	1.5	2.5	0.5	1	1.6	0
Sampled Date	19/01/2018	26/09/2017	19/01/2018	19/01/2018	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	26/03/2018
Carbon																
Soil Organic Matter (SOM)	3.38	2.47	0.722	1.83	1.43	0.548	1.09	0.35	0.35	3.05	1.14	0.35	0.988	1.11	1.93	0.967
Metals (Solids)																
Arsenic	9.96	9.28	6	8.53	6	12.4	6	6	19	6	6.59	32	6	6	8.08	19.8
Cadmium	0.2	0.2	0.2	0.2	2.43	4.21	2.49	0.304	3.66	1.91	2.46	5.05	1.84	1.98	1.88	0.02
Chromium	709	54.4	773	377	348	9	600	12.9	9	1120	73.2	9	1260	984	143	31.9
Copper	77.2	56.8	31.3	41.9	35	14	20.6	14	14	14	14	14	14	43.9	14	11.8
Lead	34.3	51.8	21.1	39.2	35.8	8.42	46.1	7	11.2	19.4	18.8	12.8	17.8	43.1	46.5	29
Mercury	1.4	1.4	1.4	1.4	1.4	1.88	1.4	1.4	1.43	1.4	1.4	1.4	1.4	1.4	1.4	0.14
Nickel	48.8	24.3	22.4	29.9	22.6	2	12.1	2	2	8.08	8.06	2.42	3.23	30.2	11.9	45.6
Selenium	12.5	10	17.4	10.6	10	10	13.5	10	10	19.2	10	20.1	22	15.7	10	1
Vanadium	587	230	616	309	279	46.9	567	28.5	129	706	174	39.1	923	571	170	-
Zinc	85.7	149	41.5	100	104	19	94.2	19	19	44	30.5	34.4	291	107	82.8	123
TPH Criteria Working Group (TPH CWG)																
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.0113	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0488	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0933	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	2.19	0.849	0.1	10.7	5.66	12.3	2.57	0.612	0.516	0.1	2.79	0.1	0.1	1.77	0.1	0.1
Aliphatics >C16-C21	12.1	6.25	3.07	23.8	17.5	19.3	11.8	3.03	2.4	2.4	7.66	1.1	4.14	9.95	3.63	0.1
Aliphatics >C21-C35	72.8	49.4	23.7	69.2	73.6	85.5	91.4	25.2	15.5	42	22.6	7.94	63.5	83.1	23.5	0.1
Aliphatics >C35-C44	18.3	24.6	5.25	42.5	40.7	8.95	26	2.2	2.13	8.82	5.73	0.842	20.9	25.2	3.44	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0618	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	1	1.73	0.439	3.08	1.3	3.6	1.13	0.1	0.1	1.1	1.1	0.1	0.1	0.964	0.1	0.1
Aromatics >EC16-EC21	4.32	8.05	2.89	10.6	6.35	8.88	6.24	0.599	1.57	4.72	4.94	1.15	0.1	5.09	1.57	0.1
Aromatics >EC21-EC35	22.4	35.1	13.9	51.8	55	44.4	36.8	7.84	16	33.6	29.3	11	17.6	31.3	21.3	0.241
Aromatics >EC35-EC44	10	18	5.98	51.1	65.6	13.7	14.4	3.58	3.23	29.5	10.6	0.76	6.56	15.8	3.54	0.353
Aromatics >EC40-EC44	4.01	7.22	2.34	24.1	29.3	5.8	5.2	1.46	0.1	13.6	3.71	0.1	1.64	6.58	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	30.1	41.1	57.7	34.1	12	12	12	12	12	34.2	17.1	12	12	19.1	12	12
Acenaphthene	10.6	82.1	16.9	39.4	10.3	23.2	37.5	8	9.37	9.74	27.6	8	8	39.3	12.2	8
Anthracene	56.9	163	97.2	58.5	16	16	59.9	16	16	58.9	48.9	16	16	53.6	16	16
Benz(a)anthracene	165	604	333	287	119	67.6	590	57.9	124	240	348	37.4	32.7	399	33.8	14
Benzo(a)pyrene	151	650	286	321	104	49.1	665	49.8	148	257	357	36.5	37.8	406	38.4	15
Benzo(b)fluoranthene	266	1100	525	540	250	71.6	1070	68.3	157	455	550	44.4	53	668	46.5	15
Benzo(k)fluoranthene	112	378	164	200	94	24.6	407	34.3	71	174	182	21.5	31.4	254	24.3	14
Benzo(g,h,i)perylene	147	581	218	294	145	44.6	531	48.8	109	273	264	32.6	39.4	341	42.1	24
Chrysene	216	590	378	352	164	45.2	676	45.3	129	232	324	35.8	39	353	45.1	10
Dibenzo(a,h)anthracene	36.4	131	60.6	72.7	38.5	0.023	127	0.023	0.023	65.3	63	0.023	0.023	84.7	0.023	0.023
Indeno(1,2,3-cd)pyrene	114	422	186	232	128	30.2	429	34.9	81.6	221	213	26.8	31.6	285	29.7	0.018
Fluoranthene	403	918	609	535	177	81.5	1010	72.4	173	309	513	69.5	86.9	604	83.2	0.017
Fluorene	34.4	55.4	54.6	30.4	10	16.4	18.1	10	10	16.1	18.3	10	10	25.3	11.7	10
Naphthalene	210	441	667	126	30.5	35.8	49.9	9	9	102	34.4	29.8	9	98.7	44.7	9
Phenanthrene	357	685	361	242	86.8	80.5	551	39.8	75.4	219	372	60.7	73	415	87.4	15
Pyrene																
PAH, Total Detected USEPA 16	2.6	7.7	4.48	3.91	1.51	0.642	7.08	0.521	1.24	2.96	3.8	0.458	0.486	4.52	0.564	0.118
Naphthalene-d8 % recovery**	86.4	101	106	91.9	94.5	95.2	100	90.3	89.7	93.6	100	90.8	88.2	100	95.9	102
Acenaphthene-d10 % recovery**	81.7	96	100	88.9	91.2	92.5	95.9	88.8	88.3	90.5	97.4	89.5	86.5	95.7	95.5	105
Phenanthrene-d10 % recovery**	81.7	95.2	99.7	88.7	89.1	91	94.8	87.2	87.4	87.9	96.4	87.7	85.8	94.3	94.2	107
Chrysene-d12 % recovery**	84.6	99.3	98.3	93	98.3	92.8	99.7	91.4	93.6	92.9	99.3	92.1	92.6	98.2	98.2	105
Perylene-d12 % recovery**	89.1	106	102	102	106	94.7	102	99	102	100	100	98.6	99.4	101	106	107
Total Aliphatics >C12-C44	105	81	32	146	138	126	132	31	20.6	53.2	38.7	9.88	88.5	120	30.6	0.1
Total Aromatics >EC12-EC44	37.8	62.9	23.2	117	128	70.6	58.6	12	20.8	68.9	46	12.9	24.2	53.2	26.4	0.595
Total Aliphatics & Aromatics >C5-C44																
Metals - (Solid)																
Iron	198000	135000	224000	213000	189000	315000	199000	31100	290000	179000	206000	374000	190000	187000	139000	37600
Manganese	17500	7030	22900	12600	17000	8630	25800	5240	10800	40800	10600	31200	46500	33400	10200	298
Metals - (Liquid)																
Calcium	211000	82500	212000	130000	195000	40000	247000	325000	58900	266000	163000	3940	330000	255000	147000	-
Magnesium	22200	11700	13500	12100	14500	3320	18200	40600	3710	15800	10600	266	17300	14800	13800	-
Phenols																
Phenol	0.01	0.0112	0.01	0.01	0.01	0.0222	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	0.004	0.136	0.0352	0.164	-	-	-	-	-	-	-	-	-	-	-	-
pH	12.7	11	12.6	11.6	11.9	11.4	12.6	11.8	11.8	12.7	12.2	10.2	12.8	12.7	12.5	-
Sulphate, Total	-	2180	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.213	-	0.242	0.257	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, Total potential	0.639	-	0.726	0.771	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	0.302	0.218	0.393	0.478	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	12	12	12	44.8	12	102
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	0.0294	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	06/10/2017	23/01/2018	23/01/2018	19/12/2017	19/12/2017	19/12/2017	-	19/12/2017	-	19/12/2017	19/12/2017	19/12/2017	19/12/2017	-	-
Analysed By	-	Neville Mann	Paul Poynton	Christian Hallam	James Richards	Renata Bozhkov	Neville Mann	-	Neville Mann	-	Renata Bozhkov	Renata Bozhkov	James Richards	James Richards	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	N/A	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	0.0294	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	Not Detected	Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-
Amosite (Brown) Asbestos	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-
Fibrous Anthophyllite	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-
Fibrous Tremolite	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-
Fibrous Actinolite	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-
Non-Asbestos Fibre	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-
Comments	-	0	0	Soil containing material typical of AC	0	0	0	-	0	-	0	0	0	0	-	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	-	0.335	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	TP3AH13V	TP3AH14V	TP3AH1V	TP3AH2V	TP3AH3V	TP3AH4V	TP3AH5V	TP3AH6V	TP3AH7V	TP3AH8V	TP3AH9V	TP3AH12V	TP3AI10	TP3AI11	TP3AI11	TP3AI301	TP3AI601	TP3AI901	TP3AI902	TP3AI1001
Depth	0	0	1.05	0	0	0	0	0	0	0	2	1.8	1	0.5	1.5	0.3	0.5	0.3	0.8	0.4
Sampled Date	26/03/2018	26/03/2018	26/09/2017	23/01/2018	24/01/2018	29/01/2018	29/01/2018	30/01/2018	30/01/2018	30/01/2018	07/12/2017	07/12/2017	19/01/2018	19/01/2018	19/01/2018	26/09/2017	26/09/2017	07/12/2017	07/12/2017	07/12/2017
Carbon																				
Soil Organic Matter (SOM)	4.24	6.95	3.12	1.08	4.86	1	0.952	2.84	1.95	1.72	3.29	6.02	1.11	0.602	0.484	3.05	0.662	3.15	1.37	1.72
Metals (Solids)																				
Arsenic	13.9	15	10.1	12.1	10.7	15.1	13.1	14.6	13.4	11.6	10.4	14.9	6	6	6.06	6	6	6	6	8.68
Cadmium	0.0955	0.293	0.208	0.2	0.732	0.137	0.151	0.0844	0.0756	0.02	0.616	0.83	0.2	0.2	0.2	0.726	0.2	2.34	2.04	2.66
Chromium	35.3	36.4	32.8	32.9	5.63	31.3	34.8	30.4	32.1	34.4	61.9	36.6	742	739	308	55	9	9	70.3	89.4
Copper	13.6	14.7	13.9	14	530	12.1	10.9	12.3	11	10.3	17.8	15.9	56.6	25.3	24.4	17.2	33.4	14	24.9	14
Lead	35.8	42.5	27.8	31.9	238	28.3	29	35.1	30.2	25.3	33.5	49.5	37.6	16.5	18.9	28.5	11.8	55.5	24.2	26.9
Mercury	0.14	0.14	0.676	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Nickel	26.5	25.5	26.2	43.2	15.7	37.5	38	27.4	31.5	32.5	35.7	29.9	31.3	13.8	15.1	15.5	8.59	30.7	20.1	19.5
Selenium	1	1	1	10	1	1	1	1	1	1	10	10	15.7	13.8	10	10	10	10	10	10
Vanadium	-	-	54.6	54.6	42.1	54.4	58.8	56.5	59.4	56.7	65.9	61.6	627	551	269	186	115	190	155	172
Zinc	125	132	119	98.6	265	140	128	118	117	113	107	145	87.3	28.9	23.5	75.5	45.5	181	62.3	63.5
TPH Criteria Working Group (TPH CWG)																				
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.0176	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.124	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.0816	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.128	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.251	0.04	0.04	0.04	0.04	0.04	0.0402	0.04	0.115	0.04	0.04	0.04	0.04	0.04	0.04	0.0561	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.217	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0702	0.04	0.04	0.04	0.04	0.04	0.04	0.105	0.04	0.04	0.0577
Aliphatics >C12-C16	0.1	2.41	0.1	0.563	0.1	0.1	0.1	0.1	0.1	0.1	19.4	0.1	1.27	1.51	1.31	2.29	6.92	1.2	2	25.9
Aliphatics >C16-C21	1.33	3.46	0.1	0.715	0.1	0.1	0.1	0.1	0.1	0.1	31.9	0.1	10.2	14.6	11.7	21.1	22.1	12.3	15.3	59.5
Aliphatics >C21-C35	7.86	10.5	1.14	0.211	1.49	1.09	1.56	3.74	3.45	0.1	30.4	2.47	81.7	155	120	247	84	116	122	130
Aliphatics >C35-C44	2.26	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	4	0.1	31.5	52.7	42.1	76.6	18	65.9	86.8	24.6
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.168	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0837	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.144	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0473	0.04	0.04	0.04	0.04	0.04	0.04	0.0693	0.04	0.04	0.04
Aromatics >EC12-EC16	0.1	2.74	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	6.44	0.1	1.88	0.1	0.1	1.37	0.862	1.01	1.63	3.77
Aromatics >EC16-EC21	1.38	3.13	0.1	0.1	0.1	0.133	0.1	0.621	0.1	0.2	15	0.1	5.57	3.44	2.37	9.43	5.02	10.1	10.6	13.8
Aromatics >EC21-EC35	29.8	53.6	5.87	2.14	1.1	1.9	1.66	5.2	4.55	1.95	33.1	31.4	29.7	36.4	27.1	98.4	23.9	103	103	38.5
Aromatics >EC35-EC44	10.3	8.32	2.77	0.1	0.128	0.1	0.392	1.34	0.1	0.1	8.3	3.64	17.8	20.5	15.7	59	12.5	78.9	109	17
Aromatics >EC40-EC44	4.39	2.66	0.929	0.1	0.1	0.1	0.1	0.367	0.1	0.1	2.68	0.1	7.91	8.49	6.53	24.3	5.36	32.7	50.6	6.49
Polyaromatic Hydrocarbons (PAHs)																				
Acenaphthylene	12	12	12	12	12	12	12	12	12	12	12	12	36	12	15.9	97.3	12	138	35.5	23.1
Acenaphthene	8	8	8	8	8	8	8	8	8	8	97.1	8	94.8	8	11.9	18.1	8	48.2	18.9	21
Anthracene	16	16	16	16	16	16	16	16	16	16	71.5	16	167	16	36.6	174	16	262	61.8	42.7
Benz(a)anthracene	14	14	14	14	14	14	14	47	14	14	30	37.8	942	36.9	206	688	25.1	921	325	163
Benzo(a)pyrene	15	15	15	15	15	15	15	15	15	15	15	51.5	1070	52	200	712	40.6	878	326	133
Benzo(b)fluoranthene	29.4	39.8	15	15	15	15	15	15	15	15	34.6	88.3	1670	105	312	1190	62.4	904	497	272
Benzo(k)fluoranthene	14	14	14	14	14	14	14	14	14	14	14	29.1	625	42.6	116	401	20.3	562	204	123
Benzo(g,h,i)perylene	24	24	24	24	24	24	24	24	24	24	24	65.2	835	51.5	165	578	38.5	682	347	175
Chrysene	20	23.3	10	10	10	10	10	17.9	10	10	37.3	74.6	1160	52.3	203	639	31	838	327	204
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	211	0.023	45.3	135	0.023	169	69.4	40.1
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	41.4	691	42.6	135	445	26.1	570	259	134
Fluoranthene	33.8	41.4	0.017	0.017	0.017	0.017	0.017	31.6	0.017	0.017	159	91.1	1670	104	306	1030	57.4	1530	449	287
Fluorene	10	10	10	10	10	10	10	10	10	10	135	10	68.7	10	21.2	55.2	10	139	28.6	22.4
Naphthalene	9	9	9	9	9	9	9	32.8	9	9	226	31	242	39.3	117	201	29.3	490	137	165
Phenanthrene	22.9	31.6	15	15	15	15	15	45.9	15	15	381	83.8	1010	98	200	428	45.5	884	237	205
Pyrene																				
PAH, Total Detected USEPA 16	0.132	0.168	0.118	0.118	0.118	0.118	0.118	0.2	0.118	0.118	1.29	0.664	11.9	0.698	2.33	7.81	0.422	10.4	3.88	2.24
Naphthalene-d8 % recovery**	94.9	90.7	106	116	109	101	106	114	99.5	97.9	101	117	101	95.6	92.3	100	95.2	89.9	92.9	93.3
Acenaphthene-d10 % recovery**	93.3	91.9	102	105	105	92.1	102	108	95.5	96.1	98	113	96.5	91.7	87.1	94.9	90.5	87.9	89.5	90.9
Phenanthrene-d10 % recovery**	94.8	99.2	98.4	101	101	85.6	98.7	103	91.7	95.5	94.7	110	96.5	90.7	87.4	94.5	90.1	87.6	87.1	87.5
Chrysene-d12 % recovery**	87.2	97.9	94.5	99.7	110	89.4	98.2	102	95.7	88.2	99	110	103	91.4	90.9	100	90.4	95.5	94.2	92.6
Perylene-d12 % recovery**	102	104	96.9	105	94.8	79.3	98.5	107	95.8	87.2	107	118	111	99.3	98.2	109	94.7	103	101	101
Total Aliphatics >C12-C44	11.4	16.3	1.14	1.49	1.49	1.09	1.56	3.74	3.45	0.1	85.8	2.47	125	224	175	347	131	195	226	240
Total Aromatics >EC12-EC44	41.4	67.7	8.64	2.14	1.23	2.03	2.05	7.17	4.55	2.15	62.8	35.1	55	60.4	45.2	168	42.3	193	225	73.1
Total Aliphatics & Aromatics >C5-C44																				
Metals - (Solid)																				
Iron	26300	23900	33700	38100	27800	32800	19400	41000	39200	29800	34000	33000	162000	191000	167000	108000	128000	171000	170000	218000
Manganese	251	282	393	738	902	451	219	430	369	489	540	245	22700	19700	10100	9730	5330	5800	11000	20500
Metals - (Liquid)																				
Calcium	-	-	-	-	-	-	-	-	-	-	16400	5010	206000	248000	167000	159000	137000	161000	171000	180000
Magnesium	-	-	-	-	-	-	-	-	-	-	9690	7150	17500	8820	6360	37000	28500	27200	17800	11400
Phenols																				
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0105	0.0106	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0152	0.0109	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																				
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-	-	-	-	-	-	0.0064	0.0091	-	0.136	0.319	-	-	-
pH	-	-	7.86	7.76	-	-	-	-	-	-	7.87	7.91	12.7	12.7	12.7	11.8	9.98	11.2	11.5	12.1
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5420	18700	-	-	-
Sulphur, Total	-	-	-	-	-	-	-	-	-	-	-	-	0.199	0.164	-	-	-	-	-	-
Sulphate, Total potential	-	-	-	-	-	-	-	-	-	-	-	-	0.597	0.492	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	-	-	-	-	-	-	0.271	0.19	-	0.542	1.87	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	246	398	262	86.7	21.5	142	135	123	193	199	96.5	307	12	12	12	15.5	12	12	12	12
Asbestos																				
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-
Date of Analysis	-	-	-	-	-	-	-	-	-	-	-	-	23/01/2018	-	23/01/2018	06/10/2017	06/10/2017	19/12/2017	19/12/2017	19/12/2017
Analysed By	-	-	-	-	-	-	-	-	-	-	-	-	Christian Hallam	-	Christian Hallam	Neville Mann	Neville Mann	Renata Bozhkov	Renata Bozhkov	Renata Bozhkov
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/C	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Detected	Not Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Comments	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	0	0	0	Loose fibres in soil	0
Volatile Organic Compounds (VOCs)																				
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-	-	-	-	-	0.13	0.13	0.13	0.13	0.13	-	-	0.13	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																				
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AI1002	TP3AI1101	TP3AI1102	TP3AI13V	TP3AI14V	TP3AI1V	TP3AI2V	TP3AI3V	TP3AI3V	TP3AI4V	TP3AI5V	TP3AI6V	TP3AI7V	TP3AI8V	TP3AI9V	TP3AI10V	TP3AI11V	TP3AJ101	TP3AJ1V	TP3AJ2V
Depth	1.5	1	2	0	0	0	0	0	1.5	0	0	0	0	0	1.1	2.4	2.6	0.2	1.6	0
Sampled Date	07/12/2017	07/12/2017	07/12/2017	26/03/2018	26/03/2018	23/01/2018	23/01/2018	24/01/2018	26/09/2017	29/01/2018	29/01/2018	30/01/2018	30/01/2018	30/01/2018	07/12/2017	07/12/2017	07/12/2017	26/09/2017	26/09/2017	23/01/2018
Carbon																				
Soil Organic Matter (SOM)	1.3	1.53	0.35	7.83	2.88	2.17	1.01	0.952	1.36	2.67	2.34	0.772	1.52	1.49	8.4	2.59	2.53	7.28	3.43	1.02
Metals (Solids)																				
Arsenic	17.3	23.4	6.33	13.8	12.6	11	16.6	12.8	9.76	13.4	12.7	14.4	12.6	15	14.4	13.7	12.2	12.6	10.7	13.9
Cadmium	4.17	2.01	1.77	0.323	0.0374	0.879	0.0609	0.201	0.179	0.203	0.148	0.051	0.0281	0.0632	0.77	0.489	0.418	0.2	0.299	0.02
Chromium	9	796	566	35.2	33	32.1	30	26.7	33.6	33.7	36	25.2	30	36.1	22.7	24.6	25.6	80.2	30.5	31
Copper	19.5	29.9	14	13.8	11.4	14.7	10.1	9.31	11	13.5	13.2	10.5	11.2	13.1	17.8	11.1	11.2	37.4	14.3	8.98
Lead	19.6	28	15.4	40.4	29.9	103	27.4	24	33.5	35.6	27.6	24.4	25.4	31.4	42.7	26.7	27.2	239	31.5	32.3
Mercury	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.741	0.14	0.14	0.14	0.14	0.14	0.725	0.865	0.905	1.4	0.713	0.14
Nickel	10.9	58.8	12.4	23.3	29	30.9	38.5	34.1	38.2	32.9	38.1	31.2	36.7	39.4	25.7	30.8	30.5	29.6	32.4	38.8
Selenium	14.4	15.5	12.3	1	1	1	1.05	1	1	1	1	1	1	1	1	1	1	10	1	1
Vanadium	297	635	503	-	-	45.5	60.2	49.1	61.6	61.3	60	46.3	55.5	55.5	49.8	60.9	59.8	224	57	55.4
Zinc	40	78	34.3	127	117	253	117	102	128	125	115	102	114	113	171	115	116	711	116	122
TPH Criteria Working Group (TPH CWG)																				
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.0111	0.0123	0.013
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.0403	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.0587	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	8.77	1.75	0.972	20.1	1.06	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.74	0.759	0.1	1.24	0.211	0.1
Aliphatics >C16-C21	17.5	15	4.47	12.7	0.665	1.68	1.17	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.06	1.23	0.453	8.05	0.484	0.1
Aliphatics >C21-C35	33	141	48.6	0.1	6.32	7.03	0.952	1.72	0.1	1.05	0.1	1.1	2.59	2.65	8.8	10.5	2.96	48.8	7.07	0.1
Aliphatics >C35-C44	7.45	39.5	8.9	6.13	5.25	1.12	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.802	0.1	13.2	0.47	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	2.89	0.88	0.32	8.09	0.237	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.253	1.35	0.263	0.1
Aromatics >EC16-EC21	9.56	5.69	1.32	0.1	0.1	0.533	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.5	0.442	0.1	8.79	0.607	0.446
Aromatics >EC21-EC35	36.3	50.2	14.4	0.1	15.8	3.52	1.21	0.449	0.1	2.35	0.578	0.717	2.45	1.79	58.2	46.4	10.1	35.1	24	1.78
Aromatics >EC35-EC44	15.1	23.6	4.03	0.1	7.93	0.83	0.517	0.578	0.1	0.406	0.904	0.195	0.4	0.1	5.88	7.88	1.25	13.9	5.82	5.51
Aromatics >EC40-EC44	5.49	8.98	1.43	0.1	3	0.1	0.1	0.1	0.1	0.1	0.502	0.1	0.1	0.1	0.1	2.59	0.1	5.15	1.88	3.33
Polyaromatic Hydrocarbons (PAHs)																				
Acenaphthylene	13.9	12	12	12	12	12	12	12	12	12	12	12	12	12	32	12	12	391	19.2	12
Acenaphthene	27.5	30.3	8	8	8	8	8	8	8	8	8	8	8	8	40.2	8	8	56.9	26.8	8
Anthracene	53.2	36.5	16	16	16	16	16	16	16	16	16	16	16	16	84.4	16	16	625	16	16
Benz(a)anthracene	500	349	168	14	14	14	14	14	14	24.4	14	14	14	14	248	20.5	14	1910	42.6	14
Benzo(a)pyrene	567	327	176	15	15	15	15	15	15	27.4	15	15	15	15	214	34.1	15	1860	59	15
Benzo(b)fluoranthene	742	605	277	15	15	15	15	15	15	28.6	15	15	15	15	318	43.1	15	3050	109	15
Benzo(k)fluoranthene	290	213	83.7	14	14	14	14	14	14	14	14	14	14	14	135	24.5	14	970	32.9	14
Benzo(g,h,i)perylene	501	290	204	24	24	24	24	24	24	24	24	24	24	24	169	45.6	24	1420	55.4	24
Chrysene	428	332	158	10	10	10	10	10	10	18.5	10	10	10	10	287	29.1	10	1620	52.2	10
Dibenzo(a,h)anthracene	82.3	72.6	41	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	58.3	0.023	0.023	360	0.023	0.023
Indeno(1,2,3-cd)pyrene	360	244	142	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	152	31.9	0.018	1130	44.7	0.018
Fluoranthene	631	570	214	0.017	0.017	0.017	0.017	0.017	0.017	36.1	0.017	0.017	0.017	0.017	408	52	0.017	3390	92.7	0.017
Fluorene	16.7	15.1	10	10	10	10	10	10	10	10	10	10	10	10	52.5	10	10	213	25.2	10
Naphthalene	83.4	64.8	18.7	9	9	9	9	9	9	9	9	9	9	9	50.6	54.8	9	1130	115	9
Phenanthrene	304	340	103	15	15	15	15	15	15	26	15	15	15	15	255	53.7	15	1840	74.6	15
Pyrene																				
PAH, Total Detected USEPA 16	5.16	3.93	1.78	0.118	0.118	0.118	0.118	0.118	0.118	0.19	0.118	0.118	0.118	0.118	2.87	0.431	0.118	22.6	0.816	0.118
Naphthalene-d8 % recovery**	99.4	97	106	102	100	91.1	98.6	104	115	100	102	111	102	104	98.4	111	99.1	100	120	101
Acenaphthene-d10 % recovery**	101	92.9	103	107	100	82.1	93.4	99.1	112	87.6	93.9	105	101	99	98.4	107	94.2	96.5	118	94.1
Phenanthrene-d10 % recovery**	96	91.4	99.7	114	105	76.2	90.5	96.6	108	80.2	88.4	100	102	94.9	96.9	97.2	92.3	94.6	115	91.1
Chrysene-d12 % recovery**	97.6	95.5	107	104	99.2	71.2	76.8	110	104	91.2	84.3	95.1	97.7	92.7	104	81	86.5	97.2	114	92.1
Perylene-d12 % recovery**	108	98	115	116	102	70.2	70.1	98.5	108	82.3	84.9	97.1	98.6	94.8	114	88.8	82.7	103	125	93.7
Total Aliphatics >C12-C44	66.7	197	62.9	38.9	13.3	9.83	2.13	1.72	0.1	1.05	0.1	1.1	2.59	2.65	11.6	13.3	3.41	71.3	8.24	0.1
Total Aromatics >EC12-EC44	63.8	80.3	20	8.09	23.9	4.88	1.73	1.03	0.1	2.75	1.48	0.912	2.85	1.79	67.6	54.7	11.6	59.1	30.7	7.74
Total Aliphatics & Aromatics >C5-C44																				
Metals - (Solid)																				
Iron	325000	181000	167000	24200	42500	34600	44600	33400	37400	27300	31900	36900	31700	33100	32200	41100	38300	244000	34800	40800
Manganese	18500	30500	27500	157	306	312	372	880	305	441	242	970	358	324	696	916	456	11100	352	247
Metals - (Liquid)																				
Calcium	66100	259000	187000	-	-	-	-	-	-	-	-	-	-	-	8100	14900	5550	127000	-	-
Magnesium	3200	10600	14500	-	-	-	-	-	-	-	-	-	-	-	8270	8920	8170	13900	-	-
Phenols																				
Phenol	0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0154	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																				
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.266	-	-
pH	12.2	12.7	12.4	-	-	7.83	8.37	-	8.07	-	-	-	-	-	7.41	8.28	8.28	11.2	8.22	8.54
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2700	-	-
Sulphur, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, Total potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.27	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	288	131	138	50.6	138	155	141	64.1	224	64.6	297	249	185	21.9	334	96.1
Asbestos																				
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	19/12/2017	19/12/2017	19/12/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysed By	Neville Mann	Neville Mann	Renata Bozhkov	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	Not Detected	Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Comments	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																				
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.13	-	-	-	-	-	-	-	-	-	-	-	0.13	0.13	0.13	-	-	-
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																				
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AJ3V	TP3AJ4V	TP3AJ5V	TP3AK401	TP3AK402	TP3AK2V	TP3AK3V	TP3AK4V	3DV01	3DV02	3DV03	3DD2	3DD2	3DD3	3DD3	3DD2V	3DD3V	3DE2
Depth	0	0	0	0.5	1	0	0	2	0	0	0	0.2	0.8	0.5	1	1.5	2	0.5
Sampled Date	24/01/2018	29/01/2018	29/01/2018	26/09/2017	26/09/2017	24/01/2018	24/01/2018	26/09/2017	16/05/2017	16/05/2017	16/05/2017	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019
Carbon																		
Soil Organic Matter (SOM)	2.45	6.05	12.8	0.376	0.35	1.49	4.72	1.98	0.972	4.43	1.83	3.88	4.62	5.88	4.95	1.34	26.4	2.98
Metals (Solids)																		
Arsenic	10.9	15.3	35.7	6	6	15.3	11.2	12	12	12.1	8.49	13.9	19.2	9.62	10	12.3	1.49	8.01
Cadmium	0.188	0.341	0.683	0.2	0.2	0.02	0.312	0.234	0.02	0.02	0.02	0.587	1.15	1.83	0.778	0.245	0.071	0.633
Chromium	34.7	36.7	31.2	73	9	36.6	46.4	27.8	22.1	24.5	34	24.2	82.8	222	47	30.8	3.62	20.4
Copper	12.1	16.8	19.2	14	14	15.8	16	12.5	10.1	14.7	16.6	20.3	34	18.8	20.2	15.9	2.57	14.8
Lead	28.2	43.8	49.8	66.5	7	25.6	34.3	31.1	17.4	28.3	27.1	75.8	89.2	152	87.4	24	2.85	53.7
Mercury	0.14	0.14	0.14	1.4	2.92	0.14	0.14	0.697	0.544	0.65	0.574	0.14	0.14	1.4	0.14	0.14	0.14	0.14
Nickel	36.8	26.6	25.7	3.96	2	33.7	30.3	42.5	28.3	31.2	33.6	20.5	28.9	16.8	16.3	37.9	4.54	14.6
Selenium	1	1	1	10.7	10	1	1	1	1	1	1	1	3.01	10	1.93	1	1	1
Vanadium	55.8	58	53.5	334	18.1	54.8	70	60.1	44.5	52.5	61.6	34.7	99.8	381	105	51.8	6.25	41.3
Zinc	109	135	152	19	19	129	133	117	96.3	119	129	127	394	317	320	118	7.15	157
TPH Criteria Working Group (TPH CWG)																		
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04							
Toluene	0.008	0.008	0.008	0.0134	0.008	0.008	0.0139	0.0109	0.008	0.008	0.008							
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012							
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009							
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.0414	0.02	0.02	0.02	0.02	0.0253
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.0482	0.02	0.0502	0.0258	0.0263	0.0759
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.0526	0.02	0.0524	0.0206	0.02	0.0759
Aliphatics >C10-C12	0.04	0.04	0.225	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0244	0.19	0.02	0.136	0.02	0.02	0.116
Aliphatics >C12-C16	0.1	0.1	0.1	0.141	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.03	1.96	2.75	0.1	0.1	1.16
Aliphatics >C16-C21	0.1	0.1	0.1	3.29	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.03	9.52	9.94	12.4	0.1	0.1	8.33
Aliphatics >C21-C35	0.1	4.78	7.3	11.6	2.96	0.1	4.26	0.1	2.19	4.39	2.96	73.8	57.3	41	55.2	0.1	3.02	73
Aliphatics >C35-C44	0.1	0.1	0.1	4.85	0.1	0.1	0.1	0.1	0.1	7.81	0.1	25.1	14.7	10.7	15	0.1	0.306	33.4
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0464	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.04	0.04	0.074	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.0347	0.02	0.0353	0.02	0.02	0.0506
Aromatics >EC10-EC12	0.04	0.04	0.15	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.127	0.02	0.0901	0.02	0.02	0.0782
Aromatics >EC12-EC16	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.32	1.51	0.414	2.93	2.17	2.96	0.1	0.1	1.97
Aromatics >EC16-EC21	0.1	0.1	0.85	0.1	0.1	0.1	0.427	0.1	0.1	0.813	1.56	1.36	19.1	7.63	32	0.1	0.979	10.3
Aromatics >EC21-EC35	0.1	31.7	47.9	3.77	0.1	0.1	15.6	0.1	0.37	0.1	6.35	33.3	61.6	36.6	67.8	0.1	42.7	74.3
Aromatics >EC35-EC44	0.1	5.73	9.09	5.45	0.1	0.1	4.64	0.1	0.1	3.12	2.76	9.31	23.7	9.39	22.8	0.1	7.47	58.4
Aromatics >EC40-EC44	0.1	2.37	3.45	2.38	0.1	0.1	1.46	0.1	0.1	1.53	1.15	1.13	8.52	1.78	8.01	0.1	2.34	24.6
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	12	12	12	12	12	12	12	12	12	12	12	29.1	339	84	121	12	12	57.3
Acenaphthene	8	8	8	8	8	8	8	8	8	8	8	8	29.1	13.3	15.9	8	8	26.1
Anthracene	16	16	16	18.3	16	16	16	16	16	16	16	44.5	847	123	212	16	16	174
Benz(a)anthracene	14	14	97.7	63.9	14	14	14	14	14	14	90	191	1690	402	586	14	14	405
Benzo(a)pyrene	15	15	61	61.5	15	15	15	15	15	34	103	186	1540	369	506	15	15	335
Benzo(b)fluoranthene	15	15	129	130	15	15	15	15	15	74.1	136	287	2590	495	644	15	15	494
Benzo(k)fluoranthene	14	14	54.2	43.5	14	14	14	14	14	23.4	48.1	97.1	856	162	278	14	14	183
Benzo(g,h,i)perylene	24	24	73.3	71.3	24	24	24	24	24	24	83.8	142	1080	297	397	24	24	245
Chrysene	10	10	82.4	73.3	10	10	10	10	10	46.2	65.8	189	1630	397	622	10	10	418
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	35.3	211	68.3	88.5	0.023	0.023	59
Indeno(1,2,3-cd)pyrene	0.018	0.018	62	46.8	0.018	0.018	0.018	0.018	0.018	0.018	64.7	113	1260	236	318	0.018	0.018	190
Fluoranthene	0.017	0.017	117	133	0.017	0.017	0.017	0.017	0.017	96.8	94.7	357	4350	840	1490	0.017	0.017	884
Fluorene	10	10	10	10	10	10	10	10	10	10	10	15.4	296	43.6	82.3	10	10	74.7
Naphthalene	9	9	9	29	9	9	9	9	9	44.2	30.4	42.5	643	314	405	9	18.6	120
Phenanthrene	15	15	83.7	90.2	15	15	15	15	15	104	59.6	141	2060	483	876	15	15	575
Pyrene												0.282	3.19	0.651	1.13	0.015	0.015	0.747
PAH, Total Detected USEPA 16	0.118	0.118	0.845	0.862	0.118	0.118	0.118	0.118	0.118	0.493	0.862	2.15	22.6	4.98	7.77	0.118	0.118	4.99
Naphthalene-d8 % recovery**	105	101	114	101	101	86.1	112	99.5	103	109	107	93.3	87.1	93.6	93.6	94.7	90.6	88
Acenaphthene-d10 % recovery**	102	95.9	109	95.2	96.8	76.7	107	93.3	104	106	104	82	81.5	83.5	83.5	85.5	83.9	85.4
Phenanthrene-d10 % recovery**	96.3	95.3	106	94.1	94.6	71.3	102	88.5	100	105	102	85.4	86.8	85.1	84.7	85.6	90.8	91.8
Chrysene-d12 % recovery**	108	92.3	110	91.6	93.6	78.7	119	84.3	93.4	106	103	85.7	83.8	83.6	75.6	83.8	79.2	84.9
Perylene-d12 % recovery**	102	91.2	115	93	99.5	73.1	112	82.6	95.6	112	110	90.9	91.5	86	77.7	88.2	78.2	89.1
Total Aliphatics >C12-C44	0.1	4.78	7.3	19.8	2.96	0.1	4.26	0.1	2.19	12.2	2.96	102	84.5	63.6	85.4	0.1	3.33	116
Total Aromatics >EC12-EC44	0.1	37.4	57.8	9.21	0.1	0.1	20.7	0.1	0.37	5.25	12.2	44.3	107	55.8	126	0.1	51.1	145
Total Aliphatics & Aromatics >C5-C44												146	192	119	211	0.1	54.5	261
Metals - (Solid)																		
Iron	30400	26500	23200	130000	381000	28300	28700	43500	31500	37500	35500	23600	55400	101000	60200	37400	4300	29600
Manganese	420	207	187	24400	1010	295	200	837	963	779	446	897	6380	12100	4180	804	122	1770
Metals - (Liquid)																		
Calcium	-	-	-	198000	2730	-	-	-	-	-	-	10900	-	-	115000	-	-	-
Magnesium	-	-	-	24400	4870	-	-	-	-	-	-	3860	-	-	21600	-	-	-
Phenols																		
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.0114	0.01	0.01	0.01
Cresols	0.01	0.01	0.0344	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	0.154	0.021	-	-	-	-	-	-	0.0489	-	-	0.158	-	-	-
pH	-	-	-	11.5	10.6	-	-	7.82	-	-	-	7.4	10.9	11	11.1	7.64	7.78	11.1
Sulphate, Total	-	-	-	9460	<48	-	-	-	-	-	-							
Sulphur, Total	-	-	-	-	-	-	-	-	-	-	-	0.0695	-	-	0.2	-	-	-
Sulphate, Total potential	-	-	-	-	-	-	-	-	-	-	-	0.209	-	-	0.6	-	-	-
Sulphate, acid soluble (total)	-	-	-	0.946	0.02	-	-	-	-	-	-	0.0521	-	-	0.342	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	119	263	116	176	12	53.3	239	182	12	22.7	33.8	28.3	12	12	12	76.3	12	12
Asbestos																		
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	0.001	-	-	-
Date of Analysis	-	-	-	-	06/10/2017	-	-	-	-	-	-	09/04/2019	-	-	08/04/2019	-	-	-
Analysed By	-	-	-	-	Neville Mann	-	-	-	-	-	-	Lucy Caroe	-	-	Renata Bozhkov	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	0.001	-	-	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	-	-	-	-	-	None	-	-	None	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-	N/A	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	0.001	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	Not Detected	-	-	-	-	-	-	Detected	-	-	Trace	-	-	-
Amosite (Brown) Asbestos	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-
Fibrous Anthophyllite	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-
Fibrous Tremolite	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-
Fibrous Actinolite	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-
Non-Asbestos Fibre	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-
Comments	-	-	-	-	0	-	-	-	-	-	-	Loose fibres in soil	-	-	Loose fibres in soil.	-	-	-
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	107	107	95.2	101	104	113	105
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	99.2	99.3	94.1	98.4	99.1	91.4	100
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	95.3	94.2	81.8	91.8	98.3	79.2	97.2
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	-	-	-	-	-	-	-	-	-	-	-	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	-	-	-	-	-	-	-	-	-	-	-	0.121	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	-	-	-	-	-	-	-	-	-	-	-	0.13	1.35	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	3DE2	3DE3	3DE3	3DE5	3DE5	3DE2V	3DE3V	3DE5V	3DF1	3DF1	3DF2	3DF2	3DF3	3DF3	3DF4	3DF4	3DF5	3DF5	3DF1V	3DF2V	3DF3V	3DF4V
Depth	1	0.5	1	0.5	1	1.4	2.6	2	0.4	1	0.5	1	0.3	0.5	0.1	0.5	0.5	1.5	1.4	1.4	1.35	1.6
Sampled Date	26/03/2019	26/03/2019	26/03/2019	25/03/2019	25/03/2019	26/03/2019	26/03/2019	25/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	25/03/2019	25/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019
Carbon																						
Soil Organic Matter (SOM)	3.12	5.24	7.69	1.21	4.47	3.07	40.7	12	1.52	3.29	5.33	3.33	3.6	3.02	11	13.5	1.28	26.5	9.65	0.931	1.88	3
Metals (Solids)																						
Arsenic	8.11	16.7	14.6	7.44	15.6	12.3	2.9	15.1	9.42	8.2	10.3	8.45	14.3	8.73	24	12.2	10.3	11.1	20.9	10.4	13.2	23.8
Cadmium	0.514	0.466	2.33	0.518	1.79	0.274	0.108	1.18	0.677	0.452	2.64	2.83	0.516	0.266	15.3	4.44	2.83	4.72	0.873	0.298	0.219	0.328
Chromium	211	31.8	132	43.4	48.2	36.8	3.84	37.1	45.2	115	64.4	79.8	314	103	9	159	216	9	31.8	31.6	36.4	32.2
Copper	17.9	20.3	23.3	13.3	21.8	16.2	7.28	21.6	17.3	29.4	34	20.2	89.6	29.1	68.9	34.3	23.5	16.2	20.7	11.7	15.2	15.7
Lead	45.8	57	185	23.6	69.2	28.9	4.16	63.3	58.7	87.8	295	328	75.8	34.9	3120	800	227	586	51.6	30.7	27.1	33.9
Mercury	0.14	0.14	1.4	0.14	1.4	0.14	0.14	1.4	0.14	0.14	1.4	1.4	1.4	0.14	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14
Nickel	13.7	19.2	26.4	17.2	29.6	33	7.33	24.1	15.3	13.7	29.7	19.6	44.9	12.5	52.7	28.2	22.1	22.3	25.9	39.2	35.4	29.4
Selenium	3.48	2.28	10	2.43	10	1	1	1	1.94	5.95	10	10	13.2	7.17	10	10	10	10	1	1	1	1
Vanadium	125	112	214	73.2	190	58.2	10.3	69.1	69.6	157	127	333	219	110	154	194	243	83.8	59.2	86.7	57.5	53.2
Zinc	174	188	488	97.1	188	117	13.5	257	162	259	897	977	116	123	7350	1960	528	1420	169	122	110	123
TPH Criteria Working Group (TPH CWG)																						
Benzene																						
Toluene																						
Ethylbenzene																						
sum of detected mpo xylene by GC																						
Aliphatics >C5-C6	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0719	0.02	0.02	0.02	0.01	0.328	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.0246	0.0559	0.0348	0.02	0.02	0.02	0.0344	0.0476	0.02	0.0947	0.0217	0.0585	0.02	0.0363	0.663	0.0384	0.02	0.021	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.0225	0.0616	0.0268	0.02	0.02	0.02	0.0344	0.0429	0.02	0.126	0.02	0.0449	0.02	0.0331	74.2	0.0256	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.0385	0.158	0.0268	0.02	0.02	0.02	0.0611	0.0464	0.02	0.167	0.0228	0.0394	0.02	0.0843	987	0.0304	0.02	0.02	0.02
Aliphatics >C12-C16	2.36	3	3.61	2.97	8.91	0.339	2.97	5.37	1.34	4.76	3.83	3.65	6.1	2.63	0.743	1.68	1.88	11.7	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	10.1	10.7	15	14.1	24.5	0.804	0.583	17.3	10.7	20.6	33.8	29.8	26.5	10.6	10.8	9.33	9.13	121	0.1	0.115	0.1	0.1
Aliphatics >C21-C35	69.3	54.3	70	99.2	114	2.1	12.5	39	187	122	185	147	252	76.1	30.1	37.7	70.8	53.5	2.13	1.13	0.1	0.1
Aliphatics >C35-C44	33.1	20.9	24.1	29.1	31.4	0.1	0.1	15.2	104	46.8	48.9	33.6	157	38.3	2.88	6.55	34.1	2.81	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	2.8	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0359	0.02	0.02	0.02	0.01	16.9	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.015	0.041	0.02	0.02	0.02	0.02	0.0233	0.029	0.02	0.0849	0.02	0.0299	0.02	0.0213	49.5	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.0257	0.106	0.02	0.02	0.02	0.02	0.0411	0.0313	0.02	0.111	0.02	0.0258	0.02	0.0566	658	0.0208	0.02	0.02	0.02
Aromatics >EC12-EC16	1.76	2.61	3.78	1.67	3.11	0.1	5.14	11.8	2.18	0.694	3.54	2.52	3.36	4.24	0.1	1.95	7.68	1010	0.174	0.1	0.1	0.1
Aromatics >EC16-EC21	13.2	12.9	17.9	12.2	15	0.1	5.56	33.9	12.2	7.83	24.9	20.7	11.1	13	7.2	8.57	44.7	2710	0.675	0.1	0.1	0.1
Aromatics >EC21-EC35	67.4	57.4	79.5	65.7	65	1.26	69.4	83.1	183	59.6	106	75.9	135	60.7	13.3	31.8	132	2330	19.6	0.5	3.72	5.54
Aromatics >EC35-EC44	46.9	27.1	34.5	33.7	35.7	0.417	19.1	27.5	148	43.3	46.2	27.7	106	33.1	0.709	9.96	55.3	419	2.02	2.41	0.855	0.733
Aromatics >EC40-EC44	20.4	10.1	12.8	13.3	15	0.1	4.58	10.5	57.8	18.7	17.7	10.3	41.9	12.1	0.1	2.99	20.5	124	0.158	1.01	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)																						
Acenaphthylene	120	254	294	343	144	12	12	12	60	20.8	208	84.9	50.4	68.5	17.5	136	57600	2100000	12	12	12	12
Acenaphthene	80	26.2	34.7	8	15.5	8	8	8	40	13.6	46.6	41.5	17.3	8	8	40	3450	115000	8	8	8	8
Anthracene	160	540	461	455	241	16	16	71.1	80	52.5	488	196	103	128	43.5	317	43300	1860000	16	16	16	16
Benz(a)anthracene	140	1230	1390	1640	505	14	14	118	70	262	1490	669	321	381	67.9	762	39200	1150000	68.4	14	14	14
Benzo(a)pyrene	150	1100	1230	1790	520	15	15	110	75	236	1310	610	281	310	39.1	570	31900	714000	72	15	15	15
Benzo(b)fluoranthene	150	1430	1930	2660	832	15	15	224	130	435	1950	995	420	410	87.4	746	46200	1110000	124	15	15	15
Benzo(k)fluoranthene	140	533	662	1110	278	14	14	67.8	70	139	631	330	149	179	20.5	274	18500	373000	36.1	14	14	14
Benzo(g,h,i)perylene	0.24	805	885	1430	407	24	24	91.8	120	217	976	457	235	250	24	442	19100	333000	66.4	24	24	24
Chrysene	0.1	1120	1280	1580	461	10	10	139	79.4	298	1440	660	338	373	71.1	713	37100	1090000	89	10	10	10
Dibenzo(a,h)anthracene	0.23	189	203	302	81.3	0.023	0.023	0.023	0.115	37.8	217	104	54.6	60.8	0.023	0.115	5770	109000	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	180	701	696	1280	438	0.018	0.018	102	90	192	760	324	183	196	0.018	405	19300	374000	48.7	0.018	0.018	0.018
Fluoranthene	0.17	2790	3310	2610	1060	0.017	0.017	326	142	434	3960	1850	701	914	269	2030	83900	2940000	163	0.017	0.017	0.017
Fluorene	0.1	148	150	122	98.7	10	10	62.3	50	18.6	148	88	36.6	42.4	17.7	102	51900	1890000	10	10	10	10
Naphthalene	90	406	588	354	293	9	32.5	123	45	51.1	295	237	195	256	106	410	119000	4680000	9	9	9	9
Phenanthrene	150	1280	1350	967	482	15	15	280	75	201	1930	799	446	548	200	836	104000	3810000	84.4	15	15	15
Pyrene	0.15	2.06	2.56	2.06	0.885	0.015	0.015	0.219	0.141	0.456	2.98	1.48	0.545	0.691	0.256	1.6	17.9	1950	0.126	0.015	0.015	0.015
PAH, Total Detected USEPA 16	1.18	14.6	17	18.7	6.74	0.118	0.118	1.93	0.59	3.07	18.8	8.92	4.08	4.81	1.2	9.34	697	24600	0.878	0.118	0.118	0.118
Naphthalene-d8 % recovery**	86.3	92.2	94.9	101	94.8	95	96.4	97.5	89.9	87.5	90.4	90	92.1	92.6	101	96.9	83.2	1100	93.5	93.5	94.7	95.3
Acenaphthene-d10 % recovery**	70.5	85.1	86.2	93.3	87.6	82.2	83.9	87.9	75	80.8	85.6	84.7	84.1	83.2	90.1	80	95.1	249	83.7	83.5	86	88.7
Phenanthrene-d10 % recovery**	79.8	87	83.7	97.5	91	85.3	84.6	89.7	80.5	85.7	90	88.9	89.1	87.2	93.6	72.4	93.3	97	88.5	85.1	84.2	87.2
Chrysene-d12 % recovery**	70.9	86.9	74.9	98.8	83.8	83.7	82.3	84.1	72.4	84.3	81.7	79.5	85.4	85.3	63.9	53.3	77.2	81.1	87.2	78.5	75.9	76.4
Perylene-d12 % recovery**	75.3	86.2	75.7	105	85.4	87.2	83.1	86.2	77.8	93.2	82.2	75.6	90.3	89.4	43.4	41.9	84.1	69.5	91.6	81.7	79.4	81.3
Total Aliphatics >C12-C44	115	88.9	113	145	179	3.24	16	76.9	303	194	272	214	441	128	44.6	55.3	116	189	2.13	1.25	0.1	0.1
Total Aromatics >EC12-EC44	129	100	136	113	119	1.68	99.2	156	346	111	181	127	255	111	21.2	52.3	240	6470	22.5	2.91	4.58	6.28
Total Aliphatics & Aromatics >C5-C44	244	189	249	259	298	5.01	115	233	648	306	453	341	698	239	65.9	108	356	8450	24.7	4.16	4.58	6.28
Metals - (Solid)																						
Iron	64100	89900	99400	38600	144000	30800	7030	25400	52900	67500	100000	149000	127000	60500	426000	189000	168000	232000	28000	40600	33200	35600
Manganese	9250	7490	9870	3440	7340	846	167	344	4670	11800	5000	8490	17000	10700	7700	11300	12700	3180	393	1360	304	318
Metals - (Liquid)																						
Calcium	136000	103000	-	103000	-	-	-	-	86600	-	-	114000	161000	-	-	97400	106000	-	-	-	-	-
Magnesium	32600	13600	-	16100	-	-	-	-	14900	-	-	14300	17200	-	-	10600	10500	-	-	-	-	-
Phenols																						
Phenol	0.011	0.0115	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0348	0.0228	0.01	0.01	0.01	0.01	0.01	1.21	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0116	0.01	0.0109	0.0114	0.01	0.01	0.01	4.77	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	4.41	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0464	0.035	0.035	0.035	0.035	0.035	0.035	10.4	0.035	0.035	0.035	0.035
Inorganics																						
Soluble Sulphate 2:1 extract as SO4 BRE	0.0578	0.238	-	0.134	-	-	-	-	0.152	-	-	0.16	0.133	-	-	0.159	0.0433	-	-	-	-	-
pH	11	11.2	11.1	9.57	11.3	7.68	7.6	7.79	10.3	11.5	10.8	11.1	12.2	12	8.09	8.52	12.1	11	8.3	7.77	7.73	7.38
Sulphate, Total																						
Sulphur, Total	0.122	0.289	-	0.235	-	-	-	-	0.219	-	-	0.206	0.678	-	-	0.18	0.169	-	-	-	-	-
Sulphate, Total potential	0.366	0.867	-	0.705	-	-	-	-	0.657	-	-	0.618	2.03	-	-	0.54	0.507	-	-	-	-	-
Sulphate, acid soluble (total)	0.18	0.405	-	1.42	-	-	-	-	0.425	-	-	0.311	1.25	-	-	0.248	0.31	-	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1.39	1	1	1	14.2	4.69	1	4.16	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	112	32.6	162	12	12	12	12	12	12	12	12	12	12	179	70.4	71.2	12
Asbestos																						
Asbestos Quantification - Gravimetric - %	-	0.0838	-		-	-	-	-	-	-	-	0.001	0.001	-	-	-	0.001	-	-	-	-	-
Date of Analysis	09/04/19	09/04/19	-	08/04/2019	-	-	-	-	09/04/19	-	-	09/04/2019	08/04/2019	-	-	09/04/2019	08/04/2019	-	-	-	-	-
Analysed By	Andrzej Ferfecki	Andrzej Ferfecki	-	Renata Bozhkov	-	-	-	-	Andrzej Ferfecki	-	-	Lucy Caroe	Barbara Urbanek-Walsh	-	-	Lucy Caroe	Barbara Urbanek-Walsh	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	0.001	-		-	-	-	-	-	-	-	0.0012	0.001	-	-	-	0.001	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	None	-		-	-	-	-	-	-	-	None	None	-	-	-	None	-	-	-	-	-
Analysts Comments	-	N/C	-		-	-	-	-	-	-	-	N/C	N/C	-	-	-	N/A	-	-	-	-	-
Asbestos Quantification - Total - %	-	0.084	-		-	-	-	-	-	-	-	0.0019	0.001	-	-	-	0.001	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Detected	Detected	-	-	Not Detected	Trace	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-
Fibrous Tremolite	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-
Fibrous Actinolite	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-
Comments	-	fibre bundles in soil	-		-	-	-	-	-	-	-	Fibre bundles in soil	Loose fibres in soil.	-	-	-	Loose fibres in soil.	-	-	-	-	-
Volatile Organic Compounds (VOCs)																						
Dibromofluoromethane**	105	92	95.7	102	101	105	114	109	106	107	99.5	105	103	104	100	90.8	102	104	108	105	105	111
Toluene-d8**	98.2	87.8	93.7	97.5	98.9	100	87.9	97	98.3	97.7	96.2	98.4	95.5	93.2	99.7	88	98.6	99.7	96.3	100	100	96.8
4-Bromofluorobenzene**	96	73.5	80.1	89.9	92	102	79.5	91.5	95.7	94.8	86.7	94.4	89.6	91.9	94.4	69.8	94.1	98.4	90.6	98.5	101	97.4
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	3.55	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	9.31	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.8	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.241	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.907	2790	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	15.7	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																						
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3DG1	3DG2	3DG2	3DG3	3DG4	3DG5	3DG5	3DG5	3DG6	3DG6	3DG1V	3DG2V	3DG3V	3DG4V	3DH1	3DH2	3DH3	3DH3	3DH4	3DH5	3DH6	3DH1V	3DH2V	3DH3V
Depth	0.5	0.4	1	0.5	0.5	0.5	1.4	2	0.5	1	1	1.9	0.9	1	0.5	0.5	0.5	1	0.5	0.5	0.5	1	1	1.5
Sampled Date	18/03/2019	26/03/2019	26/03/2019	19/03/2019	19/03/2019	19/03/2019	19/03/2019	19/03/2019	26/03/2019	26/03/2019	18/03/2019	26/03/2019	19/03/2019	19/03/2019	18/03/2019	18/03/2019	19/03/2019	19/03/2019	19/03/2019	21/03/2019	21/03/2019	18/03/2019	18/03/2019	19/03/2019
Carbon																								
Soil Organic Matter (SOM)	10.5	3	19.7	1.68	3.88	6.45	42.2	26.9	4.81	4.48	3.81	0.746	3.07	0.964	14.6	6.38	18.3	7.26	0.717	4.81	2.24	2.26	1.57	7.71
Metals (Solids)																								
Arsenic	9.22	6.5	9.95	13	8.93	18.5	24.8	11.3	16.3	8.09	11.8	9.02	8.72	12.9	10.7	9.81	22	10.8	7.06	10.3	9.5	13.4	13	13.5
Cadmium	1.06	0.507	2.7	0.486	6.09	8.94	5.07	4.74	3.5	3.88	0.236	0.22	2.88	0.254	1.32	1.19	0.2	0.332	0.666	1.11	1.8	0.392	0.364	0.229
Chromium	87	66.8	85.4	38.3	361	9	9	9	413	274	43.2	24.6	133	35.7	30.2	36.8	83.9	111	86.7	106	61.2	37.6	35.6	42.2
Copper	21.6	12.8	21.9	12.3	26.7	31.1	27	23.1	52.1	17.9	14.9	8.71	25.9	12.1	29.5	20.7	47.6	27.9	11	20.7	25.6	16.6	14.6	20
Lead	75.5	42.3	229	28.5	261	967	556	719	406	498	23.5	19.6	240	27.9	127	84.5	60.2	125	27.9	281	155	23.9	25.1	40
Mercury	0.14	0.14	1.4	0.14	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	0.14	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14
Nickel	16.3	13.4	25.6	39.6	32	65.2	33.1	28.8	49.6	13.5	28.1	32.4	18.9	39.3	24	57.9	47.7	31.1	12.6	28.6	23.6	38.1	36.6	27.6
Selenium	2.95	1	10	1	10	10	10	10	19.2	12.8	1	1	10	1	1.71	1.77	10	10	3.56	10	4.55	1	1	1
Vanadium	117	207	125	60	152	311	122	171	441	1640	67.8	45.7	210	56.3	63.1	84.5	232	314	288	254	194	58.7	54.1	70.8
Zinc	275	123	604	124	827	2100	1500	1560	991	1130	132	93.1	718	121	413	270	183	373	98.9	750	600	108	107	143
TPH Criteria Working Group (TPH CWG)																								
Benzene																								
Toluene																								
Ethylbenzene																								
sum of detected mpo xylene by GC																								
Aliphatics >C5-C6	0.0499	0.02	0.0302	0.02	0.02	0.02	0.02	0.2	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0269	0.02	0.02	0.02	0.0592	0.02	0.02	0.02
Aliphatics >C6-C8	0.0557	0.0559	0.137	0.02	0.02	0.02	0.023	0.585	0.0319	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.115	0.02	0.02	0.02	0.0812	0.02	0.02	0.02
Aliphatics >C8-C10	0.0557	0.057	0.12	0.02	0.02	0.02	0.0387	60.4	0.0231	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.131	0.02	0.02	0.0127	0.4	0.02	0.02	0.02
Aliphatics >C10-C12	0.0557	0.0855	0.146	0.02	0.02	0.0269	0.092	767	0.022	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.868	0.02	0.02	0.02	0.129	0.02	0.02	0.02
Aliphatics >C12-C16	1.77	2.89	3.87	0.1	2.88	0.1	2.25	67.9	1.95	0.124	0.1	0.1	2.85	0.1	3.47	3.58	1.47	1.2	7.94	2.32	3.4	0.1	0.1	0.1
Aliphatics >C16-C21	9.84	18.4	25.8	0.1	29.6	0.1	10.5	668	13	8.59	0.1	0.1	19.6	0.1	16	12.7	6.34	6.49	23.7	14.4	24.2	0.1	0.1	0.1
Aliphatics >C21-C35	51.6	408	82.5	2.45	194	0.1	30.5	152	95.2	35.9	7.45	0.1	105	0.1	85	67.2	17.9	17.7	184	67.1	149	2.14	0.1	6.57
Aliphatics >C35-C44	17.2	276	30.9	0.1	53.7	0.1	1.7	5.27	34.1	5.32	0.1	0.1	33.6	0.1	23.6	19.9	5.69	0.618	49.5	16.6	45.4	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.0202	0.02	0.02	0.02	0.02	5.26	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.0224	0.02	0.02	0.02	0.02	20.3	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.0371	0.0376	0.0795	0.02	0.02	0.02	0.0254	40.3	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0878	0.02	0.02	0.02	0.267	0.02	0.02	0.02
Aromatics >EC10-EC12	0.0371	0.057	0.0974	0.02	0.02	0.02	0.0617	512	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.579	0.02	0.02	0.02	0.0858	0.02	0.02	0.02
Aromatics >EC12-EC16	5.63	3.71	8.77	0.1	1.45	0.633	2.69	5280	1.4	1.75	1.08	0.1	2	0.1	6.08	8.98	6.71	6.16	2.58	1.56	1.74	0.1	0.1	0.1
Aromatics >EC16-EC21	45.4	23.1	72.6	0.1	15.2	8.06	8.69	9800	12	43.9	4.58	0.1	16.9	0.1	46	89	67.1	43.7	12.5	13.2	18.2	0.728	0.1	2.1
Aromatics >EC21-EC35	129	378	183	3.56	100	24.5	13	9010	49.6	112	25.4	0.1	85.6	0.1	142	138	148	160	75.7	59.6	110	5.1	0.823	30.4
Aromatics >EC35-EC44	50.5	414	61.6	0.1	59.8	6.56	0.442	1400	27.8	32.5	8.77	0.1	51.1	0.1	54.6	42	42.7	50.8	41.7	23.1	62	2.8	0.428	3.36
Aromatics >EC40-EC44	17.2	191	22.6	0.1	23.3	1.98	0.1	366	11.3	9.21	2.78	0.1	20.5	0.1	18.5	15.5	15.2	16.2	16.3	7.87	25.1	0.96	0.165	0.1
Polyaromatic Hydrocarbons (PAHs)																								
Acenaphthylene	1950	59.7	827	12	197	407	28.3	355000	25.9	340	313	12	56	12	2460	265	621	287	27.5	286	281	12	12	12
Acenaphthene	216	53.9	105	8	52	8	15.8	13300	27.9	21.3	19.9	8	27.7	8	93.5	48.8	8	130	8	47.2	60.2	8	8	13.5
Anthracene	5970	232	2050	16	478	1040	33.4	268000	97.6	855	1000	16	156	16	5900	547	2400	960	78.7	442	464	16	16	16
Benz(a)anthracene	11400	639	4410	14	1200	1580	39.2	185000	432	3320	1680	14	393	14	19600	1880	4820	2730	341	1550	1190	14	14	52.7
Benzo(a)pyrene	9500	450	3370	15	930	1280	22.2	125000	390	2810	1120	15	335	15	14300	1710	3960	2220	369	1500	1010	15	15	45.4
Benzo(b)fluoranthene	15600	683	4790	15	1240	2270	26.5	140000	685	4300	1900	15	643	15	23000	2620	6490	3510	589	2330	1500	15	15	99.5
Benzo(k)fluoranthene	5590	205	1670	14	500	894	14	60700	248	1730	651	14	238	14	8400	979	2330	1300	250	752	565	14	14	29.4
Benzo(g,h,i)perylene	5760	283	2160	24	700	790	24	65400	329	2170	647	24	265	24	7630	1110	2580	1490	288	1000	617	24	24	41
Chrysene	12500	618	3590	16.5	1210	1500	42.7	167000	487	3300	1560	10	428	10	18400	1890	4780	2350	327	1630	967	10	10	55.9
Dibenzo(a,h)anthracene	1760	79.8	560	0.023	182	236	0.023	20600	52	573	190	0.023	62.7	0.023	2530	297	715	371	59.1	222	145	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	5450	219	1950	0.018	588	779	0.018	65000	311	1930	645	0.018	211	0.018	7790	1010	2430	1340	238	1200	772	0.018	0.018	32.2
Fluoranthene	27200	1510	11500	38.6	2740	3090	112	580000	896	6220	4840	0.017	929	0.017	52100	3950	9770	5390	667	3410	2950	32.2	0.017	163
Fluorene	1920	103	960	10	191	53.7	29.3	280000	25.5	113	471	10	61.8	10	2050	197	573	356	10	147	378	10	10	20.8
Naphthalene	2010	133	828	11.7	201	9	6770	1170000	81.3	224	89.9	9	202	12.2	428	278	942	576	9	457	284	9	9	505
Phenanthrene	12900	892	6280	23.4	1410	1030	106	794000	479	2800	3880	15	491	15	11300	1600	4670	3040	306	1210	2190	15	15	101
Pyrene	18.4	1.09	7.94	0.0303	1.98	2.17	0.0773	341	0.783	5	3.02	0.015	0.793	0.015	32.8	2.8	7.42	4.02	0.549	2.89	2.23	0.0213	0.015	0.114
PAH, Total Detected USEPA 16	138	7.25	53	0.12	13.8	17.1	7.3	4630	5.35	35.7	22	0.118	5.29	0.118	209	21.2	54.5	30.1	4.09	19.1	15.6	0.118	0.118	1.27
Naphthalene-d8 % recovery**	96.3	92.5	87.9	101	111	96.5	86.1	99	88.7	92	95.4	92.8	98.6	114	95.4	97.7	97.6	94.5	96.8	94.7	99.8	97.6	95.1	93.7
Acenaphthene-d10 % recovery**	96.4	85.4	80.1	93.7	108	93.8	72.6	99.5	81.3	85.3	94.2	85.2	96.8	107	96	96.1	97.8	75.4	95.8	94.5	96.7	97.6	94.4	93.3
Phenanthrene-d10 % recovery**	96.3	84.9	87.9	94.6	110	101	55.9	93	81	85.6	98.4	90.4	101	116	97.6	98.8	102	100	101	103	102	99	95.8	101
Chrysene-d12 % recovery**	98.3	78.2	81.3	97.6	115	83.3	27.9	108	70.8	77.7	106	82.6	82.5	111	108	107	81.9	86	86.3	91.5	88.5	107	96.6	90.8
Perylene-d12 % recovery**	99.7	84.3	78.3	102	112	79	16.6	108	70.3	78.2	111	84.5	75.7	114	109	115	86.5	86.1	84.8	87.2	84.3	113	99	86.3
Total Aliphatics >C12-C44	80.4	705	143	2.45	281	0.1	44.9	894	144	50	7.45	0.1	161	0.1	128	103	31.4	26	265	100	222	2.14	0.1	6.57
Total Aromatics >EC12-EC44	230	818	326	3.56	177	39.7	24.8	25500	90.7	190	39.8	0.1	156	0.1	248	278	264	261	133	97.5	192	8.62	1.25	35.8
Total Aliphatics & Aromatics >C5-C44	311	1520	470	6.01	457	39.7	70	27800	235	240	47.3	0.1	316	0.1	377	381	297	287	398	198	415	10.8	1.25	42.4
Metals - (Solid)																								
Iron	76700	41100	73900	36500	117000	344000	261000	212000	205000	194000	39000	32300	83100	38300	55700	58700	300000	109000	67700	119000	79800	33300	32800	18900
Manganese	6350	2210	5930	323	8640	5240	6040	4380	31000	24500	635	946	13600	340	3340	3830	8540	7840	6650	8970	10800	327	294	348
Metals - (Liquid)																								
Calcium	-	140000	-	4330	133000	38600	45500	-	147000	-	-	-	-	-	-	-	94900	125000	139000	127000	167000	-	-	-
Magnesium	-	30600	-	10300	34900	5120	7130	-	11500	-	-	-	-	-	-	-	9910	14900	15400	14600	25000	-	-	-
Phenols																								
Phenol	0.0232	0.01	0.0336	0.01	0.0113	0.01	0.01	0.1	0.01	0.0109	0.01	0.01	0.01	0.01	0.01	0.0114	0.01	0.01	0.0114	0.069	0.01	0.01	0.01	0.01
Cresols	-	0.01	0.01	0.01	0.01	0.01	0.01	1.22	0.01	0.01	-	0.01	0.011	0.01	-	-	0.01	0.01	0.01	0.0115	0.01	-	-	0.01
Xylenols	-	0.015	0.015	0.015	0.015	0.015	0.015	0.434	0.015	0.015	-	0.015	0.015	0.015	-	-	0.015	0.015	0.015	0.015	0.015	-	-	0.015
Phenols, Total Detected monohydric	-	0.035	0.035	0.035	0.035	0.035	0.035	1.65	0.035	0.035	-	0.035	0.035	0.035	-	-	0.035	0.035	0.035	0.0575	0.035	-	-	0.035
Inorganics																								
Soluble Sulphate 2:1 extract as SO4 BRE	0.235	0.117	-	0.0325	0.2	0.025	0.147	-	0.105	-	-	-	-	-	0.189	0.138	0.173	0.235	0.241	0.2	0.233	-	-	-
pH	11.2	10.1	11.1	7.81	11.3	8.96	10.7	10.8	12.1	12.3	7.85	8.15	11.3	8.16	11.1	11.2	11.4	11.6	10.9	11.2	11.1	7.79	7.74	7.72
Sulphate, Total																								
Sulphur, Total	0.24	0.138	-	0.02	0.311	0.0819	0.217	-	0.219	-	-	-	-	-	0.258	0.183	0.247	0.31	0.242	0.226	0.318	-	-	-
Sulphate, Total potential	0.72	0.414	-	0.06	0.933	0.246	0.651	-	0.657	-	-	-	-	-	0.774	0.549	0.741	0.93	0.726	0.678	0.954	-	-	-
Sulphate, acid soluble (total)	0.417	0.199	-	0.02	0.429	0.0687	0.206	-	0.355	-	-	-	-	-	0.41	0.243	0.466	0.548	1.26	0.585	0.682	-	-	-
Cyanide, Total	1	1	1	1	3.51	1	9.28	1.25	2.52	1.83	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	-	12	12	164	12	12	12	12	12	12	-	17	12	101	-	-	12	12	12	12	12	-	-	187
Asbestos																								
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0065	-	-	-	0.0165	0.0053	-	-	-	-
Date of Analysis	22/03/2019	09/04/19	-	02/04/2019	02/04/2019	02/04/2019	02/04/19	-	09/04/2019	-	22/03/2019	-	-	-	22/03/2019	22/03/2019	02/04/2019	02/04/19	02/04/19	03/04/2019	05/04/19	22/03/2019	25/03/2019	-
Analysed By	Marcin Magdziarek	Andrzej Ferfecki	-	Marcin Magdziarek	James Richards	Marcin Magdziarek	Andrzej Ferfecki	-	Lucy Caroe	-	Lucy Caroe	-	-	-	Lucy Caroe	Lucy Caroe	James Richards	Andrzej Ferfecki	Andrzej Ferfecki	Marcin Magdziarek	Christian Hallam	Marcin Magdziarek	James Richards	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	0.0133	0.001	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	None	None	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-	-	PCOM analysis shows fibres typical of Amphibole asbestos.	N/C	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0065	-	-	-	0.0298	0.0058	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Detected	Not Detected	Not Detected	Not Detected	Detected	Detected	Not Detected	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-
Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Soil containing ACM debris	-	-	-	loose fibres in soil	Loose fibres in soil	-	-	-	-
Volatile Organic Compounds (VOCs)																								
Dibromofluoromethane**	110	108	96.8	106	105	103	116	105	104	102	114	107	102	103	104	104	97.7	116	105	101	106	115	117	108
Toluene-d8**	101	94.9	94.8	99.1	98.1	99.4	95.7	97.9	96.9	97.3	102	100	99.9	102	98.9	97.4	98.1	103	100	101	99.5	103	102	97.4
4-Bromofluorobenzene**	82.2	90.1	84.6	98.7	94.5	94.6	87.8	89.6	93.3	91.7	85.7	102	92.6	98.1	73.1	72.3	85.5	96.8	91.2	94.6	94.7	89.3	86.7	92
Methyl Tertiary Butyl Ether	0.2	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.18	0.09	0.09	0.09	0.09	0.09	0.09	7.03	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.14	0.07	0.07	0.07	0.07	0.07	0.07	28.3	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.08	0.04	0.04	0.04	0.04	0.04	0.04	1.15	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.2	0.1	0.1	0.1	0.1	0.1	0.1	61.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.2	0.1	0.1	0.1	0.1	0.1	0.1	17.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.26	0.169	0.31	0.13	0.13	0.13	0.228	15500	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.181	0.26	0.13	0.212	0.13	0.13	0.13	0.13
Sum of BTEX	0.8	0.4	0.4	0.4	0.4	0.4	0.4	116	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																								
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

												Sample ID	3DH4V	3DH5V	3DH6V	3DI1	3DI1	3DI2	3DI3	3DI4	3DI1V	3DI2V	3DI3V	3DI4V	3DJ1	3DJ1	3DJ1	3DJ2	3DJ2	3DJ3	3DJ4	3DJ4	3DJ1V	3DJ2V	3DJ3V	3DJ4V	3DK1	3DK1	3DK1	3DK2	3DK2	3DK4	3DK4	3DK1V	3DK2V	3DK4V	3DL1	3DL1	3DL2	3DL2	3DL4	3DL4	3DL1V	3DL2V	3DM1	3DM1	3DM2	3DM2
												Depth	1	1.1	1.6	0.5	1	0.5	0.5	0.5	1.5	1.2	1.8	1	0.5	1	1.6	0.5	2	0.5	0.5	1.1	2.4	3.3	2	2	0.5	1.2	2	0.5	1.2	0.3	0.6	2.9	2.5	0.8	0.3	0.8	0.5	1	0.5	1.2	2.8	2.8	0.5	1.2	0.5	1
												Sampled Date	19/03/2019	21/03/2019	21/03/2019	13/03/2019	13/03/2019	18/03/2019	19/03/2019	19/03/2019	13/03/2019	18/03/2019	19/03/2019	19/03/2019	18/03/2019	18/03/2019	18/03/2019	19/03/2019	19/03/2019	19/03/2019	19/03/2019	19/03/2019	18/03/2019	19/03/2019	19/03/2019	19/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019	21/03/2019	21/03/2019	13/03/2019	13/03/2019	21/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019	21/03/2019	21/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019
Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances																																													
Carbon																																																										
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00	2.16	2.19	6.48	10.6	33.4	4.07	9.93	4.91	1	3.76	8.98	2.53	20.3	62.8	2.62	27.4	12.3	11.8	6.79	4.33	3.33	3.1	4.14	7.41	21.6	>100	9.34	16.7	60.9	18.6	4.36	2.22	2.76	1.9	17.9	0.35	33.8	3.33	35.2	2.86	2.45	8.5	92.1	11.5	9.52	55.5
Metals (Solids)																																																										
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93	9.27	9.79	11.2	7.74	13.1	11.4	20.7	10.9	18.3	11.7	15.8	14.5	7.9	8.97	10.9	3.64	9.05	6	21	35.8	10.1	12.4	11.1	12.7	6	6.89	8.4	5.8	6	4.69	11.1	11.6	12	13.2	6	6	9.58	6	6	14.6	11.7	16.1	6	6	6.59	1.97
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47	0.02	0.02	0.37	1.41	2.99	1.21	1.92	1.4	0.28	0.489	0.808	0.02	1.27	0.189	0.143	0.613	0.381	0.2	5.52	14.9	0.489	0.02	0.02	0.02	1.11	0.31	0.256	0.287	0.758	0.482	0.959	0.443	0.343	0.02	1.56	0.979	1.72	1.03	1.35	0.387	0.424	0.605	0.488	0.367	1.5	0.258
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09	33.9	34	39.7	441	131	37.9	204	58.8	33.8	39.4	46.8	36.6	238	157	16.6	230	33	533	9	9	32.1	34.1	37.1	38.9	487	53.6	28.6	109	267	6.07	29.9	36.3	33.8	34.3	264	412	268	596	433	20.1	37.7	43.5	322	386	325	223
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00	12.4	13.8	17.7	18.8	38.9	22.9	20.6	24.9	13	17.4	19.7	15.3	12.8	15.7	24.7	9.61	23.2	14	39.5	98.6	23.2	21.1	17.3	17.2	14	18.7	8.69	13.3	14	18.8	31.8	18.3	14	16.9	18.4	14	22.3	14	148	8.71	16.9	21.2	14	14	14	7.33
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66	26.6	25.2	26.7	67.7	185	106	350	295	28	28.7	46	24.6	99.1	11.9	14.7	27.6	19.9	32.5	1500	3300	28.2	25.9	27.6	35.9	30	17.9	10.7	22.7	17.1	14.4	170	23.4	25.9	23.8	61.2	8.98	99.2	15	21.8	7	26.4	42.7	5.15	0.763	107	8.83
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82	0.14	0.14	0.14	1.4	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	1.4	1.4	1.4	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87	32.7	31	39.7	18.7	44.7	29	21.7	31.3	39.2	29.5	25.7	31.5	11.7	9.03	40.1	6.94	24.2	14.5	54.8	80.2	34.2	31.9	26.4	24.9	8.96	8.75	11.2	10	7.19	25.1	31	29.4	27.7	44.1	29.1	4.24	17.7	11	10	6.77	39	26.1	8.13	6.22	12.5	3.48
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93	1	1	1	10	10	2.88	10.5	10	1	1	1	1	3.87	2.71	1	5.53	1.14	17.7	10	10	1	1	1	1	12.3	3.75	1.01	3.69	12.1	1	1.41	1	1	1	10	15.3	10	12.2	11.7	5.46	1	1	10	15.4	10.4	4.67
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57	53	54.2	59.3	509	218	186	229	206	55.5	63.4	79.5	59.9	169	164	26.1	189	47.2	378	209	217	52	54.2	55.4	65.1	497	203	75.6	140	938	17.6	26.3	57.8	58.1	54.8	302	1530	274	503	360	71.6	60.3	74.4	241	1750	503	152
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57	111	124	99.1	179	818	237	999	794	112	135	149	124	408	103	63.7	87.1	64.4	82.4	3390	7120	129	130	125	125	86.9	21.2	24.9	75.2	30.2	143	314	127	114	130	163	24.2	243	94.4	184	31.7	116	132	133	28.9	247	35
TPH Criteria Working Group (TPH CWG)																																																										
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00																																														
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00																																														
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00																																														
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00																																														
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0821	0.0921	0.01	0.0207	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0109	0.0422	0.0119	0.02	0.01	0.0452	0.02	0.02	0.02	0.02	0.0505	0.02	0.0154	0.01	0.0372	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00	0.02	0.02	0.02	0.0296	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0744	0.17	0.01	0.0598	0.02	0.0362	0.02	0.02	0.02	0.02	0.02	0.02	0.0612	0.18	0.0474	0.0396	0.0231	0.115	0.02	0.02	0.02	0.02	0.271	0.02	0.0638	0.0306	0.0733	0.02	0.02	0.02	0.0209	0.02	0.02	0.0667
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00	0.02	0.02	0.02	0.0205	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0488	0.0888	0.01	0.0311	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0557	0.0522	0.0291	0.0237	0.01	0.0742	0.02	0.02	0.02	0.02	0.342	0.02	0.0572	0.0186	0.0897	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00	0.02	0.02	0.02	0.0365	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0344	0.0677	0.01	0.0253	0.02	0.0224	0.02	0.02	0.02	0.02	0.02	0.02	0.047	0.0189	0.0183	0.0203	0.01	0.0527	0.02	0.02	0.02	0.02	0.285	0.02	0.12	0.0284	0.0667	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00	0.1	0.1	0.1	5.22	1.76	3.45	1.91	3.98	0.1	0.1	0.1	0.1	5.73	9.12	0.1	13.3	4.36	1.42	0.1	0.1	0.1	0.1	0.1	0.1	4.06	6.43	3.07	4.23	14.5	4.08	1.35	0.377	0.1	0.384	5.32	0.955	2.54	3.52	5.4	2.32	0.1	0.1	27.6	6.1	2.21	16
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00	0.1	0.1	0.1	21.8	9.35	14.2	22.9	23	0.339	0.1	0.1	0.1	36.7	42	0.1	18.3	4.46	6.46	7.61	0.1	0.1	0.1	0.1	0.1	15	11.1	19.7	17.1	17.1	6.52	3.02	1.16	0.1	0.134	17.1	5.32	7.5	7.4	7.41	4.89	0.1	0.1	111	21.2	11.3	18.5
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00	8.36	0.871	0.1	59.8	59.5	73.1	103	123	0.1	5.2	13	0.1	403	220	0.1	47.5	7.17	75.4	23	0.1	5.9	0.1	6.53	3.6	28	23.5	27.5	45.6	59.9	17.1	6.81	3.56	1.14	0.642	65.4	31.3	15	25	48	14.2	0.1	5.37	158	120	47.9	39.1
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00	0.1	0.1	0.1	23.3	15	18.1	31.2	30.6	0.1	0.1	0.1	0.1	96	53.3	0.1	5.82	0.1	4.3	1.19	0.1	0.1	0.1	0.1	0.1	6.31	4.97	6.93	10.8	13.9	1.99	0.1	1.14	0.932	0.1	13	14	2.81	3.3	2.63	3.62	0.1	0.1	25.2	31.9	14.3	4.65
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.11	0.014	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.0296	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0444	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0599	0.0151	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.0373	0.02	0.011	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00	0.02	0.02	0.02	0.0137	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0322	0.0588	0.01	0.0207	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0372	0.0344	0.0194	0.02	0.01	0.0495	0.02	0.02	0.02	0.02	0.228	0.02	0.0385	0.012	0.0602	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07	0.02	0.02	0.02	0.0239	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0222	0.0444	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0306	0.0122	0.0119	0.02	0.01	0.0355	0.02	0.02	0.02	0.02	0.19	0.02	0.0803	0.0186	0.0438	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07	0.1	0.1	0.1	9.78	1.14	2.66	2.73	4.01	0.1	0.1	0.1	0.1	9.24	10.4	0.1	17.9	3.7	1.36	1.79	0.1	0.1	0.1	0.1	0.1	7.93	16.3	3.48	8.02	12	4.65	0.1	0.1	0.1	0.1	7.35	0.967	7.4	6.43	5.34	2.14	0.625	0.1	17.4	3.64	4.53	14.7
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14	0.1	0.1	0.1	67.2	7.64	15.9	29.9	29.1	0.169	1.13	2.77	0.1	55.1	44.8	0.1	78.9	23.1	6.04	15	4.04	0.1	0.1	1.5	1.58	36.8	35.6	11.4	55.3	31.4	13.5	0.1	0.1	0.1	0.1	26.7	10.1	51.3	23.8	15.3	11.6	1.02	0.1	56.5	11.4	31.1	28.4
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00	7.86	5.34	2.38	205	51.8	75.7	120	108	2.93	18.4	44.4	2.8	185	92.7	0.1	166	43.4	24	50.5	5.49	7.05	6.12	22.2	23	74.7	55.9	25.7	267	72.3	37.7	3.5	4.18	3	3.21	76.3	34.1	108	70.1	38.1	30.1	7.45	24.1	93.6	51.1	79.3	59
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00	1.11	0.348	0.246	65	20.5	32.4	51.8	43.7	1.1	5.25	6.54	0.1	74.6	32.8	0.1	33.2	6.96	3.54	8.34	0.1	0.1	1.07	2.51	3.89	18.1	14.8	8.16	66.5	20.7	10.8	0.1	1.96	0.561	0.1	21.4	12	22.5	18	8.52	5.9	2.35	2.11	28.3	19.2	23.2	15.5
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00	0.1	0.1	0.1	21.3	7.61	12	19.9	16.6	0.256	1.7	0.733	0.1	25.6	11.2	0.1	8.54	1.07	0.65	1.12	0.1	0.1	0.1	0.1	1.35	5.51	4.83	2.87	19.1	6.73	3.5	0.1	0.737	0.1	0.249	6.61	3.7	6.52	5.98	2.41	1.36	0.952	0.1	10.9	6.52	7.73	5
Polyaromatic Hydrocarbons (PAHs)																																																										
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01	12	12	12	956	154	217	255	296	12	12	27.6	12	719	12	12	1990	2070	84.7	133	12	12	12	40.1	12	2020	85.9	14.5	419	146	26.4	12	12	12	12	162	38.6	1550	3300	142	58.6	12	12	166	34.8	340	89.6
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40	8	8	8	130	21.3	36	70.3	70.1	8	8	8	8	111	8	8	131	18900	8	8	8	8	8	8	8	2850	363	31.7	115	60.2	10.7	8	8	8	8	36.3	79.6	457	1990	17.5	11.2	8	8	40.5	53.9	29.6	8
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33	16	16	16	1510	239	700	577	593	16	16	32.9	16	1670	16	16	2900	46700	16	94.5	16	16	16	59.1	16	7410	272	42.8	1560	277	41.9	16	16	16	16	294	203	2370	6840	305	103	16	16	327	75.6	592	126
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27	14	14	14	6080	647	1570	2010	1630	14	29.5	143	14	3300	624	14	6500	152000	238	466	14	14	14	74.4	27	5870	516	140	5990	689	109	14	14	14	14	785	777	4380	12000	544	218	14	28.7	770	468	1610	222
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93	15	15	15	5390	584	1290	1840	1540	15	25.6	143	15	2900	559	15	5020	105000	282	420	15	15	15	54.8	15	5140	323	135	4950	451	91.9	15	15	15	15	703	688	3720	9090	395	212	15	15	528	508	1290	107
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00	15	15	15	7530	933	1840	3030	1790	15	40.6	152	15	4350	639	27.1	5650	137000	372	676	15	26.9	15	60.4	45.4	7330	455	207	7730	642	196	17.4	15	15	15	1110	1130	4280	10500	652	250	15	26.6	650	643	2230	280
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00	14	14	14	4310	309	691	989	758	14	14	75.3	14	1670	627	14	2420	60300	113	175	14	14	14	27.2	14	2310	149	73.2	2280	282	51.3	14	14	14	14	317	420	1650	3950	215	101	14	14	231	170	738	68.3
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51	24	24	24	3750	498	805	1300	1160	24	24	123	24	1900	346	24	3050	57500	149	315	24	24	24	40.4	24	3800	206	111	3620	259	76.8	24	24	24	24	574	532	2630	6420	227	146	24	24	318	498	958	84.2
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26	10	10	10	4790	693	1530	2080	1450	10	32.4	131	10	3030	651	22.5	5150	127000	275	394	24.5	10	10	53	31.1	6780	650	186	5250	811	180	25.2	10	10	10	751	885	3400	8870	470	232	10	32.5	885	578	1640	327
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63	0.023	0.023	0.023	806	99.9	209	325	273	0.023	0.023	0.023	0.023	508	96.4	0.023	749	19800	39.8	62.5	0.023	0.023	0.023	0.023	0.023	784	63.5	0.023	1000	80.7	0.023	0.023	0.023	0.023	0.023	125	82.1	582	1270	71.4	35.5	0.023	0.023	81	83	212	0.023
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93	0.018	0.018	0.018	2390	355	723	1140	938	0.018	0.018	136	0.018	2400	287	0.018	2750	54600	123	250	0.018	0.018	0.018	40	0.018	3050	128	69.9	2880	212	50.5	0.018	0.018	0.018	0.018	416	426	2040	4490	271	115	0.018	0.018	214	294	753	74.1
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85	0.017	0.017	0.017	11700	1430	3300	4020	3790	0.017	61.5	282	0.017	7800	2020	0.017	17500	275000	721	1210	108	37.7	0.017	260	74.1	17600	1450	284	11100	1720	251	23.9	0.017	0.017	0.017	1760	1820	11200	34600	1260	569	0.017	55.5	1990	1010	3270	583
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80	10	10	10	547	149	152	177	274	10	10	16.9	10	649	97.7	10	1270	24500	33.5	31.5	10	10	10	74.3	10	4060	725	50.1	498	195	59.8	10	10	10	10	169	49.6	1750	6390	95.2	62.4	10	10	175	48.9	213	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86	9	9	27.9	2100	221	217	574	404	9	40.6	75.6	9	1740	9	17.1	4400	<0.45	522	173	57.7	9	14.9	173	43.1	5530	2350	245	1260	894	321	34.1	9	9	9	1110	99.1	12600	41500	1120	404	13.1	23.3	917	297	2390	885
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64	15	15	15	4250	916	1090	1540	2040	15	44.8	127	15	4460	1640	37.3	8370	135000	688	431	150	15	15	328	67.2	20600	2410	271	5610	1860	444	66	15	15	15	1210	1670	8130	28200	1280	478	15	32.4	1630	772	1780	991
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09	0.015	0.015	0.015	9.51	1.2	2.32	3.28	2.81	0.015	0.0449	0.217	0.015	5.76	1.45	0.015	12.5	184	0.473	0.915	0.158	0.0306	0.015	0.169	0.0536	12.7	1.09	0.23	8.19	1.22	0.193	0.0181	0.015	0.015	0.015	1.28	1.34	8.09	21.9	0.937	0.417	0.015	0.0422	1.49	0.834	2.71	0.466
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00	0.118	0.118	0.118	65.8	8.44	16.7	23.2	19.8	0.118	0.32	1.68	0.118	43	9.04	0.118	80.4	1400	4.11	5.75	0.498	0.118	0.118	1.45	0.342	108	11.2	2.09	62.4	9.8	2.1	0.185	0.118	0.118	0.118	10.8	10.2	68.8	201	8	3.42	0.118	0.241	10.4	6.37	20.8	4.3
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00	93.2	94	96.5	83.6	87.2	95.5	89.4	108	89.6	97.3	102	92	93.9	0	97.3	105	109	96.2	93.9	102	96.2	97.4	100	94.9	88.6	98.7	91.2	86.7	90.9	92.3	95.9	86.9	95.5	96.6	91	103	92.1	96	97	93.3	104	86.8	90.8	95.4	89.1	99.6
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00	91.1	90	94.9	73	81.4	94.9	89.7	101	80.1	96.7	94.5	92.5	99.4	58.4	95.2	86.2	99	94.2	83.3	94.7	95.8	97.5	94.4	94.1	90	97	82.4	85.2	89.7	87.3	89.6	85.2	100	95	87.1	97.5	90.7	82	95.9	86.2	95	87.6	93.6	91.7	84.5	100
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00	96.9	95.3	99.3	73.9	78.9	98.1	95.7	102	73.4	102	97.5	97.3	99.7	87.2	96.1	87.1	95.5	97.8	74.5	94.1	98	104	95.9	99.9	89.5	92.6	77.2	81.4	86.7	88.7	89.1	83.6	102	100	81.8	96.4	91.4	79.2	99.1	88.7	96	83.2	94.9	93.4	76.2	99
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00	90.6	84.9	89	104	84.2	99.1	78.3	98.6	81	107	98.6	84.3	86.7	75.6	98.4	87.9	110	84.5	56.6	85.8	106	98.5	91.7	90.1	87.8	77	84.1	84.9	78.4	74.8	74.3	84.4	95.8	90.4	85.8	88.4	98.8	109	87.1	78.2	85.2	84.6	93.7	105	81.7	85.5
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00	87.2	101	84.9	95.8	86.6	102	77.3	101	80.4	110	104	79.1	86.8	61.9	103	76.4	109	79.8	45.3	78.6	114	94.7	95.1	87.2	81	56.7	80.4	78.3	62	77.6	83.4	84.1	88.2	86.5	79.1	83.7	87.6	82	78.8	87.8	81.8	83.1	74.8	97.9	79.1	65.4
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00	8.36	0.871	0.1	110	85.6	109	159	181	0.339	5.2	13	0.1	542	324	0.1	85	16	87.5	31.9	0.1	5.9	0.1	6.53	3.6	53.3	46	57.2	77.7	105	29.7	11.2	6.24	2.07	1.16	101	51.5	27.8	39.2	63.4	25	0.1	5.37	322	180	75.8	78.2
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00	8.97	5.69	2.63	347	81.1	127	204	185	4.2	24.8	53.7	2.8	324	181	0.1	296	77.2	34.9	75.7	9.54	7.05	7.18	26.2	28.5	138	123	48.7	397	136	66.7	3.5	6.14	3.56	3.21	132	57.2	189	118	67.2	49.8	11.4	26.2	196	85.4	138	118
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00	17.3	6.56	2.63	457	167	236	363	366	4.54	30	66.7	2.8	865	505	0.1	381	93.2	122	108	9.54	12.9	7.18	32.8	32	191	169	106	474	242	96.7	14.7	12.4	5.64	4.37	234	109	218	158	131	74.8	11.4	31.6	518	265	214	196
Metals - (Solid)																																																										
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000			18600	23800	34700	91200	164000	117000	159000	118000	38300	23300	28400	23600	78000	80300	22600	66300	24000	133000	404000	669000	28700	21300	21700	19100	108000	37200	24900	53800	79600	31100	26000	37700	38600	31700	109000	141000	107000	139000	123000	48200	34900	27600	84600	103000	104000	41000
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520			438	464	467	17900	7770	7030	16000	6500	384	451	443	263	9800	9070	451	11900	1680	27300	5970	11500	400	452	256	315	23000	4820	2220	7470	20800	897	796	523	680	493	13500	32900	16400	27300	22300	7310	298	274	12200	21700	19800	9380
Metals - (Liquid)																																																										
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950			-	-	-	-	-	-	164000	126000	-	-	-	-	-	-	-	101000	40200	211000	53000	53700	-	-	-	-	-	-	-	-	-	37600	22600	-	-	-	-	-	-	-	186000	-	-	-	-	-	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290			-	-	-	-	-	-	11600	16300	-	-	-	-	-	-	-	14800	6810	35500	5800	2300	-	-	-	-	-	-	-	-	-	2390	9100	-	-	-	-	-	-	-	34800	-	-	-	-	-	-	-
Phenols																																																										
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00	0.01	0.01	0.01	0.0114	0.0114	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0111	0.0234	0.069	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0219	0.0222	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.022	0.0219	0.0109	0.01	0.01	0.01	0.011	0.011	0.01	0.0109
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06	0.01	0.01	0.01	-	-	-	0.01	0.01	-	-	0.01	0.01	-	-	-	0.0345	0.01	0.01	0.01	0.01	-	0.01	0.01	0.01	-	-	-	-	-	0.01	0.01	-	-	0.0133	-	-	-	-	0.01	0.01	-	-	-	-	-	-
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06	0.015	0.015	0.015	-	-	-	0.015	0.015	-	-	0.015	0.015	-	-	-	0.015	0.015	0.015	0.015	0.015	-	0.015	0.015	0.015	-	-	-	-	-	0.015	0.015	-	-	0.015	-	-	-	-	0.015	0.015	-	-	-	-	-	-
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06	0.035	0.035	0.035	-	-	-	0.035	0.035	-	-	0.035	0.035	-	-	-	0.104	0.035	0.035	0.035	0.035	-	0.035	0.035	0.035	-	-	-	-	-	0.035	0.035	-	-	0.035	-	-	-	-	0.035	0.035	-	-	-	-	-	-
Inorganics																																																										
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42	-	-	-	0.125	-	0.239	0.129	0.256	-	-	-	-	0.089	-	0.0303	0.0464	0.031	0.0112	0.0405	0.597	-	-	-	-	0.043	-	0.0588	0.0957	-	0.0111	0.0154	-	-	-	-	0.0105	0.059	-	0.0107	-	-	-	0.0569	-	-	0.0499
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01	7.75	7.43	7.64	11	11.2	11.2	10.9	10.9	7.95	8.09	7.62	7.32	10.4	11.2	9.77	11.7	10.8	12.7	8.45	10.7	8.83	7.38	7.35	7.65	11.8	12.6	11.6	11.3	12	8.52	8.27	6.79	7.93	7.49	12.2	12.8	11.1	12.6	12.7	11.7	7.84	7.13	11.9	12.7	11.6	11.9
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33																																														
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32	-	-	-	0.239	-	0.274	0.179	0.286	-	-	-	-	0.155	-	0.103	0.125	0.138	0.144	0.175	0.293	-	-	-	-	0.254	-	0.153	0.191	-	0.0976	0.0837	-	-	-	-	0.156	0.265	-	0.128	-	-	-	0.044	-	-	0.13
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32	-	-	-	0.717	-	0.822	0.537	0.858	-	-	-	-	0.465	-	0.309	0.375	0.414	0.432	0.525	0.879	-	-	-	-	0.762	-	0.459	0.573	-	0.293	0.251	-	-	-	-	0.468	0.795	-	0.384	-	-	-	0.132	-	-	0.39
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42	-	-	-	0.303	-	0.491	0.227	0.574	-	-	-	-	0.201	-	0.0907	0.0927	0.237	0.247	0.117	0.683	-	-	-	-	0.353	-	0.215	0.461	-	0.033	0.107	-	-	-	-	0.188	0.361	-	0.182	-	-	-	0.15	-	-	0.157
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6.41	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.61	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61	12	266	119	-	-	-	12	12	-	-	217	12	-	-	-	12	12	12	12	12	-	212	235	171	-	-	-	-	-	12	12	-	-	129	-	-	-	-	12	12	-	-	-	-	-	-
Asbestos																																																										
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	0.001	0.001	0.0033	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0					0.00		-	-	-	21/03/2019	21/03/19	22/03/2019	02/04/2019	02/04/2019	-	22/03/2019	-	-	22/03/2019	22/03/2019	25/03/2019	02/04/2019	02/04/2019	02/04/2019	02/04/19	02/04/19	22/03/2019	-	-	-	21/03/2019	21/03/2019	21/03/2019	21/03/19	20/03/19	04/04/19	05/04/19	-	-	-	21/03/2019	21/03/2019	21/03/2019	21/03/2019	05/04/19	-	-	-	20/03/19	20/03/19	21/03/19	21/03/19
Analysed By	TM048	No units		1371	0	0					0.00		-	-	-	Renata Bozhkov	Andrzej Ferfecki	Renata Bozhkov	Marcin Magdziarek	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	-	James Richards	Renata Bozhkov	James Richards	Marcin Magdziarek	Marcin Magdziarek	Marcin Magdziarek	Andrzej Ferfecki	Andrzej Ferfecki	James Richards	-	-	-	Barbara Urbanek-Walsh	James Richards	Lucy Caroe	Andrzej Ferfecki	Christian Hallam	Christian Hallam	Christian Hallam	-	-	-	James Richards	Lucy Caroe	Lucy Caroe	Barbara Urbanek-Walsh	Christian Hallam	-	-	-	Christian Hallam	Lucy Caroe	Andrzej Ferfecki	Andrzej Ferfecki
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00		-	-	-	-	-	None	None	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0					0.00		-	-	-	-	-	N/A	N/C	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/C	-	-	-	-	-	-	-	N/A	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	0.001	0.001	0.0038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00		-	-	-	Not Detected	Not Detected	Detected	Detected	Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Trace	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00		-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00		-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00		-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	TM048	No units		1371	0	0					0.00		-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	TM048	No units		1371	0	0					0.00		-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00		-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Detected	Not Detected	Not Detected
Comments	TM048	No units		1371	0	0			0		0.00		-	-	-	-	-	Loose fibres in soil.	Loose fibres in soil	Loose fibres in soil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Loose fibres in soil	-	-	-	-	-	-	-	Fibre bundles in soil	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																																																										
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00		101	111	107	99.6	107	115	103	101	121	116	104	104	108	109	122	115	91.1	86.5	106	102	125	103	104	103	77.4	101	101	86.5	104	100	109	121	113	115	103	79	98.7	97.5	81.3	97.1	119	119	103	101	107	101
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00		100	101	100	96.9	99.6	102	99.4	99.5	103	100	99	100	102	104	99.8	101	89.9	96.9	98	101	101	100	99.8	100	93.7	97.7	93.1	95.7	97.4	99.9	99.3	101	102	101	96.6	102	99.1	94.7	88.1	96.9	101	102	97.7	97.3	95.3	95.3
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00		95.4	101	98.5	79.2	85.3	83.8	92.5	90.1	92.6	91.1	92.1	96.4	93.3	91.8	82.8	97.6	71	86.7	91.6	96.3	82.3	96.4	95.8	91.2	70.3	93.6	71.1	72.1	90	96.5	86.5	85.8	93.5	102	75.4	95.2	79.9	74	70.3	82.4	90	88.3	86.4	83.3	76.9	80.5
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.2	2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	2	0.2	0.1	2
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8	1.8	0.09	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	1.8	0.13	0.18	1.8	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	1.8	0.18	0.09	1.8
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	1.4	1.4	0.07	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	1.4	0.128	0.14	1.4	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	1.4	0.14	0.07	1.4
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.8	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.8	0.04	0.08	0.8	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.8	0.08	0.04	0.8
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.2	2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	2	0.2	0.1	2
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.2	2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	2	0.2	0.1	2
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00		0.13	0.13	0.13	0.426	0.161	0.13	0.13	0.13	0.13	0.13	0.13	0.13	2.6	2.6	0.13	2.6	0.361	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1.4	2.6	0.141	0.26	2.6	2.6	0.13	0.13	0.13	0.13	0.712	0.13	4.38	1.07	0.273	0.13	0.13	0.13	2.6	0.26	0.602	2.6
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8	8	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	8	0.4	0.8	8	8	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	8	0.8	0.4	8
Subcontracted: Inorganics																																																										
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

												Sample ID	3DM4	3DM1V	3DM2V	3DM4V	TPAC13	TPAC13	TPAC13	TPAD10
												Depth	0.5	3	2.7	2.7	0.5	1.5	2.4	1
												Sampled Date	21/03/2019	13/03/2019	13/03/2019	21/03/2019	########	11/12/2017	11/12/2017	11/12/2017
Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances								
Carbon																				
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00	62.1	3.64	5.28	1.84	5.36	1.61	6.93	0.919
Metals (Solids)																				
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93	5.35	12.2	13.6	17.3	11.8	11.4	10.5	6
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47	0.861	0.391	0.467	0.484	5.29	0.2	0.557	0.591
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09	132	40.8	40.7	33.7	20.2	9	24.5	9
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00	15.6	19.6	16.1	10.2	37.9	14	39.4	22.1
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66	73.8	25.9	33.3	31.8	289	50	327	21.7
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82	0.14	0.14	0.14	0.14	5.11	1.4	0.937	3.54
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87	10.2	37.9	28.5	32.4	37.2	9.32	20.1	17.9
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93	3.53	1	1	1	10	10	1	10
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57	76.8	66.4	67.5	57.7	98.1	83.5	53.5	168
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57	202	118	119	101	790	131	364	62.8
TPH Criteria Working Group (TPH CWG)																				
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00					0.04	0.04	0.04	0.04
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00					0.025	0.008	0.0189	0.008
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00					0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00					0.009	0.009	0.009	0.009
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00	0.0209	0.02	0.02	0.02	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00	0.091	0.02	0.02	0.02	0.04	0.0497	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00	0.08	0.02	0.02	0.02	0.04	0.167	0.0554	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00	0.0947	0.02	0.02	0.02	0.04	0.472	0.04	0.04
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00	14	0.1	0.1	0.1	0.581	18.2	0.1	2.65
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00	31.3	0.1	1.19	0.1	5.99	34.5	0.748	10.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00	53.8	2.03	7.94	0.1	34.2	62.6	25.5	39.5
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00	8.9	0.1	0.1	0.1	7.04	12.1	11.1	6.22
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00	0.0529	0.02	0.02	0.02	0.04	0.111	0.0403	0.04
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07	0.064	0.02	0.02	0.02	0.04	0.315	0.04	0.04
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07	17.4	0.642	196	0.1	1.97	4.49	0.916	0.579
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14	70.1	1.68	413	0.1	10	13.1	2.66	3.09
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00	113	7.54	224	1.74	47	30.9	43.9	21.5
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00	26.6	1.21	15.5	0.1	18.9	14.7	41.8	9.08
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00	8.61	0.1	5.38	0.1	7.38	6.26	18	3.18
Polyaromatic Hydrocarbons (PAHs)																				
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01	882	12	12	20.2	9260	12	82.5	12
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40	114	8	8	8	413	29.1	8	10.9
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33	1320	16	16	27.9	6670	38.6	160	16
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27	2180	14	36.7	89.1	17300	113	521	121
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93	1480	15	29.9	97.2	15400	90.6	547	105
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00	2250	15	31.3	116	19900	163	984	154
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00	889	14	14	30.3	7540	59.9	317	62.5
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51	835	24	36.3	63.5	11400	86.1	571	89.8
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26	1840	10	40.8	86.8	9570	115	616	108
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63	246	0.023	0.023	0.023	2400	0.023	135	0.023
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93	1090	0.018	0.018	49.5	9870	63.7	452	73.3
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85	6090	0.017	87.4	218	69700	188	831	163
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80	816	10	10	13.9	7040	29.2	33	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86	5120	9	11.4	75.8	4370	72.9	142	42.6
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64	5640	15	41.2	120	68200	144	342	71.7
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09	4.24	0.015	0.0695	0.168				
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00	35	0.118	0.384	1.18	311	1.38	6.35	1.16
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00	91.6	88	98.8	93	93.5	95.2	92	101
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00	93.7	83.2	96.3	87.4	91.6	93.1	88.7	97.7
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00	95.2	74.2	96.8	92	91.5	90.1	86.8	95.3
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00	77.7	79.9	106	81.8	103	92.8	87.6	99.3
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00	70.2	78.6	101	98.5	105	95.4	91.3	109
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00	108	2.03	9.14	0.1	47.8	127	37.4	58.5
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00	227	11.1	849	1.74	77.9	63.2	89.3	34.3
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00	336	13.1	858	1.74				
Metals - (Solid)																				
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000			30300	34400	31900	43000	106000	171000	44500	232000
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520			6550	382	289	585	3300	7380	2610	5830
Metals - (Liquid)																				
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950			63300	-	-	-	-	124000	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290			7150	-	-	-	-	12700	-	-
Phenols																				
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00	0.01	0.01	0.01	0.01	0.0238	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06	0.01	-	-	0.01	0.0714	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06	0.015	-	-	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06	0.035	-	-	0.035	0.0952	0.035	0.035	0.035
Inorganics																				
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42	0.114	-	-	-	-	0.155	-	-
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01	8.71	8.79	7.25	8.22	10.2	11	7.8	11.1
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33					-	-	-	-
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32	0.107	-	-	-	-	0.265	-	-
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32	0.321	-	-	-	-	0.795	-	-
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42	0.0928	-	-	-	-	0.979	-	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61	12	-	-	137	38.2	12	31.7	12
Asbestos																				
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0					0.00		04/04/2019	-	-	-	-	22/12/2017	-	-
Analysed By	TM048	No units		1371	0	0					0.00		James Richards	-	-	-	-	James Richards	-	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00		-	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0					0.00		-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00		Not Detected	-	-	-	-	Not Detected	-	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00		Not Detected	-	-	-	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00		Not Detected	-	-	-	-	Not Detected	-	-
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00		Not Detected	-	-	-	-	Not Detected	-	-
Fibrous Tremolite	TM048	No units		1371	0	0					0.00		Not Detected	-	-	-	-	Not Detected	-	-
Fibrous Actinolite	TM048	No units		1371	0	0					0.00		Not Detected	-	-	-	-	Not Detected	-	-
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00		Not Detected	-	-	-	-	Not Detected	-	-
Comments	TM048	No units		1371	0	0			0		0.00		-	-	-	-	-	0	-	-
Volatile Organic Compounds (VOCs)																				
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00		93.4	122	117	116	-	-	-	-
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00		98.2	101	100	102	-	-	-	-
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00		82.6	91.1	87.1	103	-	-	-	-
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00		0.1	0.1	0.1	0.1	-	-	-	-
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00		0.09	0.09	0.09	0.09	-	-	-	-
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00		0.07	0.07	0.07	0.07	-	-	-	-
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00		0.04	0.04	0.04	0.04	-	-	-	-
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00		0.1	0.1	0.1	0.1	-	-	-	-
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00		0.1	0.1	0.1	0.1	-	-	-	-
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00		0.29	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00		0.4	0.4	0.4	0.4	-	-	-	-
Subcontracted: Inorganics																				
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00		-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00		-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00		-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00		-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00		-	-	-	-	-	-	-	-

Sample ID	TPAD10	TPAD10	TPAD11	TPAD11	TPAD11	TPAD12	TPAD12	TPAD12	TPAD12	TPAD13	TPAE10	TPAE10	TPAE10	TPAE11	TPAE11	TPAE12	TPAE12	TPAE12	TPAE13	TPAE13	TPAE13
Depth	2	2.5	0.5	1.5	2.7	0.9	1.5	2.3	2.7	0.3	1	2	3	0.5	1.5	0.5	1.5	1.8	0.7	1.1	2
Sampled Date	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017
Determinand																					
Carbon																					
Soil Organic Matter (SOM)	1.47	24.3	2.69	1.66	5.1	4.6	2.84	3.5	1.39	5.45	1.84	1.93	1.04	0.934	6.53	4.57	1.01	0.864	1.38	2.12	7.33
Metals (Solids)																					
Arsenic	9.88	12.4	12.3	13.4	8.73	8.73	10.2	6.61	10.1	6.14	6.75	8.96	9.56	6.89	6	8.36	6	13.4	6	6	17.6
Cadmium	0.2	0.0479	4.89	0.989	0.0993	1.79	0.205	0.02	0.02	0.482	0.22	0.2	0.02	0.2	0.2	1.05	0.2	0.2	0.2	0.2	0.222
Chromium	574	24.5	143	83.9	12.5	35.5	94.1	136	28.1	69	94.3	352	23	454	487	63.1	558	173	390	733	28.4
Copper	55.1	15.2	38.8	34.2	24	29	30.7	20.5	11.7	21.8	19.9	27.2	7.8	25	29.7	30.9	16.7	45.3	19.6	19.2	18.6
Lead	110	36	120	195	33.6	355	57.4	20.7	24.8	65.4	36.9	57.5	21.8	36.6	33.8	109	16	17.9	33	60.9	47.9
Mercury	1.4	0.972	6.24	1.69	0.729	1.4	1.4	0.14	0.896	1.42	1.4	1.4	0.707	1.4	1.4	2.02	1.4	1.4	1.4	1.4	0.791
Nickel	28.5	22.7	36.9	24.2	22.8	26.9	22.9	17.9	36.5	18.4	15.1	21.7	32.5	16.6	9.53	27.9	5.48	13.8	7.26	11.2	25.1
Selenium	13.3	1	11.2	10	1	10	10	3.42	1.6	10	10	11.9	1.32	21.4	16.3	10	14.9	15.9	10	16.4	1.48
Vanadium	213	54.7	299	187	30	102	133	159	64.3	176	163	278	52.4	472	394	201	492	255	336	538	56.9
Zinc	287	154	384	561	96.9	963	183	67.9	111	185	99.2	110	98.6	116	55.4	338	72	54.7	92.1	168	315
TPH Criteria Working Group (TPH CWG)																					
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.0686	0.019	0.008	0.032	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.0409	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.0807	0.108	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.234	0.0594	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	7.01	0.1	2.92	15.6	1.21	2.71	14.6	1.2	1.02	1.11	3.85	0.268	1.08	0.683	1.34	3.65	0.463	3.89	0.1	0.741	0.632
Aliphatics >C16-C21	16.6	0.1	9.86	30.5	1.39	10.8	34.7	2.98	1.49	6.99	20.5	5.36	2.06	5.73	6.13	14.5	5.37	11.9	2.49	5.18	2.81
Aliphatics >C21-C35	53.6	7.05	59.2	77.3	15	47.9	126	19.3	5.44	34.3	109	51.8	6.42	45.2	52	59.2	45.9	61.1	24	43.8	7.02
Aliphatics >C35-C44	12.9	0.1	23.9	32	0.595	11.8	41.7	8.05	0.762	10.2	39.6	15.2	0.978	7.86	7.9	23.9	10.9	27	5.32	17.5	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.0686	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.0534	0.0818	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.156	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	3.23	0.1	1.23	4.61	1.41	2.77	3.33	1.03	0.182	1.87	1.73	0.673	0.318	0.696	0.921	3.5	0.1	1.78	0.706	1.24	0.1
Aromatics >EC16-EC21	9.69	0.1	7.6	19.8	4.87	12.9	14.2	4.04	0.831	14.6	15.3	6.77	0.678	10.5	12.9	30.5	2.09	7.23	2.3	4.99	0.705
Aromatics >EC21-EC35	34.9	27.2	44.5	73.7	59.2	59.5	80.9	36.5	4.6	66.9	102	58.5	3.52	60.1	69.4	115	15	35.2	14.4	28.5	39.1
Aromatics >EC35-EC44	14.2	3.37	32.1	47.1	14.4	23.5	58.8	24.6	0.774	23.6	52.1	27.2	0.995	18.2	22.9	50.2	6.49	13.6	7.39	16.7	6.41
Aromatics >EC40-EC44	5.29	0.1	14.4	19.7	5.38	8.98	25.3	10.4	0.1	8.44	20.8	10.8	0.1	6.13	8.48	20.4	2.64	5.26	3	7.02	1.6
Polyaromatic Hydrocarbons (PAHs)																					
Acenaphthylene	84.3	12	70.8	112	12	70.2	32.7	31.7	12	86.8	32.9	26.8	12	14.4	12.2	835	12	12	71.8	26.4	21.7
Acenaphthene	33.1	8	20.5	61.3	8	46.7	31.6	12.2	8	16.3	44.5	63.6	8	110	62.6	70.6	21.3	27.6	13.2	23	8
Anthracene	228	16	125	234	25.3	168	63.4	45.4	16	157	127	173	16	219	143	1550	29.6	67.1	169	54	16
Benz(a)anthracene	782	28.4	349	759	147	696	372	284	20.6	757	1010	1520	83.9	2470	2080	6340	220	639	601	336	127
Benzo(a)pyrene	671	38.4	335	843	178	720	383	322	29.6	744	1080	1650	106	2380	2060	6290	214	661	558	362	123
Benzo(b)fluoranthene	951	44.4	483	860	259	996	541	382	30.3	1170	1280	2060	124	3160	2730	8790	342	899	914	557	174
Benzo(k)fluoranthene	345	20.8	211	439	90.4	368	228	163	14	462	560	830	60.5	1360	1200	3150	151	363	342	207	77.7
Benzo(g,h,i)perylene	446	40.3	290	594	150	515	291	220	24	601	737	1130	101	1810	1490	4310	208	503	439	304	108
Chrysene	676	32.6	343	793	146	650	399	270	23	782	959	1460	54.3	2530	2150	5260	221	624	564	327	130
Dibenzo(a,h)anthracene	134	0.023	77.6	149	46.6	146	69.1	64.3	0.023	158	199	292	0.023	460	378	1210	48.5	125	126	77.5	40.7
Indeno(1,2,3-cd)pyrene	407	27	241	500	119	447	229	189	0.018	499	616	920	81.3	1460	1250	4100	180	401	392	267	96.1
Fluoranthene	1400	46.6	661	1420	194	1170	515	388	34.2	939	1320	1900	74	4140	3370	11200	368	936	1050	541	183
Fluorene	76.7	10	68.1	119	10	90.5	28.6	28.2	10	39.9	38	42.3	10	37.5	18.8	453	11.7	19.1	48.5	21.2	17.6
Naphthalene	228	13.8	260	279	32.6	235	93.5	122	9	141	108	126	30.8	115	39.6	1280	32.7	31.2	112	69.3	42.7
Phenanthrene	654	40.2	478	736	122	696	271	214	23.1	409	586	807	62.6	2100	1140	4390	289	390	470	246	141
Pyrene																					
PAH, Total Detected USEPA 16	8.14	0.368	4.51	9.12	1.66	7.96	4.12	3.11	0.19	7.98	9.93	14.8	0.885	25.8	20.9	67.4	2.63	6.47	6.68	3.88	1.41
Naphthalene-d8 % recovery**	107	112	85.2	101	96.2	99.1	97.7	101	103	95.3	102	101	118	106	92	104	102	102	93.2	101	115
Acenaphthene-d10 % recovery**	103	106	79.7	94.5	94.8	94.7	93.5	98.5	101	92.9	97.9	97.2	115	103	87.6	101	98.5	99.2	92.6	96.6	118
Phenanthrene-d10 % recovery**	100	103	78.3	92.8	92.7	91.7	91	96	96.6	91.5	96.8	95.8	112	102	87.2	99.6	97.4	97.8	90.8	94.9	115
Chrysene-d12 % recovery**	106	94.8	79.3	92.4	92.4	93.7	90.8	94.1	97.2	93.8	98.6	98.2	116	106	91.4	105	97.8	98.4	92.7	94.6	118
Perylene-d12 % recovery**	113	113	82.4	106	97	100	104	101	104	98	106	107	126	114	102	113	106	106	98.2	102	125
Total Aliphatics >C12-C44	90.2	7.05	96	155	18.2	73.2	218	31.5	8.7	52.6	173	72.7	10.5	59.4	67.3	101	62.6	104	31.8	67.1	10.5
Total Aromatics >EC12-EC44	61.9	30.5	85.4	145	79.9	98.7	157	66.1	6.39	107	171	93.2	5.51	89.5	106	199	23.5	57.9	24.8	51.4	46.2
Total Aliphatics & Aromatics >C5-C44																					
Metals - (Solid)																					
Iron	188000	41400	207000	195000	28300	130000	162000	71700	41400	75000	147000	204000	37000	185000	174000	167000	144000	333000	117000	149000	32100
Manganese	17200	652	10300	10900	858	4360	10800	8930	690	4090	11000	17800	1150	36500	30500	10400	30100	20000	19800	37000	316
Metals - (Liquid)																					
Calcium	188000	-	-	137000	31500	70600	-	90700	-	146000	-	157000	-	-	239000	-	264000	-	-	216000	-
Magnesium	7940	-	-	13300	11300	10000	-	12700	-	32500	-	12700	-	-	7350	-	27800	-	-	16200	-
Phenols																					
Phenol	0.131	0.01	0.322	0.147	0.01	0.0357	0.0314	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.01
Cresols	0.01	0.01	0.023	0.0105	0.0132	0.0714	0.01	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0213	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.131	0.035	0.345	0.157	0.035	0.107	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																					
Soluble Sulphate 2:1 extract as SO4 BRE	0.114	-	-	0.162	0.0756	0.069	-	0.0447	-	0.158	-	0.19	-	-	0.0308	-	0.011	-	-	0.0774	-
pH	11.1	7.23	11.4	11.3	7.75	10.1	11.4	8.6	7.53	11.4	9.68	11.6	8.46	12.6	12.6	11.2	12.7	12.6	11.2	12.2	6.8
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.294	-	-	0.0563	0.0813	0.121	-	0.0922	-	0.2	-	0.226	-	-	0.286	-	0.218	-	-	0.361	-
Sulphate, Total potential	0.882	-	-	0.169	0.244	0.363	-	0.277	-	0.6	-	0.678	-	-	0.858	-	0.654	-	-	1.08	-
Sulphate, acid soluble (total)	0.322	-	-	0.258	0.0481	0.212	-	0.107	-	0.371	-	0.361	-	-	0.322	-	0.517	-	-	0.561	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	242	12	12	12	26.9	12	12	157	12	12	12	113	12	12	12	12	12	12	12	269
Asbestos																					
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-
Date of Analysis	22/12/2017	-	-	22/12/2017	22/12/2017	22/12/2017	-	22/12/2017	-	22/12/2017	-	22/12/2017	-	-	22/12/2017	-	22/12/2017	-	-	22/12/2017	-
Analysed By	Barbara Urbanek-Walsh	-	-	Eva Guerra	Barbara Urbanek-Walsh	Eva Guerra	-	James Richards	-	Eva Guerra	-	Barbara Urbanek-Walsh	-	-	Barbara Urbanek-Walsh	-	James Richards	-	-	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/C	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Detected	-	Not Detected	-	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Comments	0	-	-	0	0	0	-	0	-	0	-	0	-	-	Fibre bundles in soil.	-	0	-	-	0	-
Volatile Organic Compounds (VOCs)																					
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.013	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																					
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TPAF9	TPAF10	TPAF12	TPAF12	TPAF13	TPAF13	TPAF13	TPAG10	TPAG11	TPAG11	TPAG11	TPAG12	TPAG12	TPAG13	TP3BC401	TP3BC402	TP3BC403	TP3BC404
Depth	0.2	0.5	0.3	1	0.4	2	3.1	0.5	0.4	1.3	2	0.5	0.8	0.3	0.5	1	2	3
Sampled Date	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	02/05/2018	02/05/2018	02/05/2018	02/05/2018
Determinand																		
Carbon																		
Soil Organic Matter (SOM)	5.81	1.71	1.41	1.13	8.72	2.14	7.84	13.6	1.66	5.6	0.931	3.41	1.35	2.81	4.45	7.83	3.15	8.72
Metals (Solids)																		
Arsenic	16.6	6	12.8	6	6	6	7.83	6	4.27	6	6	6	191	6	4.57	5.74	5.27	4.37
Cadmium	1.23	0.2	0.2	0.2	0.2	1.04	0.197	0.2	0.02	0.2	0.2	0.2	0.2	0.2	0.0732	0.706	0.156	0.431
Chromium	14.4	207	9	353	770	796	18.6	115	10.2	283	9	169	775	9	30.5	47	18.5	50.5
Copper	50.9	23.3	29.2	20.4	14	26.5	12.3	14	1.4	14	14	20.7	123	22	1.4	9.19	2.18	1.4
Lead	240	96.9	41.6	23.7	19.4	348	27.8	20.3	5.31	8.24	14.9	71.5	84.2	86.8	6.73	31.6	17.6	1.59
Mercury	1.4	1.4	2.61	1.4	1.4	1.4	0.488	1.4	1.01	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14
Nickel	32.3	12.6	5.6	4.38	3.4	10.2	13	5.22	2.84	2	3.39	22	18.2	18.5	3.76	7.42	4.95	5.57
Selenium	10	14	10	12.9	19.3	17.2	1	10	1	10	10	10	15.7	10.3	6.44	3.64	4.57	4.14
Vanadium	87.1	353	42.7	331	617	685	35.8	136	22.7	259	66.1	293	504	117	112	92.6	46.5	265
Zinc	678	107	161	59.8	57.4	917	75.2	55.1	36.7	19.2	25	209	755	236	43.8	166	70.4	41.1
TPH Criteria Working Group (TPH CWG)																		
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04				
Toluene	0.0176	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008				
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012				
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009				
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0837	0.0541	0.04	0.0613
Aliphatics >C8-C10	0.0454	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0487	0.0443	0.04	0.0613
Aliphatics >C10-C12	0.0706	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0604	0.0497	0.0533	0.0452
Aliphatics >C12-C16	6.32	4.59	0.1	0.862	1.42	0.597	0.1	2.53	3.62	6.07	1.53	0.655	1.65	1.76	2.04	4.93	3.8	5.13
Aliphatics >C16-C21	54.5	20.4	1.74	7.82	11.2	4.95	0.1	14	15.7	15.4	5.7	4.69	11.3	12.2	21.3	35.5	19	98.5
Aliphatics >C21-C35	162	158	19.8	62.2	75.4	46.1	3.93	98.3	363	283	158	31	136	100	28	76	46.4	57
Aliphatics >C35-C44	39	34	9.88	15.5	8.96	4.83	0.1	17	238	187	88.9	8.19	30.9	25	6.73	30.9	15.3	8.53
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.0504	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0508	0.0519	0.04	0.0667
Aromatics >EC10-EC12	0.0466	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0402	0.04	0.04	0.04
Aromatics >EC12-EC16	4.82	2.13	0.613	0.649	0.729	0.543	0.1	1.56	3.69	4.36	2.71	0.392	1.35	1.26	7.09	8.03	7.66	2.34
Aromatics >EC16-EC21	37.8	18	1.28	4.09	4.83	4.29	0.1	6.37	12.2	15.7	9.33	4.72	3.91	8.31	34.2	47.4	31.7	33
Aromatics >EC21-EC35	139	134	7.09	27.6	23.8	20.9	44.8	40.6	289	247	148	25.8	33.4	45.6	92.2	143	89	47.2
Aromatics >EC35-EC44	62.1	43.7	1.7	11.2	8.85	4.9	6.9	14.3	243	198	114	13.3	12.6	16.6	31	72.9	37.2	13.4
Aromatics >EC40-EC44	25.1	16	0.1	4.54	3.32	1.32	2.08	5.27	96.7	81.3	46.3	5.45	5.01	6.41	11.1	28.7	14.5	4.71
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	695	29	12	12	26.3	12	12	12	12	60	12	148	12	65	1880	1720	605	404
Acenaphthene	109	153	8	80.4	14.5	11.5	8	14	59.2	40	14.5	29.7	8	14.1	198	151	69.8	48.5
Anthracene	1210	564	16	72.9	59.2	30.1	16	33.4	83.2	80	16	231	16	164	1640	2210	519	349
Benz(a)anthracene	4570	3870	14	540	255	139	85.1	318	186	240	109	1310	91.8	430	4810	5180	1540	762
Benzo(a)pyrene	4520	4890	20	630	218	108	97.1	320	140	189	91.1	1410	75.5	409	4950	5120	1570	867
Benzo(b)fluoranthene	6820	6530	35	1040	407	202	152	472	236	316	171	1900	134	639	8030	7920	2530	1610
Benzo(k)fluoranthene	2460	2370	14	493	165	67.2	59.6	207	99.1	124	74.4	719	39.6	281	3230	2770	855	479
Benzo(g,h,i)perylene	3420	3080	24	539	193	103	93.2	290	136	176	89.6	1020	74.5	343	4210	4200	1300	1070
Chrysene	3870	3910	19.6	619	258	151	81.3	345	205	259	152	1140	86.1	508	4890	4160	1550	601
Dibenzo(a,h)anthracene	945	767	0.023	137	52.3	29.3	0.023	55.2	44	0.115	25.4	299	0.023	88.8	963	1100	304	239
Indeno(1,2,3-cd)pyrene	3030	2370	0.018	457	164	80.4	73.4	216	104	143	63.8	914	59.3	277	4440	3660	1400	897
Fluoranthene	8250	5130	30.7	822	423	266	119	465	549	781	416	1810	139	810	9630	11200	2760	1410
Fluorene	445	97.7	10	34.5	15.6	10	10	13	10	50	10	79.6	10	33.5	1050	933	313	190
Naphthalene	3340	136	9	44.6	226	57.8	33.6	67.2	17	45	16.2	385	16.9	197	5600	4470	2620	2370
Phenanthrene	3280	2770	26	527	317	237	104	213	866	594	175	770	81.6	421	6340	5480	1780	1080
Pyrene																		
PAH, Total Detected USEPA 16	53.1	41.5	0.157	6.73	3.13	1.69	0.99	3.47	3.18	3.4	1.72	13.6	0.908	5.34	69	68.5	21.8	13.5
Naphthalene-d8 % recovery**	98.5	102	95.1	90.2	91.9	98.7	109	100	103	99.9	99.2	101	90.9	78.6	93.4	91.9	87.4	91
Acenaphthene-d10 % recovery**	95.8	100	92.1	87	90.4	95.6	108	96.7	98.7	93.5	93.1	97.7	90.3	69	101	92.4	98.5	90.3
Phenanthrene-d10 % recovery**	94.2	98.3	90.2	86.2	88.4	94.3	105	95.5	98	93.5	91	96	88.8	68.2	98.6	89.2	104	88
Chrysene-d12 % recovery**	103	105	87.3	90.1	90.4	95.8	106	96.3	99.3	87.7	92	97.6	91.9	68.3	101	90.1	109	86.6
Perylene-d12 % recovery**	106	122	87.8	92.5	92.5	94.7	113	103	111	95.5	109	106	95.6	69	98.6	89.1	96.2	83
Total Aliphatics >C12-C44	261	217	31.4	86.3	97	56.5	3.93	132	620	491	254	44.5	180	139	58.1	147	84.5	169
Total Aromatics >EC12-EC44	244	198	10.7	43.6	38.2	30.6	51.7	62.8	548	465	274	44.2	51.3	71.8	165	271	166	95.9
Total Aliphatics & Aromatics >C5-C44																		
Metals - (Solid)																		
Iron	191000	219000	230000	157000	201000	22200	116000	153000	18000	64700	185000	135000	122000	248000	32400	53600	24200	69800
Manganese	20300	5190	16600	36800	32400	277	4200	10100	6010	17700	8330	12200	25900	8480	7430	693	4840	9170
Metals - (Liquid)																		
Calcium	111000	196000	-	180000	-	222000	-	186000	215000	-	128000	-	267000	71900	218000	-	168000	-
Magnesium	10800	10400	-	8430	-	13100	-	18400	26200	-	10800	-	30200	7190	32700	-	26700	-
Phenols																		
Phenol	0.01	0.01	0.01	0.0106	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.0107	0.0108
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0107	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	0.0962	0.136	-	0.004	-	0.0404	-	0.144	0.322	-	0.177	-	0.0222	0.139	0.627	-	0.908	-
pH	9.45	11.8	11.1	12.7	12.7	12.7	7.27	12	11.4	12.1	11.8	10.3	12.7	11.4	9.62	10.2	10.1	8.33
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.147	0.358	-	0.0691	-	0.215	-	0.314	0.494	-	0.339	-	0.352	0.123	0.885	-	1.03	-
Sulphate, Total potential	0.441	1.07	-	0.207	-	0.645	-	0.942	1.48	-	1.02	-	1.06	0.369	2.66	-	3.09	-
Sulphate, acid soluble (total)	0.209	0.623	-	0.145	-	0.407	-	0.534	1.02	-	0.694	-	0.358	0.194	2.35	-	2.85	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.07	1	1.08
Exchangeable Ammonia as N	12	12	12	12	12	12	243	12	12	12	12	12	12	12	12	12	12	12
Asbestos																		
Asbestos Quantification - Gravimetric - %	0.001	0.001	-	-	-	-	-	0.001	-	-	0.001	-	-	-	-	-	-	-
Date of Analysis	22/12/2017	22/12/2017	-	22/12/2017	-	22/12/2017	-	22/12/2017	22/12/2017	-	22/12/2017	-	22/12/2017	22/12/2017	15/05/2018	-	15/05/2018	-
Analysed By	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	-	James Richards	-	Barbara Urbanek-Walsh	James Richards	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	James Richards	Barbara Urbanek-Walsh	-	James Richards	-
Asbestos Quantification - PCOM Evaluation - %	0.001	0.001	-	-	-	-	-	0.001	-	-	0.001	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	None	None	-	-	-	-	-	None	-	-	None	-	-	-	-	-	-	-
Analysts Comments	N/C	N/C	-	-	-	-	-	N/C	-	-	N/C	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	0.001	0.001	-	-	-	-	-	0.001	-	-	0.001	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Detected	Detected	-	Not Detected	-	Not Detected	-	Detected	Not Detected	-	Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Comments	Loose fibres in soil.	Loose fibres in soil.	-	0	-	0	-	Fibre bundles in soil.	0	-	Fibre bundles in soil.	-	0	0	0	-	0	-
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	99.8	100	94.9	98.6
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	92.8	93.5	96.1	92.3
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79.4	81.4	84.3	79.7
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.1	0.2	0.1
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.009	0.09	0.18	0.09
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.007	0.07	0.14	0.07
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.004	0.04	0.08	0.04
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.1	0.2	0.1
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.1	0.2	0.1
Naphthalene	0.518	0.13	0.013	0.13	0.13	0.13	0.013	0.13	0.13	0.013	0.13	0.13	0.13	0.13	0.576	1.05	1.08	0.359
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.4	0.8	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	TP3BC501	TP3BC502	TP3BC503	TP3BC504	TP3BC601	TP3BC602	TP3BC603	TP3BC604	TP3BC701	TP3BC702	TP3BC703	TP3BC704	TP3BC801	TP3BC802	TP3BC803	TP3BC804
Depth	0.4	0.8	1.5	2	0.5	1.5	2	3	0.3	0.8	1.2	1.8	0.3	0.8	1.2	1.7
Sampled Date	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018
Carbon																
Soil Organic Matter (SOM)	14.2	13.4	9.21	14	1.24	0.46	0.572	0.493	2.22	0.56	0.602	1.63	0.872	1.88	1.01	1.08
Metals (Solids)																
Arsenic	13.3	22.1	21.2	24.7	6.1	40.4	92.6	77.4	7.02	9.04	46.6	16.8	14.9	4.24	7.28	8.47
Cadmium	0.2	5.63	5.04	4.75	0.02	0.2	1.58	1.57	0.2	0.2	3.43	3.22	0.274	0.02	0.137	0.368
Chromium	9	9	9	9	754	371	150	277	324	387	9	8.63	77.5	2.07	73.9	11.4
Copper	18.3	35.2	45.9	37	3.35	14	1.4	1.4	14	27.3	116	15.2	9.19	1.4	2.27	2.44
Lead	97	2260	1960	1680	13	26.4	17	14.3	28.7	45.2	45.4	93.5	59.7	0.7	13.1	1.52
Mercury	1.4	1.4	1.4	1.4	0.14	1.4	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14
Nickel	28.1	30.9	32.6	38.2	5.82	44.8	75.1	58	21.8	22.2	19.3	27.1	16.9	2.8	8.21	4.34
Selenium	10	10	10	10	11.8	10	1	1.95	12	15.1	10	1.24	2.58	4.65	4.26	3.43
Vanadium	164	181	144	137	432	360	357	407	1090	395	142	31.1	156	9.69	105	33.6
Zinc	286	5130	4470	3780	26.5	92.3	183	140	82.6	75.4	120	192	198	12.1	52	22.5
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.0419	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.0445	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	4.21	4.75	5.01	2.05	3.62	2.06	0.59	1.75	0.437	0.264	0.82	1.56	1.17	0.1	0.234	0.1
Aliphatics >C16-C21	22.7	31.9	46.4	17.3	10.7	5.47	2.83	3.3	3.69	2.93	4.46	2.15	6.51	0.1	2.79	0.719
Aliphatics >C21-C35	50.7	87.4	134	51.3	50	28.4	42.5	22.5	38.5	24.8	37.1	5.64	46.3	1.65	17.9	9.66
Aliphatics >C35-C44	20.8	16.9	21.7	7.13	8.85	3.21	0.944	4.73	8.09	3.53	5.8	1.06	29.8	0.1	7.1	2.07
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.0508	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	6.83	3.88	34.9	2.4	3.88	2.15	0.1	0.1	0.946	0.578	0.251	0.984	0.322	0.198	0.425	0.25
Aromatics >EC16-EC21	49.5	24.4	310	17	12.7	4.36	0.689	0.1	4.12	3.31	1.81	2.92	2.02	0.1	2.28	1.16
Aromatics >EC21-EC35	136	36.3	507	36.7	45.8	14.8	13.5	1.93	22.5	18.7	14.1	11.8	19.8	3.41	10.8	6.59
Aromatics >EC35-EC44	45	5.61	88.9	3.15	11.2	3.67	1.14	0.1	11.4	8.46	7.44	4.54	28.8	5.33	10.4	3.2
Aromatics >EC40-EC44	14.8	1.63	27	0.1	4.61	1.54	0.129	0.1	4.51	8.81	2.66	2.09	13.9	2.51	4.16	1.18
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	1440	16.4	68.9	12	12	12	12	12	45.6	12	12	12	12.6	12	12	12
Acenaphthene	153	34.4	40.9	15.6	48.2	8	8	8	17.5	8	8	8	8	8	8	8
Anthracene	1890	118	415	99.8	54.5	16	16	16	84.7	16	16	16	28.3	16	16	16
Benz(a)anthracene	5840	49.9	355	57.9	214	47.8	18	14	313	113	65.3	14	95.4	14	74.4	36.1
Benzo(a)pyrene	5560	20.7	256	36.6	171	44.9	15	15	324	111	67.3	16.7	92.2	15	75.5	31.9
Benzo(b)fluoranthene	8360	37.6	436	69.2	273	105	19.9	15	480	188	122	32.5	148	15	132	55.6
Benzo(k)fluoranthene	2940	14	129	14	97.4	30.5	14	14	194	99.9	45.4	14	53.5	14	56.1	20.2
Benzo(g,h,i)perylene	4030	24	174	24	131	47.6	24	24	288	98.5	70.9	24	88.6	24	66.2	27.1
Chrysene	4370	53.3	419	66.5	408	76.6	30.3	11.9	275	143	90.1	10	102	10	95.5	37.6
Dibenzo(a,h)anthracene	1070	0.023	44.4	0.023	31.2	0.023	0.023	0.023	66.2	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	3530	0.018	128	0.018	90.8	33	0.018	0.018	221	84	58.2	0.018	64.3	0.018	66.7	29
Fluoranthene	11500	313	1280	304	466	103	26.4	19.4	551	199	90.8	34.1	192	0.017	130	66.8
Fluorene	930	110	183	80.3	19	10	10	10	35.6	10	10	10	12.6	10	10	10
Naphthalene	3240	202	320	120	146	40.1	14.5	12	200	23.3	12.4	9	61.4	9	41.9	21.3
Phenanthrene	5140	449	948	356	564	90.4	30.3	29	325	65.4	47.4	61.8	130	15	75	39.7
Pyrene																
PAH, Total Detected USEPA 16	69.6	1.87	6.46	1.59	3.15	0.702	0.171	0.118	3.87	1.33	0.753	0.173	1.26	0.118	0.937	0.418
Naphthalene-d8 % recovery**	89.2	103	85	104	86.9	90.2	93.3	87.1	95.4	87.7	91.9	88.7	94.9	90.3	89.2	92.7
Acenaphthene-d10 % recovery**	88.7	100	83.3	105	85.8	86.8	95.4	85	93.5	86.4	95.6	92.1	92	94.7	93.7	95.7
Phenanthrene-d10 % recovery**	86.8	88.9	74.8	101	86.9	87.1	88.2	84.1	90.9	85.7	88.9	87.8	90.1	89	89.9	89.9
Chrysene-d12 % recovery**	86.7	47.8	36	71.7	101	96.5	90	92.5	87	82.4	86.4	96.5	82.7	96.6	95.2	106
Perylene-d12 % recovery**	84.3	25.3	23.1	55	101	96.4	88.1	93	89.8	79.1	87	95.7	84	95.2	97.1	110
Total Aliphatics >C12-C44	98.5	141	207	77.8	73.2	39.2	46.9	32.3	50.7	31.5	48.2	10.4	83.8	1.65	28	12.4
Total Aromatics >EC12-EC44	237	70.2	940	59.3	73.6	25	15.4	1.93	39	31.1	23.6	20.2	51	8.94	23.8	11.2
Total Aliphatics & Aromatics >C5-C44																
Metals - (Solid)																
Iron	255000	308000	287000	295000	137000	168000	214000	214000	190000	186000	287000	49500	150000	18200	65900	36200
Manganese	6030	9130	6220	5800	29900	9970	2640	9670	27300	32800	10900	2300	8560	3280	5420	3660
Metals - (Liquid)																
Calcium	81000	-	57400	-	218000	-	174000	-	186000	-	73700	-	190000	-	201000	-
Magnesium	11200	-	4990	-	16500	-	5380	-	14600	-	5780	-	25400	-	35300	-
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.0103	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	0.131	-	0.521	-	0.0151	-	0.158	-	0.0639	-	0.13	-	0.276	-	0.343	-
pH	10.3	10.5	9.92	8.37	12.5	12.3	9.71	11.7	11.2	11.7	11	8.38	11.5	11.3	11.4	11.3
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.198	-	0.231	-	0.113	-	0.0822	-	0.144	-	0.104	-	0.489	-	0.26	-
Sulphate, Total potential	0.594	-	0.693	-	0.339	-	0.247	-	0.432	-	0.312	-	1.47	-	0.78	-
Sulphate, acid soluble (total)	0.197	-	0.194	-	0.305	-	0.0478	-	0.195	-	0.119	-	0.426	-	0.911	-
Cyanide, Total	1	9.21	9.46	7.29	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	15.9	65.5	114	12	12	12	12	12	12	12	12	12	12	12	12
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-
Analysed By	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	Marcin Magdziarek	-	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Comments	0	-	Loose fibres in soil.	-	0	-	0	-	0	-	0	-	0	-	0	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	108	105	104	97.2	79.1	104	107	110	106	109	106	113	104	106	107	105
Toluene-d8**	95.8	99.1	95.5	105	96.1	97.2	100	103	98.2	99	98.2	99.6	95.5	99	99.3	98.9
4-Bromofluorobenzene**	79	89.9	93.4	88.2	92.4	99.1	97	96.1	92.7	102	99	92.6	102	96.7	96.4	94.5
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.282	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3BC4V	TP3BC5V	TP3BC6V	TP3BC7V	TP3BC8V	TP3BD401	TP3BD402	TP3BD403	TP3BD404	TP3BD501	TP3BD502	TP3BD503	TP3BD504
Depth	3.4	2.5	3.2	2	1.9	0.5	1	2	3	0.3	0.8	1.5	2
Sampled Date	02/05/2018	01/05/2018	02/05/2018	01/05/2018	01/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018
Carbon													
Soil Organic Matter (SOM)	3.65	4.72	7.55	6.65	2.84	4.57	7.98	7.48	9.79	37.4	22.6	15.6	7.91
Metals (Solids)													
Arsenic	11	12.9	18.1	17.1	12.2	24	13.6	31.4	10.5	10.7	13.7	9.23	11.6
Cadmium	0.471	0.603	0.915	0.592	0.548	0.2	0.2	0.2	3.97	0.2	0.2	0.2	0.554
Chromium	32.5	32.7	29.9	36.2	36.5	9	9	9	0.9	14.5	31.3	80.7	99.6
Copper	13.9	16	19.4	14.8	13.2	32	16.3	39.9	23	21	28.1	22.1	23.3
Lead	28.9	38.7	59.2	45.9	35.4	167	79.2	112	84.7	98.1	45.2	108	110
Mercury	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	1.4	1.4	1.4	1.4
Nickel	25.8	23.1	31	23.7	33.7	43.1	26.9	46.2	22.8	31.4	23.8	23.2	24.6
Selenium	1	1	1	1	1	10	10	10	1	10	10	10	10
Vanadium	51.3	56.7	54.6	59.7	60.9	128	106	146	106	121	111	400	151
Zinc	108	119	207	117	126	675	269	383	405	240	127	290	331
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.0466	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.0755	0.04	0.04	0.04	0.143	0.0533	0.04	0.04	0.0683	0.0627	0.0688
Aliphatics >C8-C10	0.04	0.04	0.169	0.04	0.04	0.04	0.104	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.126	0.04	0.04	0.04	0.194	0.04	0.0858	0.04	0.0616	0.0844	0.121
Aliphatics >C12-C16	0.535	0.1	0.614	0.187	0.927	1.18	4.73	3.08	2.36	13.4	6.59	5.89	7.85
Aliphatics >C16-C21	1.47	0.1	0.521	0.1	0.1	9.03	20.8	13.2	12.7	53.2	30.4	30.3	20.3
Aliphatics >C21-C35	4.69	0.1	11.1	0.1	2.36	43.1	79.4	52	50.9	114	97.9	57.1	79.3
Aliphatics >C35-C44	0.1	0.1	0.1	0.1	0.1	19.7	30.3	21.5	21.6	42.5	34.8	14.4	25.3
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.112	0.04	0.04	0.04	0.112	0.0566	0.04	0.04	0.047	0.0604	0.0555
Aromatics >EC10-EC12	0.04	0.04	0.0844	0.04	0.04	0.04	0.13	0.04	0.0572	0.04	0.0403	0.0559	0.081
Aromatics >EC12-EC16	0.449	0.1	0.823	0.1	0.803	1.62	6.23	3.5	2.44	133	16.2	15.1	7.86
Aromatics >EC16-EC21	1.56	0.1	2.76	0.1	0.1	12.8	35.7	20.4	21.3	719	137	121	188
Aromatics >EC21-EC35	21.3	9.68	39.7	16	10.6	43	108	62.8	57.5	1310	374	317	296
Aromatics >EC35-EC44	2.09	0.648	7.87	0.777	1.28	15.6	41.8	24.4	17.2	428	112	85.8	9.51
Aromatics >EC40-EC44	0.1	0.1	1.52	0.1	0.1	5.91	15.9	9.04	5.58	166	33.1	24	2.94
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	12	12	12	12	12	160	371	333	238	57800	10200	5100	1300
Acenaphthene	8	8	8	8	8	17.2	53.6	42.8	30.7	4650	919	496	197
Anthracene	16	16	16	16	16	491	596	552	479	81600	13200	6990	1830
Benz(a)anthracene	14	14	54.9	14	14	1150	1310	1770	1300	106000	26900	14500	3320
Benzo(a)pyrene	15	15	53.6	15	15	1150	1260	1710	1250	96800	19000	14400	2950
Benzo(b)fluoranthene	15	15	15	29.6	15	1890	2060	2710	1980	135000	37600	19100	4760
Benzo(k)fluoranthene	14	14	37.6	14	14	558	689	972	630	53300	11200	10900	1760
Benzo(g,h,i)perylene	24	24	42.3	24	24	989	898	1360	1030	63300	17500	9230	2060
Chrysene	10	10	75.3	17.5	10	981	1400	1440	1280	98200	24500	14400	3310
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	221	206	340	249	16600	4610	2370	541
Indeno(1,2,3-cd)pyrene	0.018	0.018	43.8	0.018	0.018	789	1010	1120	850	68200	17900	9890	2340
Fluoranthene	0.017	0.017	112	33.8	0.017	2180	2960	3300	2720	322000	70800	35900	7530
Fluorene	10	10	10	10	10	145	294	256	159	81600	10100	3380	1150
Naphthalene	9	9	9	9	9	406	926	934	668	36200	9180	6910	2390
Phenanthrene	15	15	59.8	15	15	967	1700	1550	1200	316000	45000	16400	5560
Pyrene													
PAH, Total Detected USEPA 16	0.118	0.118	0.566	0.118	0.118	14.2	18.1	21.3	16.4	1750	371	196	46.5
Naphthalene-d8 % recovery**	90.8	88.3	92	89.5	82.9	90.8	93.4	93.3	90.4	94.1	90.2	89.9	92.3
Acenaphthene-d10 % recovery**	88.9	87.8	99.7	87.8	81.7	88.6	94.9	92.4	89.3	108	98.7	92.2	97.4
Phenanthrene-d10 % recovery**	86.7	85.5	96.3	87	80.1	85.8	93.2	89.3	86.3	98.5	96	93.2	91.5
Chrysene-d12 % recovery**	76.1	77.3	113	90.4	71.5	79.7	88.6	86	79.4	85.4	101	96.9	91.2
Perylene-d12 % recovery**	75.2	77.9	116	92.5	71.3	76.8	83.5	84.5	77.7	87.1	97.5	95.4	94.4
Total Aliphatics >C12-C44	6.7	0.1	12.2	0.187	3.29	73	135	89.8	87.6	223	170	108	133
Total Aromatics >EC12-EC44	25.4	10.3	51.1	16.8	12.7	73	191	111	98.4	2590	640	539	501
Total Aliphatics & Aromatics >C5-C44													
Metals - (Solid)													
Iron	32100	30600	26700	26600	33600	343000	240000	328000	374000	154000	145000	147000	94000
Manganese	208	199	427	170	402	5610	6490	4900	5950	4200	6350	9630	7570
Metals - (Liquid)													
Calcium	-	-	-	-	-	46300	-	56300	-	78100	-	139000	-
Magnesium	-	-	-	-	-	7010	-	8780	-	11200	-	10700	-
Phenols													
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0224	0.0114	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.0224	0.0228	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0448	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	0.239	-	0.216	-	0.144	-	0.185	-
pH	7.78	10.7	7.97	7.13	7.9	10.7	9.57	10.6	10.3	10.3	10.4	10.7	11.1
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	-	-	-	-	-	0.167	-	0.172	-	0.64	-	0.273	-
Sulphate, Total potential	-	-	-	-	-	0.501	-	0.516	-	1.92	-	0.819	-
Sulphate, acid soluble (total)	-	-	-	-	-	0.224	-	0.279	-	1.14	-	0.467	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	4.36	5.23	3.13	1
Exchangeable Ammonia as N	228	319	385	323	217	12	12	12	12	12	12	12	12
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Date of Analysis	-	-	-	-	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-
Analysed By	-	-	-	-	-	Marcin Magdziarek	-	James Richards	-	Marcin Magdziarek	-	Marcin Magdziarek	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	None	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	N/A	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	-
Amosite (Brown) Asbestos	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Comments	-	-	-	-	-	0	-	0	-	Loose fibres in soil	-	0	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	106	111	104	104	117	108	96.2	101	103	83.6	85.7	90.5	96.6
Toluene-d8**	97.1	99.8	98.6	100	98.5	97.9	94.3	97.6	96	89.7	91.4	93.9	96.7
4-Bromofluorobenzene**	99.3	91.5	95.4	92.2	97.6	97.9	80.1	95	90.6	68.1	79.4	73.2	81.5
Methyl Tertiary Butyl Ether	0.01	0.1	0.01	0.1	0.1	0.01	0.1	0.01	0.01	0.2	0.2	0.1	0.1
Benzene	0.009	0.09	0.009	0.09	0.09	0.009	0.09	0.009	0.009	0.18	0.18	0.09	0.09
Toluene	0.007	0.07	0.007	0.07	0.07	0.007	0.07	0.007	0.007	0.14	0.14	0.07	0.07
Ethylbenzene	0.004	0.04	0.004	0.04	0.04	0.004	0.04	0.004	0.004	0.08	0.08	0.04	0.04
p/m-Xylene	0.01	0.1	0.01	0.1	0.1	0.01	0.1	0.01	0.01	0.2	0.2	0.1	0.1
o-Xylene	0.01	0.1	0.01	0.1	0.1	0.01	0.1	0.01	0.01	0.2	0.2	0.1	0.1
Naphthalene	-	-	0.013	-	-	0.013	1.21	0.183	2.96	2.21	3.54	1.05	1.22
Sum of BTEX	0.04	0.4	0.04	0.4	0.4	0.04	0.4	0.04	0.04	0.8	0.8	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3BD601	TP3BD602	TP3BD603	TP3BD604	TP3BD701	TP3BD702	TP3BD703	TP3BD704	TP3BD801	TP3BD802	TP3BD803	TP3BD804	TP3BD4V	TP3BD5V	TP3BD6V	TP3BD7V	TP3BD8V	TP3BE6	TP3BE6
Depth	0.5	1	2	3	0.3	0.8	1.5	2.3	0.3	1	1.5	1.8	3.4	2.3	3.2	2.5	1.9	0.5	1
Sampled Date	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	02/05/2018	01/05/2018	02/05/2018	01/05/2018	01/05/2018	15/05/2018	15/05/2018
Carbon																			
Soil Organic Matter (SOM)	0.559	0.391	0.35	0.35	0.448	0.583	0.465	1.04	3.48	3.93	2.29	1.23	2.71	7.52	4.47	6.67	1.95	1.52	1.27
Metals (Solids)																			
Arsenic	101	118	68	108	3.61	7.9	30.9	8.11	14.2	14.4	20.1	7.32	12.9	19.7	13.5	16.9	13.5	10.5	16.3
Cadmium	1.94	0.2	0.2	0.731	0.802	0.02	0.2	0.629	0.02	0.2	2.92	0.862	0.589	0.918	0.568	0.723	0.464	0.2	0.2
Chromium	255	216	212	303	369	386	34.1	11.1	394	254	80.2	26.6	31.1	33.8	43.9	40.8	32.2	801	203
Copper	14	14	14	14	1.4	10.4	14.2	12.4	19.1	24.4	34.7	10.9	13.2	17.5	16.2	17	13	17.7	14
Lead	26.7	19.5	17.8	19.8	6.85	14.4	78	19.2	22.1	109	224	95.1	42.6	97	32.3	46	25.7	35.5	25.6
Mercury	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4
Nickel	104	113	99.4	114	5.18	5.94	17.6	28.3	22.6	25.6	39.5	8.8	32.4	25.9	28.7	25.2	31.9	12.4	21.6
Selenium	10	10	10	10	8.57	14.1	10	1	4.75	10	10	3.97	1	1	1	1	1	18.5	10
Vanadium	495	487	376	470	394	400	144	23	239	278	132	59	54.7	65.6	56.3	71.9	55.2	528	215
Zinc	200	217	178	208	52.3	26.2	210	76.9	82.1	212	226	135	150	247	199	131	107	117	72.6
TPH Criteria Working Group (TPH CWG)																			
Benzene																			
Toluene																			
Ethylbenzene																			
sum of detected mpo xylene by GC																			
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0422	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0558	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.114	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	1.16	0.119	0.1	1.05	0.34	0.1	2.4	0.571	2.1	1.15	1.94	1.94	0.1	0.295	0.1	0.525	0.789	1.98	2.31
Aliphatics >C16-C21	8.43	2.67	0.596	2.72	4.35	0.74	7.62	0.797	17	10.7	16.2	11.2	0.1	0.1	0.1	0.1	0.361	10.4	11.1
Aliphatics >C21-C35	122	33.7	6.32	9.97	62.2	13.8	71.5	2.91	125	83.7	123	86.1	5.65	9.75	0.692	4.48	0.999	71.3	74.9
Aliphatics >C35-C44	12.7	2.32	0.1	0.936	8.05	3.87	9.39	0.1	40.1	25.8	50.3	38.9	1.93	0.1	0.622	0.1	0.1	23	18.5
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0762	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.1	0.488	0.1	0.1	0.444	0.1	0.793	0.486	0.1	1.14	1.1	1	0.1	0.468	0.1	0.244	0.146	0.679	1.09
Aromatics >EC16-EC21	2.5	1.1	0.1	0.1	2.05	0.82	2.15	1.53	0.544	5.68	8.47	9.14	1.16	1.77	0.33	0.192	0.1	5.93	5.91
Aromatics >EC21-EC35	40	9.55	3.14	0.1	20.3	9.21	21.1	5.55	11.1	33.5	56	44.1	13.6	52.7	18.6	48.7	3.31	33	30.5
Aromatics >EC35-EC44	8.98	1.29	1.31	0.1	5.73	5.49	3.93	3.49	3.45	20.7	37.2	24.2	5.64	6.55	1.43	6.01	1.03	17.3	12.6
Aromatics >EC40-EC44	3.26	0.1	0.876	0.1	1.9	2.63	0.972	1.45	0.876	9.06	15.9	9.48	1.21	1.55	0.1	1.17	0.233	6.97	4.71
Polyaromatic Hydrocarbons (PAHs)																			
Acenaphthylene	12	12	12	12	12	12	12	12	18.2	23.6	12	18.7	12	12	12	12	12	32.7	52.2
Acenaphthene	8	8	8	8	8	26.8	8	8	23.6	14.7	13.7	13.2	8	8	8	8	8	28.5	18.7
Anthracene	16	16	16	16	16	92.4	40.5	16	52.7	43.1	35.3	30.4	16	16	16	16	16	104	103
Benz(a)anthracene	67.8	14	14	14	63.5	1010	61.5	14	211	167	171	201	19.7	56.8	14	14	14	321	240
Benzo(a)pyrene	47.6	15	15	15	77.4	1070	57.6	15	160	164	103	175	15	54	15	15	15	280	218
Benzo(b)fluoranthene	95.9	15	15	15	104	1670	98.2	18.6	313	326	249	363	24.3	94.1	15	35.5	15	567	394
Benzo(k)fluoranthene	40.4	14	14	14	41.1	597	35.4	14	109	135	105	126	14	29.2	14	14	14	207	133
Benzo(g,h,i)perylene	36.5	24	24	24	64.8	675	57	24	140	163	112	152	24	59.9	24	24	24	226	169
Chrysene	97.8	12.8	10	10	69.2	1130	67.2	19	265	254	217	279	26.3	52.7	10	28	10	430	301
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	167	0.023	0.023	34.5	42	27.9	38.4	0.023	0.023	0.023	0.023	0.023	45.2	33.2
Indeno(1,2,3-cd)pyrene	34.2	0.018	0.018	0.018	49.1	714	39.9	0.018	143	159	87.9	157	0.018	38	0.018	0.018	0.018	236	173
Fluoranthene	142	24.4	0.017	0.017	98.8	1320	121	17.7	451	300	507	458	46.3	129	0.017	44.5	0.017	736	651
Fluorene	10	10	10	10	10	10	10	10	26.1	19.2	12.9	14.8	10	10	10	10	10	46.2	61.4
Naphthalene	27.1	9	9	9	22.6	15.3	15.4	9	112	140	41.4	54.1	14.9	18	9	9	9	151	181
Phenanthrene	103	21.4	15	15	52.4	366	73.1	42.3	264	210	305	225	26.4	71.3	15	26.5	15	450	530
Pyrene																			
PAH, Total Detected USEPA 16	0.825	0.118	0.118	0.118	0.731	10	0.771	0.118	2.74	2.45	2.41	2.69	0.202	0.702	0.118	0.172	0.118	4.39	3.71
Naphthalene-d8 % recovery**	86.7	85.5	92.8	92.4	91.4	90.8	95	88.7	88.2	90.9	90.8	90.4	76.4	92	83.9	87.1	89	97.8	97.8
Acenaphthene-d10 % recovery**	94	91.7	90.3	93.4	91.4	93.4	92.4	86.8	97.5	96	88.5	95	83.5	91.6	85.3	95.2	92.5	107	106
Phenanthrene-d10 % recovery**	95.5	90.8	90.4	87.7	91	92.7	91.8	88.9	97.3	96.2	88.3	92.7	90.9	90.2	89.2	97.9	86.4	110	110
Chrysene-d12 % recovery**	102	75.2	85.1	91.9	88.3	91.6	87.3	84.4	93.6	103	85.6	101	105	80.4	92.1	105	100	96.7	96.4
Perylene-d12 % recovery**	89	72.5	92.2	88.8	94.3	88.5	91	75.1	84.6	96.9	87.5	101	93.2	80.1	88.9	94.9	108	90.9	89.5
Total Aliphatics >C12-C44	145	38.8	6.91	14.7	75	18.4	90.9	4.28	184	121	192	138	7.58	10	1.31	5	2.15	107	107
Total Aromatics >EC12-EC44	51.5	12.4	4.45	0.1	28.5	15.5	28	11.1	15.1	61	103	78.4	20.4	61.4	20.4	55.1	4.49	56.9	50
Total Aliphatics & Aromatics >C5-C44																			
Metals - (Solid)																			
Iron	199000	244000	189000	210000	162000	182000	257000	39900	173000	161000	207000	62400	43700	35900	30700	30400	36300	175000	390000
Manganese	5190	3420	4160	4160	29100	41700	11300	1610	13700	16100	10700	6790	695	352	273	347	525	28100	12700
Metals - (Liquid)																			
Calcium	181000	-	221000	-	208000	-	83700	-	155000	-	151000	-	-	-	-	-	-	222000	87800
Magnesium	7700	-	5180	-	40500	-	10000	-	15000	-	18800	-	-	-	-	-	-	21700	8960
Phenols																			
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0106	0.0105
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																			
Soluble Sulphate 2:1 extract as SO4 BRE	0.227	-	0.11	-	0.0149	-	0.0928	-	0.258	-	0.316	-	-	-	-	-	-	0.004	-
pH	10.5	9.93	9.04	8.6	12.6	12.2	11.6	8.24	11.5	11.3	11.3	11.8	7.62	7.46	7.07	6.97	7.5	12.6	11.2
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.142	-	0.049	-	0.15	-	0.171	-	0.43	-	0.324	-	-	-	-	-	-	0.169	-
Sulphate, Total potential	0.426	-	0.147	-	0.45	-	0.513	-	1.29	-	0.972	-	-	-	-	-	-	0.507	-
Sulphate, acid soluble (total)	0.107	-	0.043	-	0.272	-	0.132	-	0.535	-	0.588	-	-	-	-	-	-	0.295	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2.62	1
Exchangeable Ammonia as N	12	12	16.6	12	12	12	12	12	12	12	12	12	163	279	282	334	159	12	12
Asbestos																			
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-
Date of Analysis	15/05/2018	-	15/05/2018	-	15/05/2018	-	16/05/2018	-	15/05/2018	-	15/05/2018	-	-	-	-	-	-	22/05/2018	-
Analysed By	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	James Richards	-	Barbara Urbanek-Walsh	-	-	-	-	-	-	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Comments	0	-	0	-	0	-	0	-	0	-	0	-	-	-	-	-	-	Loose fibres in soil.	-
Volatile Organic Compounds (VOCs)																			
Dibromofluoromethane**	113	110	107	117	111	106	112	114	104	121	115	111	104	107	113	106	106	102	101
Toluene-d8**	97.5	98	98	98.5	99.1	97.5	98.1	99.8	98.5	99.5	96.5	97.3	98.5	99.5	97.5	98.5	99.5	94.8	96.7
4-Bromofluorobenzene**	98.9	100	98.3	96.1	98.6	97.8	103	93.1	94.4	97.1	97.3	97.5	100	92.3	99.2	93.7	96.3	92	97.2
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	-	0.13	-	-	0.198	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																			
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

												Sample ID	TP3BE6	TP3BE7	TP3BE7	TP3BE7	TP3BE8	TP3BE8	TP3BE401	TP3BE402	TP3BE403	TP3BE404	TP3BE501	TP3BE502	TP3BE4V	TP3BE5V	TP3BE8V	TP3BF1	TP3BF1	TP3BF1	TP3BF1	TP3BF2	TP3BF2	TP3BF2	TP3BF2	TP3BF3	TP3BF3	TP3BF3	TP3BF4	TP3BF4	TP3BF4	TP3BF4	TP3BF5	TP3BF5	TP3BF5	TP3BF5	TP3BF6	TP3BF6	TP3BF6	TP3BF6	TP3BF7	TP3BF7	TP3BF7	TP3BF7	TP3BF8	TP3BF8	TP3BF8	TP3BF1V	TP3BF2V	TP3BF3V	TP3BF4V	TP3BF5V	TP3BF7V
												Depth	1.5	0.5	1.2	1.8	1	2	0.5	1	2	3	1	2	4	2.5	2.2	0.5	1	2	3	0.5	1	1.8	2.3	0.5	1	2	0.5	1	2	2.5	0.5	1	1.5	2	0.3	0.7	1	1.5	0.5	1.2	1.7	2.3	0.5	1	1.5	3.1	2.7	2.2	2.7	2.4	2.7
												Sampled Date	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**Upper 95th Percentile**	**WQS**	**Percentage of exceedances**																																																					
Carbon																																																														
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00	1.04	1.21	0.667	1.43	2.45	3.22	5.67	2.91	10.2	9.98	5.05	4.38	4	8.36	1.25	12	17.2	6.05	0.821	21.6	3.55	3.41	4.53	6.86	6.02	2.48	11.3	28.8	12.6	14.4	3.67	0.655	2.95	12.2	2.45	2.43	0.471	0.543	1.07	0.352	1.78	1.84	0.988	2.02	1.38	5.31	4.41	1.33	2.84	1.16	2.24
Metals (Solids)																																																													
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93	91.9	7.41	19.8	13.9	16	13	15.1	5.41	20.1	30.4	13.3	9.5	13.3	22.4	12.6	9.81	9.97	30.4	8.09	12.7	7.89	15.5	24.8	16	15	12.6	15.7	17.8	20.4	32.1	14.7	6.12	10.2	35.9	9.39	15.1	125	92.3	10.1	15.3	22	12.1	17	11.8	12.4	14.3	12.1	10.2	14.6	13.7	12.1
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47	2.31	0.2	0.2	1.39	0.2	0.2	2.08	4	2.45	3.76	0.328	0.02	0.245	0.93	0.132	0.2	0.231	0.2	0.2	0.28	0.2	0.265	0.2	0.2	0.2	0.2	0.206	1.42	3.53	8.97	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.275	0.156	0.38	0.02	0.02	0.02	0.02
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09	189	559	119	425	143	103	0.9	0.9	9	9	138	223	36.5	54.2	32.1	310	129	472	879	196	419	507	602	50.4	11	269	9	17.3	9	9	174	204	108	219	581	170	388	217	498	261	42.2	264	168	55.4	24.9	38.9	26.9	34.2	32.4	28.8	31.9
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00	14	15.7	44.2	42.7	16.3	30.2	21	19.2	23.3	164	20	9.01	15.8	21.7	10.5	14.5	14.3	82.2	25.4	37.2	14	42.3	110	16.9	14	24.4	22.3	24	19.5	37.2	17.9	14	14	20.4	14	14	14	14	14	14.1	29.9	15.8	14	18.6	21.5	18	14	13.4	20.3	12.1	12.8
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66	82.7	21	410	820	40.5	52.7	46.3	89.5	1050	1880	101	28	49	53	30.2	46.4	20.5	31.6	14.4	93.3	35.8	45.3	39.4	38.1	43	18.7	170	430	952	2280	63.7	8.37	61.4	93.3	15.9	23.7	23.6	37.1	25.7	39	45.2	29.9	24.4	30.2	58.9	38.8	29.9	27.4	33.8	27.6	26.3
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.166	1.4	1.55	1.4	0.14	0.14	0.14	0.14	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.65	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87	86.7	11.8	19.9	26.2	28.3	37.2	20.2	21.5	29.4	31.9	23.5	9.98	30.8	33	40.2	12.4	11.6	97.8	19.7	33.7	9.24	33.9	73	19.6	23.1	12.6	31.6	26.1	22.1	35.7	41.8	6.1	16.8	40.9	8.34	14.6	119	92.2	14.3	18.3	28.9	20.8	22.6	13.9	40.4	27.3	23.9	40.5	38.3	41.6	35
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93	10	15.3	18	25.9	10	10	1	1	10	10	10	7.9	1	1	1	18.7	11.5	14.8	36	15.6	30.7	19.7	25.7	10	10	13	10	10	10	10	10	13.6	10	11.7	15.5	10	10	10	15.6	15.1	10	14.9	10	10	10	1.03	10	1	1	1	1
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57	414	763	125	1110	305	202	84.2	31.4	105	105	228	352	57.1	106	62.5	1340	496	1110	1440	1100	2880	677	753	224	87.7	374	52.2	158	67.4	198	196	201	192	279	436	192	639	436	654	742	130	449	230	125	40.3	74	45.3	63.1	63.4	59.5	61.2
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57	312	119	172	274	129	113	199	306	2340	4290	340	90.3	149	170	128	342	97.5	114	41.3	183	52	337	87.7	64.9	95	49.5	393	986	2210	5280	180	31.6	177	254	44.3	55.5	246	193	138	94.4	122	65.3	77.7	105	157	137	90.7	125	146	118	105
TPH Criteria Working Group (TPH CWG)																																																														
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00																																																			
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00																																																			
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00																																																			
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00																																																			
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0439	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0404	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0715	0.101	0.04	0.115	0.0655	0.04	0.0521	0.04	0.0511	0.0407	0.04	0.04	0.04	0.04	0.04	0.046	0.04	0.103	0.04	0.04	0.0599	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0522	0.04	0.04	0.04	0.0433	0.04	0.0547	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.299	0.337	0.0537	0.0626	0.04	0.04	0.0664	0.04	0.11	0.04	0.04	0.0449	0.04	0.04	0.04	0.092	0.04	0.0818	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0978	0.118	0.04	0.04	0.04	0.04	0.04	0.0449	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00	0.134	0.04	0.04	0.04	0.04	0.04	0.04	165	194	0.076	0.0845	0.756	0.0658	0.0537	0.04	0.165	0.0682	0.092	0.606	0.04	0.04	0.0552	0.147	0.04	0.0499	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0827	0.354	0.917	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00	27.7	0.827	3.37	7.43	1.19	1.16	0.1	33.2	14.4	2.18	6	2.92	0.1	0.63	0.1	20.7	14.3	5.65	1.26	11.6	0.1	3.56	5	2.29	20.4	0.743	2.92	4.83	2.64	0.1	1.51	0.1	0.521	1.1	1.23	2.08	4.15	4.66	1.78	5.74	2.84	2.09	1.74	2.13	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00	37.2	5.04	18.6	31.8	10.1	5.62	6.73	979	410	16.3	23.7	19.6	0.1	0.643	0.1	86.7	49.1	27.2	3.17	17.5	2.88	15.6	15.6	6.27	55.7	2.7	18.8	28.4	19.3	8.39	10.9	1.45	9.52	16.6	6.37	8.88	18.6	13.3	9.13	13	5.37	4.86	7.63	10.5	2.23	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00	60.5	64.8	145	167	83.4	36.6	16.6	164	120	70	140	39.8	0.1	3.85	0.1	356	802	164	16.6	40.2	17.6	114	126	29.6	90.4	14.9	89	62.7	44.4	28.5	138	11.5	42.6	79.8	47.4	71.3	123	78.5	77.3	54.1	19.9	20.4	52.5	66.9	11.4	2.63	5.06	0.1	0.1	0.1	0.1
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00	7.22	5.02	24.2	45.7	33.6	15.4	1.7	14.3	17.8	14.7	105	6.5	0.1	1.88	0.1	371	913	172	8.4	7.62	2.11	58.5	68.9	3.43	11.5	1.41	32.3	9.53	7.13	1.93	48.4	2.97	11.9	24.4	13.3	13.7	11.6	12.3	11.1	7.35	3.66	2.67	19.4	31.6	2.81	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.116	0.0952	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.13	0.107	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.325	0.35	0.0445	0.0747	0.04	0.04	0.0442	0.04	0.0888	0.04	0.04	0.04	0.04	0.04	0.04	0.0667	0.04	0.0977	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0656	0.0844	0.04	0.04	0.04	0.04	0.04	0.047	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07	0.0899	0.04	0.04	0.04	0.04	0.04	0.04	110	130	0.0511	0.056	0.504	0.0429	0.04	0.04	0.11	0.0451	0.0614	0.405	0.04	0.04	0.04	0.0978	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0548	0.236	0.611	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07	2.65	0.1	0.308	1.97	1.4	0.924	0.468	25.2	19.2	1.43	5.01	2.67	0.1	0.1	0.1	20.1	17.1	7.28	1.25	26	1.17	2.53	2.37	2.74	41.4	1.34	4.2	20.8	3.3	0.1	1.8	0.1	1.26	1.16	0.942	2.13	0.1	1.33	0.893	0.893	0.966	0.1	0.395	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14	8.02	1.86	6.58	15.8	6.69	4.19	8.09	316	166	11.5	26.1	25.5	0.1	0.343	0.1	115	93.9	49.9	8.71	213	8.69	20.3	25.7	10	116	5.13	27.5	130	26.4	6.62	15.8	1.42	10	11.7	8.26	13.6	5.2	4.56	10.4	5.14	2.51	2.63	3.45	3.01	1.17	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00	17.5	15.5	39.7	71.9	41.2	22	23.2	97.5	91.6	20.2	116	94	6.7	42	3.3	776	1810	411	36.4	453	35.8	110	146	33.4	220	16.9	85.7	320	53.4	13.4	85.6	4.39	31.1	41.2	38.6	59.1	45.4	29.5	41.4	32.3	10.3	11.9	23.4	28.8	8.83	15.8	17.2	2.82	8	3.17	0.1
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00	4.26	4.64	14.2	30.8	30.2	17.9	6.24	14.9	16.2	5.71	75	30.2	0.1	53	0.916	602	1580	321	16.2	92.5	12.1	46.2	52.7	11.3	52.8	5.31	28.3	80	10.1	0.963	54.6	1.04	12.4	23.5	11.7	15	3.97	7.96	13.8	11	3.3	2.14	18	33.5	7.61	2.1	1.61	0.1	0.617	0.523	0.1
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00	1.42	1.47	5.36	12.9	12.7	7.65	1.8	4.98	6.24	2.17	31.7	9.8	0.1	26	0.1	260	724	142	6.71	21.4	3.97	16.4	16.8	3.73	16.1	1.56	9.22	22.4	3.31	0.1	21.6	0.1	4.13	9.54	3.98	5.72	0.1	2.87	4.96	4.24	1.05	0.1	7.95	16.6	3.26	0.1	0.1	0.1	0.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)																																																														
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01	12	31.1	12	16.5	33.3	12	163	5070	2080	12	336	1000	12	12	12	1500	1620	51800	4100	2980	204	122	77.6	416	719	176	487	2580	117	29.8	120	29	629	88.4	41.7	66.8	12	12	23.1	15.8	12	12	12	13.6	12	12	12	12	12	12	12
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40	11.3	17.6	24.2	32.6	42.2	21.7	51	310	245	30.7	106	107	8	8	8	1900	870	3310	192	154	47.3	168	157	43.4	90.6	53.2	41.9	141	41.6	40.5	35.9	8	125	40	54.1	154	8	8	31.2	39.6	8	8	15.4	13.6	8	8	8	8	8	8	8
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33	36	67.3	159	89.9	88.4	23.4	228	2050	1080	97.5	606	1160	16	16	16	5700	6690	51300	2420	5060	315	362	315	500	894	174	1110	3450	425	212	200	38.1	965	145	135	259	16	16	92.1	97	25.2	22	19.3	32.9	16	16	16	16	16	16	16
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27	53.5	290	377	692	319	97.1	760	976	501	47	1520	3680	14	26.2	14	10200	13500	57600	5260	11500	989	1900	2530	1270	1550	390	2780	10100	1320	142	543	105	1620	336	554	998	16.8	46.1	503	474	96.5	49.1	84	95.5	35.8	14	14	14	14	14	14
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93	40.8	319	274	649	341	88.1	742	831	338	28	1540	3990	15	25	15	9150	13000	56900	5490	9890	1020	2380	3310	1090	1280	359	2600	9610	952	98.9	601	102	1460	319	515	928	15	40.1	549	494	99.6	45.6	91.6	85.6	34.8	15	15	15	15	15	15
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00	73.8	573	576	953	566	115	1110	1450	568	65.8	1930	5530	15	51	15	13300	14400	66000	6610	16000	1460	3070	3240	1510	2130	548	3170	14700	1570	173	943	178	2170	590	815	1300	19.4	54.6	928	833	175	96.7	134	154	51.6	15	15	15	15	15	15
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00	24.8	182	186	402	194	52.4	426	509	261	18.4	751	2060	14	14	14	4150	6220	26900	2580	6200	569	1240	1590	601	768	193	1300	5530	483	54.8	296	59.8	800	207	268	544	14	20.6	392	334	55.8	30.8	54.3	50.9	19.3	14	14	14	14	14	14
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51	32.5	310	227	568	261	85.5	482	623	328	24	1170	2760	24	24	24	6590	8400	48100	4540	6000	689	1520	2120	797	871	241	2000	7180	541	69.5	468	83.5	1020	254	368	611	24	34.2	453	416	82.7	46	104	78.7	27.8	24	24	24	24	24	24
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26	52.9	344	420	751	352	107	774	1040	541	43.8	1320	3740	10	39.4	10	8460	12400	56900	4270	10200	1050	2020	2420	1040	1580	448	2260	9640	1260	127	640	115	1730	438	701	1170	17.1	41.5	622	583	100	64.1	92.4	86	40.3	10	10	10	10	10	10
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63	0.023	67.8	62.4	132	62.9	0.023	117	161	0.23	0.023	309	735	0.023	0.023	0.023	1460	1930	10200	894	1540	128	266	491	218	222	45.4	522	1960	135	0.023	95.9	0.023	213	0.115	86.1	121	0.023	0.023	76.1	64.9	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93	24.6	328	188	448	218	60.8	535	702	261	0.018	974	3320	0.018	0.018	0.018	5420	7030	38000	3590	6610	706	1510	1710	673	944	243	1680	6270	744	46	462	85.4	1030	241	354	594	0.018	23.4	438	404	65.2	33.6	67.8	58.9	21.1	0.018	0.018	0.018	0.018	0.018	0.018
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85	146	535	1040	1590	600	253	1570	3290	1870	271	3200	7710	0.017	53.7	0.017	32900	38500	269000	18400	32700	2160	2980	3260	2860	3990	963	6060	22500	2780	627	1090	236	4380	730	1140	1790	27.3	76.1	967	866	185	118	161	172	77.2	0.017	0.017	26.5	0.017	0.017	0.017
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80	20.3	40.7	23.5	19.5	33	10	149	3320	1450	79.2	341	648	10	10	10	2980	3550	39000	2820	1940	127	129	99.1	316	628	149	335	1360	159	156	82.4	30.3	675	68.4	50.2	135	10	10	38.8	34.1	10	10	10	13.8	10	10	10	10	10	10	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86	48.7	79	35.9	67.6	150	90.6	1470	372000	1550000	472	1330	3100	35.4	27.9	9	2000	2340	37400	5230	4050	593	721	403	1370	2880	1080	1210	6570	434	308	344	98	1290	328	151	332	9	14	109	167	48.3	38.3	32.9	51.4	12	9	9	20.9	284	9	9
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64	137	306	689	667	397	180	727	11700	5360	370	2020	3820	15	28.8	15	27400	35700	275000	19700	14400	1090	1390	1340	2040	3390	772	2250	9640	1650	738	613	142	3510	479	667	1330	23.8	45.6	465	422	122	82.8	104	129	68.7	15	15	15	15	15	15
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09																																																			
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00	0.819	3.92	5.12	8.39	4.16	1.37	10.5	407	1570	1.92	19.8	49	0.118	0.296	0.118	157	192	1280	99.6	154	12.9	22.7	26.3	16.8	24.7	6.61	32.2	128	14.8	3.58	7.43	1.49	24.8	4.82	6.91	11.9	0.131	0.464	6.51	6.03	1.22	0.721	1.11	1.19	0.451	0.118	0.118	0.118	0.284	0.118	0.118
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00	107	103	104	104	106	98	89	96.8	102	93.6	94	92.9	91	93.7	103	103	94.1	95.5	91	90.6	95.7	93.6	90.2	95	96.6	95.9	90.9	105	89.9	89.8	97.8	98.9	155	110	93.8	97	92.6	108	95.4	94.6	106	107	103	103	102	103	93.4	85.8	83.2	94.6	89.7
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00	104	104	101	102	104	95.1	93.1	102	107	90.3	93.2	98.9	95.5	96.4	99.7	101	97.5	97.9	94.2	98.7	105	103	94.1	92.1	105	104	99.7	103	87.1	90.4	106	110	164	113	104	108	97	108	103	103	103	105	98.2	101	101	102	98	91.2	89.5	94.1	94
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00	103	104	100	100	108	92.2	85	99.4	105	83.2	92.4	96.9	88.7	92.8	104	101	98.6	102	94.8	104	110	108	94.7	90.2	108	110	102	107	88.3	79.5	109	113	171	111	107	109	95.1	106	107	108	101	102	95.8	97.6	99.1	102	99.1	97.7	100	96.1	93.6
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00	88.3	91.7	92.3	100	111	83.8	74.7	110	68.8	53.3	90.6	97.1	89.8	106	101	90.7	110	122	107	84.2	97.8	92.7	102	90.3	89.3	93.5	107	108	79.8	42	94.7	99.4	158	96.6	90.7	95.6	109	106	97.9	98.6	86.4	87.9	90.4	83	93.7	89.5	105	91.6	93	98.8	99.3
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00	82.5	97.2	92.3	105	112	82.5	71.1	108	41.1	40.1	98.9	96.3	86.8	106	103	91.1	119	131	108	78.5	87.1	86.8	104	87	75.2	83.2	101	110	70.1	23.1	86.2	92.7	144	78.5	82.8	90.2	112	112	88.3	88	83.6	84.5	86.9	79.6	95.9	88.3	105	84.7	84.6	87.8	98.2
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00	133	75.6	191	252	128	58.9	25	1190	562	103	274	68.8	0.1	7.01	0.1	835	1780	369	29.5	76.9	22.6	191	216	41.6	178	19.8	143	106	73.5	38.8	199	15.9	64.5	122	68.3	95.9	158	109	99.2	80.2	31.8	30	81.3	111	16.5	2.63	5.06	0.1	0.1	0.1	0.1
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00	32.5	22	60.8	121	79.5	45	38	454	293	38.9	222	152	6.7	95.3	4.22	1510	3500	789	62.6	785	57.7	179	227	57.5	430	28.7	146	551	93.2	21	158	6.86	54.8	77.6	59.5	89.9	54.6	43.4	66.5	49.3	17.1	16.7	45.2	65.3	17.6	17.9	18.9	2.82	8.62	3.69	0.1
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00																																																			
Metals - (Solid)																																																														
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000			211000	173000	599000	235000	168000	109000	223000	413000	316000	350000	103000	166000	37600	48800	35000	100000	63700	314000	166000	134000	166000	215000	376000	340000	170000	248000	390000	237000	207000	618000	153000	83900	114000	281000	187000	296000	265000	197000	212000	244000	183000	138000	126000	99600	47800	28700	-	39000	41000	36300	33700
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520			5340	47100	42100	40900	15100	6640	4480	5520	7350	8530	9990	22500	257	289	383	27000	13600	25500	38800	21700	>50000	36100	45000	14300	5010	21600	6210	5100	5560	11600	11400	17800	13700	18400	23700	11200	11700	4560	24200	24300	8580	23100	10400	6760	2240	437	-	746	777	955	391
Metals - (Liquid)																																																														
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950			155000	222000	117000	217000	153000	76900	65300	-	49500	-	146000	-	-	-	-	205000	167000	159000	226000	-	223000	165000	165000	92800	146000	149000	47600	76900	103000	53800	148000	225000	189000	131000	199000	87400	188000	174000	170000	168000	68800	166000	174000	178000	33300	-	5870	-	-	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290			9150	38200	13100	15000	23100	15000	7700	-	5240	-	9240	-	-	-	-	24400	18100	7020	8940	6350	7490	7410	4930	5000	3980	8690	5450	7580	14600	4930	12700	26700	23100	7410	15600	6970	5410	10400	26500	16600	11700	10300	35400	33000	10900	-	7930	-	-	-	-
Phenols																																																														
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0439	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.0115	0.01	0.01	0.01	0.0115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0215	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.0112	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.033	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0549	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																																														
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42	0.315	0.0235	-	0.0162	0.19	0.147	0.206	-	0.224	-	0.548	-	-	-	-	0.159	-	0.167	-	-	0.124	-	0.0365	0.108	-	0.162	0.141	-	0.326	-	-	0.049	-	0.0974	0.028	-	0.106	-	-	0.0144	-	0.0526	0.211	-	0.0712	-	-	-	-	-	-
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01	11	12.6	12.1	12.6	11.7	11	10.3	8.51	8.89	11.1	10.9	11.2	7.82	7.23	7.41	11.6	12	11.5	12.6	10.9	11.9	12.3	10.5	11.4	11.2	11.4	11	9.45	10.8	11	10.6	10.9	11.1	10.8	11.8	11.9	8.77	9	12.7	12.3	11.4	11.5	11.3	10.8	7.72	7.5	7.65	7.83	7.55	7.96	7.37
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32	0.178	0.211	-	0.276	0.314	0.166	0.156	-	0.13	-	0.294	-	-	-	-	0.599	-	0.752	-	-	0.358	-	0.299	0.208	-	0.301	0.106	-	0.281	-	-	0.628	-	0.199	0.197	-	0.0942	-	-	0.201	-	0.161	0.404	-	0.0731	-	-	-	-	-	-
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32	0.534	0.633	-	0.828	0.942	0.498	0.468	-	0.39	-	0.882	-	-	-	-	1.8	-	2.26	-	-	1.07	-	0.897	0.624	-	0.903	0.318	-	0.843	-	-	1.88	-	0.597	0.591	-	0.283	-	-	0.603	-	0.483	1.21	-	0.219	-	-	-	-	-	-
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42	0.25	0.305	-	0.458	0.469	0.246	0.209	-	0.117	-	0.565	-	-	-	-	0.763	-	0.865	-	-	0.609	-	0.602	0.307	-	0.561	0.132	-	0.283	-	-	1.81	-	0.213	0.419	-	0.0788	-	-	0.281	-	0.207	1.16	-	0.0732	-	-	-	-	-	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90	1	1	1	1	1	1	1	1	4.03	1.73	1	1	1	1	1	8.48	3.31	2.44	1	1	1	1.63	1	1	1	1	1	1.22	2.9	7.85	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61	12	12	12	12	12	12	12	12	12	29.6	12	12	246	321	170	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	37.5	376	341	311	172	119	178
Asbestos																																																														
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0					0.00		22/05/2018	21/05/2018	-	22/05/2018	21/05/2018	22/05/2018	15/05/2018	-	15/05/2018	-	15/05/2018	-	-	-	-	22/05/2018	-	22/05/2018	-	-	22/05/2018	-	22/05/2018	21/05/2018	-	21/05/2018	22/05/2018	-	22/05/2018	-	-	22/05/2018	-	22/05/2018	22/05/2018	-	22/05/2018	-	-	22/05/2018	-	22/05/2018	22/05/2018	-	22/05/2018	-	-	-	-	-	-
Analysed By	TM048	No units		1371	0	0					0.00		Marcin Magdziarek	Andrzej Ferfecki	-	Andrzej Ferfecki	Lucy Caroe	James Richards	James Richards	-	James Richards	-	James Richards	-	-	-	-	James Richards	-	Barbara Urbanek-Walsh	-	-	Barbara Urbanek-Walsh	-	Lucy Caroe	Andrzej Ferfecki	-	Lucy Caroe	James Richards	-	Lucy Caroe	-	-	Barbara Urbanek-Walsh	-	Lucy Caroe	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	-	-	Lucy Caroe	-	James Richards	Lucy Caroe	-	Andrzej Ferfecki	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0					0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Tremolite	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Actinolite	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-
Comments	TM048	No units		1371	0	0			0		0.00		0	0	-	0	0	0	0	-	0	-	0	-	-	-	-	0	-	0	-	-	0	-	Loose fibres in soil	0	-	0	0	-	0	-	-	0	-	0	0	-	0	-	-	0	-	0	0	-	0	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																																																														
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00		120	104	104	104	105	106	110	107	97.1	96.9	102	97.4	111	108	107	107	116	110	106	103	105	103	102	96.1	92.4	108	101	91.4	86.6	70.2	103	104	99.4	107	107	104	112	104	112	104	115	115	103	104	109	112	109	108	106	104	109
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00		97.5	99.1	97.8	99.1	98.5	98.6	96.6	93.5	97.8	98.3	94.8	96.2	97.7	95.5	97.7	93	81.6	95.7	97.6	98.6	98.6	98.6	96.1	95.1	93	94.6	95	91.8	94.4	96.4	97.7	99.5	96.5	98.6	98.8	97	93.1	97.9	97.6	98.9	98.6	98.2	99.4	98.5	97.4	93.7	96.9	97.1	97.9	98.9	98.5
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00		99.3	97.2	99.3	102	94.7	95.7	92.6	82.7	90.3	96.4	84.4	85.8	96.1	87.8	99.2	86.4	70	89.6	97.2	94.4	93.7	93.5	95.6	83	76.3	90.7	86.3	80.5	87.1	88.5	86.7	94.9	87.8	93.3	91.9	97.3	96.3	99	96.7	97.8	89.7	95.2	95.4	93.2	91.7	94.1	94.7	95.9	100	93.8	95.7
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.0689	0.009	0.009	0.009	0.009	0.009	0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.09	1.8	0.18	0.18	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.067	0.0862	0.007	0.007	0.007	0.007	0.07	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	0.07	1.4	0.14	0.14	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.8	0.08	0.08	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.0668	0.0353	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.0341	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.439	2.6	2.6	0.638	1.21	13.7	-	-	-	0.289	1.15	0.758	0.591	3.26	0.13	0.13	0.13	4.82	0.673	0.418	0.239	0.815	0.13	0.13	0.13	0.13	0.338	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	-	-	-	-	-
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.237	0.122	0.04	0.04	0.04	0.04	0.4	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	0.4	8	0.8	0.8	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																																														
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances					
												Sample ID	TP3BF8V	TP3BA2	TP3BA2	TP3BA2	TP3BA3
												Depth	2	0.4	0.5	1.5	0.5
												Sampled Date	15/05/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018
Carbon																	
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00	4.14	76.5	27.4	6.76	19.7
Metals (Solids)																	
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93	12.3	5.32	6	4.2	6.89
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47	0.143	0.467	0.2	0.02	0.2
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09	34.7	45.6	468	309	300
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00	15.7	27.6	31.6	11.4	28.9
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66	31.1	11.1	11.7	9.08	69.6
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82	0.14	0.14	1.4	0.14	1.4
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87	26.9	19.6	13.4	5.46	19.6
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93	1	2.89	18.6	10.1	10
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57	60.9	121	1680	1050	308
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57	122	89.6	59.5	52.8	228
TPH Criteria Working Group (TPH CWG)																	
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00					
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00					
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00					
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00					
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00	0.04	0.01	0.01	0.01	0.0322
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00	0.04	0.01	0.01	0.0314	0.153
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00	0.04	0.01	0.01	0.0202	0.142
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00	0.04	0.01	0.01	0.0728	19.8
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00	0.1	26.5	1.04	2.62	0.74
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00	0.1	35.2	5.81	1.63	12.7
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00	0.1	93.6	20.1	12.8	47.6
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00	0.1	19.4	4.3	2.58	81.5
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00	0.04	0.01	0.01	0.01	0.15
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00	0.04	0.01	0.01	0.01	0.0433
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00	0.04	0.01	0.01	0.0134	0.0944
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07	0.04	0.01	0.01	0.0482	13.2
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07	0.1	82.8	4.77	6.39	12.8
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14	0.1	745	26.3	23.4	104
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00	8.84	1230	65.4	59	246
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00	1.02	242	15.9	19.6	74.3
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00	0.1	68.3	4.43	6.72	29.9
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01	12	133000	712	1090	6850
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40	8	7580	104	125	309
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33	16	114000	827	1310	16000
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27	14	186000	1820	3580	31700
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93	15	131000	1880	3150	23100
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00	15	197000	2110	4490	36600
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00	14	62700	1060	1500	15700
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51	24	73500	1140	1810	13100
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26	10	117000	1730	3050	24800
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63	0.023	20000	265	449	3850
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93	0.018	72500	1250	1590	12300
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85	0.017	578000	4710	8490	82200
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80	10	141000	411	565	3260
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86	9	<0.45	2360	2650	17400
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64	15	607000	3110	5290	40900
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09		384	3.63	6.18	60.5
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00	0.118	2830	27.1	45.3	388
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00	86.3	93.5	95.7	85.3	84.3
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00	89.4	115	84.1	90.1	90
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00	92.9	115	80.8	94.9	95.3
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00	92.1	94.5	80.5	94	85.7
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00	83	102	79.5	83	73.4
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00	0.1	175	31.3	19.7	143
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00	9.87	2300	112	108	437
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00		2470	144	128	613
Metals - (Solid)																	
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000			30400	14400	148000	112000	122000
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520			243	2950	30600	32200	27500
Metals - (Liquid)																	
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950			-	-	201000	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290			-	-	8130	-	-
Phenols																	
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00	0.01	0.0108	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06	0.01	0.0217	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42	-				
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01	7.3				
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33	-				
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32	-				
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32	-				
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42	-				
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90	1				
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61	290				
Asbestos																	
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0					0.00		-	-	18/07/2018	-	-
Analysed By	TM048	No units		1371	0	0					0.00		-	-	Andrzej Ferfecki	-	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-
Additional Asbestos Components (Using TM048	TM304	No units		1002	0	0					0.00		-				
Analysts Comments	TM304	No units		1002	0	0					0.00		-				
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00		-	-	Not Detected	-	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00		-	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00		-	-	Not Detected	-	-
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00		-	-	Not Detected	-	-
Fibrous Tremolite	TM048	No units		1371	0	0					0.00		-	-	Not Detected	-	-
Fibrous Actinolite	TM048	No units		1371	0	0					0.00		-	-	Not Detected	-	-
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00		-	-	Not Detected	-	-
Comments	TM048	No units		1371	0	0			0		0.00		-	-	0	-	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00		114	91.5	81.6	98	101
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00		98.8	90.9	87.8	99.4	96.1
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00		96.5	81.1	73.3	103	100
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00		0.1	0.2	0.01	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00		0.09	0.18	0.009	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00		0.07	0.14	0.007	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00		0.04	0.08	0.004	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00		0.1	0.2	0.01	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00		0.1	0.2	0.01	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00		-	0.474	0.17	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00		0.4	0.8	0.04	0.4	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00		-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00		-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00		-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00		-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00		-	-	-	-	-

Sample ID	TP3BA3	TP3BA3	TP3BA2V	TP3BA3V	TP3BB2	TP3BB3	TP3BB3	TP3BB4	TP3BB4	TP3BB4	TP3BB4	TP3BB5	TP3BB5	TP3BB5	TP3BB8	TP3BB8	TP3BB8	TP3BB2V	TP3BB3V	TP3BB4V	TP3BB5V	TP3BB8V	TP3BC1	TP3BC1	TP3BC1	TP3BC1
Depth	1.2	2	2.1	3.9	0.7	0.5	1.2	0.5	1	1.5	2.5	0.8	1.5	2	0.5	1	1.5	2.1	2.1	3	2.9	1.9	0.5	1	2	3
Sampled Date	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
Carbon																										
Soil Organic Matter (SOM)	63.8	2.76	2.72	0.772	6.22	5.97	14.3	7.64	15.6	2.93	4.81	1.88	25.7	11.3	4.67	2.1	2.19	0.795	3.64	4.1	2.55	3.41	2.69	3.31	1.57	5.02
Metals (Solids)																										
Arsenic	11.3	13.3	10.9	8.31	6	14.5	10.4	13	6.82	13.2	20.3	8.97	6	25.3	6	9.15	4.47	9.36	10.6	12.5	11.7	8.87	15.5	6	43.7	7.2
Cadmium	0.02	2.24	0.02	0.02	0.2	0.627	0.02	0.2	0.02	0.2	0.2	0.2	0.2	2.76	0.2	0.02	0.02	0.02	0.02	0.28	0.02	0.02	1.11	0.907	1.18	0.407
Chromium	152	15.1	33.2	22.8	96.5	126	159	67.9	217	9	9	595	375	9	386	104	76.9	22	33.3	34.9	30.8	31.6	0.9	401	279	132
Copper	28.7	197	14.2	7.78	15.2	20.6	11.6	27.6	28.7	14	18.9	36	14	21.8	21.1	14.2	13	7.39	15	15.5	12.7	11.4	17.5	14	85.9	26.8
Lead	16.7	561	26.6	15.5	69.7	84.3	32.5	57.7	0.7	7	47.5	22.2	31.2	1050	34.8	20.9	47.1	19.3	28	34.2	27.6	23.1	36.4	29.3	58	20.2
Mercury	0.14	1.4	0.14	0.14	1.4	1.4	0.14	1.4	0.14	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14
Nickel	16.2	24.1	28.5	28.5	6.86	27.5	21.3	40.4	12.8	5.15	23.2	22.1	12.6	21.4	12.3	20	4.95	27.5	24.9	28.8	35	22	19.1	13.2	11.7	10.7
Selenium	5	10	1	1	10	10	3.08	10	6.99	10	10	11.9	11.5	10	10	1	4.08	1	1	1	1	1	2.32	11.3	13	5.39
Vanadium	238	25.1	52.1	40	134	210	243	341	1130	26.7	179	581	373	284	688	311	117	41.2	53.8	56.8	52.4	47	129	374	932	161
Zinc	63.9	1280	111	86	161	245	124	166	36.9	29.3	227	87.7	112	2420	117	125	146	83.5	116	170	120	101	121	237	139	48.4
TPH Criteria Working Group (TPH CWG)																										
Benzene																										
Toluene																										
Ethylbenzene																										
sum of detected mpo xylene by GC																										
Aliphatics >C5-C6	0.0173	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0145	0.01	0.01	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.0667	0.0164	0.0186	0.0141	0.01	0.0181	0.01	0.01	0.01	0.02	0.0226	0.0213	0.01	0.01	0.01	0.01	0.01	0.01	0.0188	0.0348	0.0253	0.0221	0.04	0.04	0.04	0.108
Aliphatics >C8-C10	0.0736	0.012	0.012	0.01	0.01	0.0249	0.01	0.01	0.01	0.0169	0.0147	0.0117	0.01	0.01	0.01	0.01	0.01	0.01	0.0161	0.0247	0.02	0.0179	0.04	0.04	0.101	0.123
Aliphatics >C10-C12	0.305	0.0394	0.01	0.01	0.01	0.0475	0.01	0.01	0.01	0.0232	0.026	0.0245	0.01	0.01	0.01	0.01	0.01	0.01	0.0121	0.0203	0.0106	0.011	0.04	0.089	0.193	0.311
Aliphatics >C12-C16	12.3	7.11	0.1	0.1	3.07	1.1	0.717	1.89	8.44	0.526	4.91	1.97	3.96	2.86	0.489	2.09	2.62	0.1	0.1	1.65	0.1	0.1	0.1	1.37	37.1	9.24
Aliphatics >C16-C21	23.3	22.1	0.1	0.1	14.3	7.69	4.2	13.2	12.2	11.5	16.6	13	3.27	22.2	3.88	8.75	0.887	0.1	0.288	0.1	0.1	0.425	6.74	5.87	166	52.5
Aliphatics >C21-C35	66.9	59.8	0.1	2.83	44.7	29.3	22.1	27.8	46.1	14.1	76.1	147	71.8	80	26.8	50.9	16	0.1	4.2	4.38	0.23	3.35	50.6	53.3	1610	263
Aliphatics >C35-C44	10.3	14.4	0.1	0.357	12.4	9.7	4.85	6.3	11.6	2.14	48.4	49.9	70	3.82	6.31	9.38	2.4	0.1	0.1	0.1	0.1	0.1	20.4	6.68	482	73.1
Aromatics >EC5-EC7	0.0345	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.0161	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.0483	0.01	0.01	0.01	0.01	0.0158	0.01	0.01	0.01	0.0116	0.0102	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0107	0.016	0.0133	0.011	0.04	0.04	0.0746	0.0889
Aromatics >EC10-EC12	0.202	0.0263	0.01	0.01	0.01	0.0316	0.01	0.01	0.01	0.0158	0.017	0.016	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0145	0.01	0.01	0.04	0.06	0.129	0.207
Aromatics >EC12-EC16	34.9	2.17	0.1	0.1	4.87	2.56	0.135	10.5	12	3.98	0.1	3.63	6.38	4.14	1.38	2.69	1.36	0.1	0.422	1.41	0.1	0.1	0.1	11	9.83	3.91
Aromatics >EC16-EC21	240	24.9	0.1	0.1	35.3	20.8	15.8	58.9	38.3	68	4.46	20.3	21.7	22.4	4.01	10.6	1.57	0.1	1.1	0.436	0.1	0.582	6.45	51.3	59.5	29.2
Aromatics >EC21-EC35	424	104	8.35	2.75	115	61.8	47.6	150	96.1	184	12.4	124	72.9	51.1	18.6	54.5	5.71	1.04	22.6	4.15	8.48	14.3	38.8	106	400	114
Aromatics >EC35-EC44	98.2	35.7	1.06	0.598	33.1	20.9	17.4	35.5	37.1	54.1	1.33	84.6	97.2	9.02	8.6	30	0.444	0.453	2.95	0.1	1.49	2.31	20.5	28	180	38.6
Aromatics >EC40-EC44	31.1	12	0.1	0.1	10.1	7.09	6.37	9.67	13.8	17.9	0.1	34.5	48.7	2.49	3.08	12.3	0.1	0.1	0.326	0.1	0.1	0.1	7.63	10.4	57.8	12
Polyaromatic Hydrocarbons (PAHs)																										
Acenaphthylene	6090	213	12	12	592	449	546	4360	1980	249	137	358	103	93.9	32.6	113	12	12	12	12	12	12	181	5140	45.6	275
Acenaphthene	524	285	8	8	125	73.4	127	298	291	73.3	35.5	67.3	113	91.1	34.7	32.5	8	8	8	8	8	8	22.9	609	172	69.4
Anthracene	7830	625	16	16	1610	863	1210	6620	4290	566	149	521	255	302	108	206	27.9	16	16	16	16	16	245	10900	745	506
Benz(a)anthracene	15300	3050	14	14	4960	2290	2790	11700	6770	1390	278	1700	378	479	385	654	71.5	14	14	21.3	14	14	992	18500	4790	1030
Benzo(a)pyrene	12500	3520	15	15	3920	2060	2650	11600	5990	1480	286	1750	250	295	417	611	59.7	15	15	15	15	15	890	13500	4090	1080
Benzo(b)fluoranthene	16800	4820	15	15	6290	2870	3830	14800	9220	1310	436	2330	479	548	602	1030	104	15	15	34.6	15	15	1340	19400	4020	1450
Benzo(k)fluoranthene	7020	1890	14	14	2540	1140	1470	5330	3070	672	149	1050	136	191	259	310	35.9	14	14	14	14	14	446	7810	5280	534
Benzo(g,h,i)perylene	8060	2530	24	24	2400	1440	1790	8200	3620	1010	225	1360	181	190	285	512	53.7	24	24	24	24	24	647	9450	4350	907
Chrysene	13900	2820	10	10	4500	2240	2710	10300	6750	1220	299	1650	495	542	422	677	71.7	10	10	24.8	10	10	945	15200	6640	1080
Dibenzo(a,h)anthracene	2430	596	0.023	0.023	666	367	440	1840	868	214	53.6	346	52.1	40.8	63.7	122	0.023	0.023	0.023	0.023	0.023	0.023	171	2290	929	235
Indeno(1,2,3-cd)pyrene	8260	2040	0.018	0.018	2280	1720	2170	9060	3910	1040	203	1610	167	180	215	407	40.9	0.018	0.018	0.018	0.018	0.018	677	10500	3980	1030
Fluoranthene	44600	5330	0.017	0.017	10700	5940	7270	29600	20300	2860	674	3780	1160	1530	732	1250	162	0.017	0.017	51.2	24.2	0.017	2130	56900	11300	2360
Fluorene	3200	252	10	10	376	329	475	3530	2410	288	122	210	274	266	36.8	63	10	10	10	14.6	10	10	68.3	3170	36.8	155
Naphthalene	34600	2000	9	9	898	1650	2020	6870	4140	935	544	1050	824	393	141	461	69.4	9	9	35.1	9	9	162	12700	1270	2810
Phenanthrene	30100	2540	15	15	4340	2670	4170	22600	17100	1970	541	1980	1550	1580	419	704	97.8	15	15	46.6	15	15	580	37400	6530	1280
Pyrene	29.9	4.86	0.015	0.015	7.79	4.64	5.35	23	15.1	2.43	0.579	3.01	0.858	1.35	0.699	1.08	0.137	0.015	0.015	0.0401	0.015	0.015	1.66	38.4	9.96	1.82
PAH, Total Detected USEPA 16	241	37.4	0.118	0.118	54	30.8	39	170	106	17.7	4.71	22.8	7.27	8.06	4.85	8.23	0.933	0.118	0.118	0.268	0.118	0.118	11.2	262	64.2	16.6
Naphthalene-d8 % recovery**	91.2	91.8	75.1	81.8	79	87.6	96.4	98.7	105	87.6	97.9	96.9	101	85.2	87.7	95.8	79.2	83.6	108	85.6	75.3	85.3	89.1	84.7	93.4	93.1
Acenaphthene-d10 % recovery**	88.2	88.7	77.4	77.6	79.9	81.5	85.8	94.9	94.1	91.9	97.6	93.8	105	84.3	88.5	94	81	82.4	93	88.8	70.4	88.2	89.2	90.6	93.3	86.2
Phenanthrene-d10 % recovery**	89.4	97.5	73.9	87.1	81.7	85.5	80.8	93.9	93	92.7	90.2	93.4	99.5	78.8	93.9	107	82	83.2	93.9	92.9	83.7	96.2	88.8	86.4	91.5	84.8
Chrysene-d12 % recovery**	84.7	95.1	87.1	88.7	89.9	79.8	76.9	93.6	88.5	88	84.7	89.3	85.7	48.1	94.1	99.1	79.1	91.2	84.6	86.4	89.5	99.5	85	84.7	89.7	89
Perylene-d12 % recovery**	84.9	97.1	77.3	84.1	74.8	76.3	76.9	93.7	81.7	83.2	79.9	91.2	70.3	34.8	83.5	95.4	74.4	84.2	84	88.5	82	92.5	82.1	83.4	100	101
Total Aliphatics >C12-C44	113	103	0.1	3.19	74.5	47.8	31.9	49.1	78.3	28.3	146	211	149	109	37.5	71.1	21.9	0.1	4.49	6.03	0.23	3.78	77.7	67.2	2290	398
Total Aromatics >EC12-EC44	797	167	9.41	3.34	188	106	80.9	255	183	311	18.2	233	198	86.7	32.6	97.8	9.09	1.49	27.1	6	9.97	17.2	65.8	196	649	185
Total Aliphatics & Aromatics >C5-C44	910	271	9.41	6.55	263	154	113	304	262	339	164	444	347	196	70.1	169	31	1.49	31.6	12.2	10.3	21.1	144	264	2940	584
Metals - (Solid)																										
Iron	35200	15600	23500	24800	55600	108000	110000	143000	157000	142000	379000	242000	127000	333000	116000	184000	139000	28100	21800	19200	22600	20700	233000	169000	134000	58000
Manganese	9130	290	317	900	20400	8250	8990	20600	28500	1050	5440	28500	1140	8320	10500	11500	7400	592	229	240	472	156	7950	24800	43800	11200
Metals - (Liquid)																										
Calcium	130000	-	78400	-	208000	-	-	-	-	-	75300	-	193000	-	201000	-	53700	-	172000	-	217000	-	-	-	-	-
Magnesium	3280	-	7180	-	43700	-	-	-	-	-	13300	-	36900	-	35600	-	7050	-	19200	-	15800	-	-	-	-	-
Phenols																										
Phenol	0.01	0.023	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.0105	0.01	0.0107	0.0107	0.0119	0.476	0.05	0.0108	0.05	0.01	0.01	0.01	0.01	0.01
Cresols	0.0209	0.0115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0107	0.0107	0.01	0.014	0.05	0.01	0.05	0.01	0.01	0.01	0.01	0.01
Xylenols	0.0313	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.075	0.015	0.075	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.0522	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.49	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																										
Soluble Sulphate 2:1 extract as SO4 BRE																										
pH																										
Sulphate, Total																										
Sulphur, Total																										
Sulphate, Total potential																										
Sulphate, acid soluble (total)																										
Cyanide, Total																										
Exchangeable Ammonia as N																										
Asbestos																										
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	16/07/2018	-	18/07/2018	-	18/07/2018	-	-	-	-	-	08/06/2018	-	08/06/2018	-	08/06/2018	-	08/06/2018	-	11/06/2018	-	11/06/2018	-	-	-	-	-
Analysed By	Lucy Caroe	-	Andrzej Ferfecki	-	Andrzej Ferfecki	-	-	-	-	-	James Richards	-	James Richards	-	James Richards	-	James Richards	-	Lucy Caroe	-	Barbara Urbanek-Walsh	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048																										
Analysts Comments																										
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Comments	0	-	0	-	0	-	-	-	-	-	0	-	0	-	0	-	0	-	0	-	Loose fibres in soil.	-	-	-	-	-
Volatile Organic Compounds (VOCs)																										
Dibromofluoromethane**	97.8	92.1	94.6	96.6	105	99.9	103	102	96.7	104	107	105	106	111	95.8	101	113	110	105	104	95.1	104	108	105	112	94.8
Toluene-d8**	96.3	95.6	90.9	96.5	95.5	98.7	98.3	97.2	97.7	97.9	99.8	99.2	94.7	98.6	95.7	98.9	98.9	98	95.1	97.4	95.9	97	97.6	97.9	97.9	96.9
4-Bromofluorobenzene**	99.9	88	77.9	98.4	89.9	104	103	103	92.2	103	103	87.7	95.8	96.9	87.7	91	98.4	93.8	88.5	89.6	84.4	86.8	98.9	87.4	88.6	83.8
Methyl Tertiary Butyl Ether	2	0.1	0.01	0.1	0.01	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	1.8	0.09	0.009	0.09	0.009	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	1.4	0.07	0.007	0.07	0.007	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.8	0.04	0.004	0.04	0.004	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	2	0.1	0.01	0.1	0.01	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	2	0.1	0.01	0.1	0.01	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	2.6	0.13	0.013	0.225	0.013	0.13	0.13	0.13	0.013	0.13	0.13	0.745	0.283	4.17	0.537	14.2	0.13	0.315	0.392	0.13	1.38	0.305	0.13	0.13	0.13	1.34
Sum of BTEX	8	0.4	0.04	0.4	0.04	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																										
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3BC2	TP3BC2	TP3BC2	TP3BC2	TP3BC3	TP3BC3	TP3BC3	TP3BC3	TP3BC1V	TP3BC2V	TP3BC3V	TP3BD1	TP3BD1	TP3BD1	TP3BD2	TP3BD2	TP3BD2	TP3BD2	TP3BD3	TP3BD3	TP3BD3
Depth	0.3	1	2	3.5	0.5	1	2	3	4.1	3.8	3.3	0.4	1	2	0.4	1	2	2.8	0.3	1	2
Sampled Date	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
Carbon																					
Soil Organic Matter (SOM)	5.36	9.09	3.05	3.84	5.91	1.34	4.81	5.53	5.14	5.19	6.48	1.33	13.4	12.6	11.5	7.15	2.83	6.69	20	29	17.9
Metals (Solids)																					
Arsenic	2.07	2.25	9.71	8.56	9.35	6	2.74	5.49	12.7	12.2	12.8	6	11.6	7.99	6	3.14	6	12.6	34.1	7.87	6.56
Cadmium	0.471	0.716	0.474	0.566	1.21	0.674	0.631	0.359	0.407	0.288	0.664	0.802	2.06	0.895	0.738	0.689	0.615	4.11	17.3	1.08	1.14
Chromium	374	337	15.7	26.4	335	409	293	79.1	33	34.3	31.8	455	41.9	151	480	243	401	121	0.9	210	153
Copper	6.22	8.84	13.6	14.2	20	14	11.9	11	16.2	15.3	16.1	14	16.9	8.88	14	9.6	14	21.7	49.9	17.7	14
Lead	17.7	6.8	21.4	22.2	42.9	14.7	9.53	14.2	35.6	29.5	46.3	12	23.5	11.9	20.5	38.4	13	736	4220	64.8	41.8
Mercury	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	1.4	0.14	1.4	0.14	1.24	1.4	1.4
Nickel	4.11	1.9	17.2	26.1	28.9	2.83	2.58	12.6	23.6	25.4	28.1	9.25	54.7	13	8.06	5.21	4.18	20.1	23.7	18.7	13.3
Selenium	7.54	12	1.48	1.99	10	18.2	10.6	5.11	1	1	1	14.1	10	6.96	11.7	9.1	18.3	3.88	5.07	10.6	10
Vanadium	281	1940	97.8	124	647	2010	1580	341	54.5	57	65.4	432	688	885	499	339	2880	124	69.4	1600	1060
Zinc	69.7	16.2	72.2	92.4	134	28	28.6	53.8	124	118	172	58.5	74.9	53	78.4	136	19	1530	11900	121	104
TPH Criteria Working Group (TPH CWG)																					
Benzene																					
Toluene																					
Ethylbenzene																					
sum of detected mpo xylene by GC																					
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0808	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.0944	0.04	0.04	0.04	0.04	0.04	0.0445	0.04	0.04	0.04	0.04	0.274	0.118	0.04	0.04	0.04	0.0686	0.04	0.04	0.0452
Aliphatics >C8-C10	0.04	0.124	0.04	0.07	0.04	0.04	0.04	0.184	0.04	0.04	0.04	0.04	0.258	0.113	0.04	0.0466	0.0949	0.147	0.04	0.04	0.0881
Aliphatics >C10-C12	0.04	1.19	0.04	0.0952	0.04	0.04	0.0828	1.12	0.04	0.04	0.04	0.0814	0.654	0.463	0.209	0.04	0.708	0.0635	0.04	0.089	0.588
Aliphatics >C12-C16	4.69	3.52	6.12	9.61	9.33	21	7.07	24.9	0.1	0.1	0.1	0.1	29	9.53	28.3	36.6	117	4.05	5.21	16.3	11.3
Aliphatics >C16-C21	57.6	7.54	17.8	28.5	226	581	182	69.8	0.1	0.1	0.1	3.76	39.3	22.3	511	647	1600	85.3	90	91.9	98.2
Aliphatics >C21-C35	111	25.2	156	213	128	212	74.7	180	4.02	3.33	6.74	24.1	151	89.6	135	158	294	59.3	224	94.9	64
Aliphatics >C35-C44	16.1	3.06	64.3	29.9	23.7	14.7	5.41	55.7	0.1	0.1	0.1	3.37	85.5	55	7.08	10.7	11.6	6.96	45.4	21.5	8.59
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.116	0.0501	0.04	0.04	0.04	0.0838	0.0482	0.0477	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.11	0.0685	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.12	0.04	0.0462	0.04	0.04	0.04	0.144	0.04	0.04	0.04	0.04	0.28	0.139	0.04	0.053	0.0764	0.169	0.04	0.0521	0.0881
Aromatics >EC10-EC12	0.04	0.791	0.04	0.063	0.04	0.04	0.0555	0.749	0.04	0.04	0.04	0.0539	0.435	0.309	0.139	0.04	0.472	0.0419	0.04	0.0597	0.392
Aromatics >EC12-EC16	17.4	12.7	1.13	4.88	5.24	8.04	7.74	9.3	0.905	0.1	0.1	3.59	27.8	34.1	35.1	13.8	47.5	1.76	4.25	68.8	233
Aromatics >EC16-EC21	80.4	61	5.53	24.7	69	162	89	57	2.74	0.1	0.1	17.6	115	129	245	211	447	28.7	59.7	354	671
Aromatics >EC21-EC35	234	93.1	39.3	103	97.5	133	90	125	58	29.9	17.8	36.9	289	239	228	160	219	41.2	147	779	1040
Aromatics >EC35-EC44	59.9	26	23.2	25.2	24.3	24.6	21.4	55.2	10.4	3.41	3.47	8.4	141	90.9	47.8	32.6	35.1	6.61	33.8	191	248
Aromatics >EC40-EC44	17.6	8.33	8.43	7.53	8.18	7.84	8.08	22.2	3.5	0.1	0.1	2.45	57.4	35.1	14.1	9.58	9.9	1.25	14.2	57.4	68.9
Polyaromatic Hydrocarbons (PAHs)																					
Acenaphthylene	3180	2710	14.9	138	763	350	1010	62.3	12	12	12	1350	1040	4240	9770	1840	3530	128	79.5	17000	204000
Acenaphthene	254	244	8	55.9	71.5	134	112	460	8	8	8	86.6	207	647	446	127	274	18	153	1950	13000
Anthracene	3510	4160	24	1130	729	604	1460	1010	16	16	16	1870	1800	5060	11800	2160	2970	180	172	19900	167000
Benz(a)anthracene	7670	5610	56.1	1650	2210	2220	3070	2440	21.5	14	23.8	3880	2900	5830	14100	4680	3960	259	187	31900	134000
Benzo(a)pyrene	8740	4810	50.4	1200	2120	2000	2800	2300	22.8	15	15	3340	2310	4080	10600	4160	2980	193	115	31900	106000
Benzo(b)fluoranthene	11000	6100	79.6	1740	3430	3040	4230	2700	36.6	15	37	4730	3450	2480	16300	6470	4350	306	258	47800	161000
Benzo(k)fluoranthene	4340	2540	25.3	673	1000	1080	1500	1300	14	14	14	1660	1200	2250	6250	1960	1680	107	83.8	15100	52800
Benzo(g,h,i)perylene	6940	3200	42	672	1690	1480	2070	1420	24	24	24	2330	1600	2740	7320	3280	2050	132	103	22300	69400
Chrysene	6630	4520	59.5	1550	1960	1860	2810	2400	22.6	17.4	32.8	3310	2520	4570	11800	3720	3740	276	175	27900	112000
Dibenzo(a,h)anthracene	1710	771	0.023	155	397	329	459	280	0.023	0.023	0.023	546	372	534	1860	795	479	35.3	0.023	5600	17800
Indeno(1,2,3-cd)pyrene	7180	3250	44.4	771	1960	1640	2260	1400	0.018	0.018	0.018	2680	1800	3000	8320	3730	2060	138	93.5	24600	78300
Fluoranthene	18200	16200	126	5420	5180	6360	8460	6520	49.4	39.4	53	10700	8000	17500	42600	12000	15400	905	556	78900	400000
Fluorene	2940	1760	19.6	259	347	198	377	469	10	10	10	1110	878	3560	7720	838	2690	113	237	14600	166000
Naphthalene	7480	26000	119	1010	1690	1140	4130	1460	28.7	26.9	20.7	2140	2330	9270	11900	5740	3950	550	1630	29600	380000
Phenanthrene	15800	15400	110	2440	2580	1750	5340	4760	36.7	28.8	37.4	6390	5730	15900	45200	8400	10800	823	567	51900	485000
Pyrene	14.3	11.2	0.0958	4.06	4.2	5.05	6.09	5.21	0.039	0.0278	0.0423	7.45	6.16	13.1	30.7	9.1	11.1	0.682	0.717	53.7	269
PAH, Total Detected USEPA 16	120	109	0.867	22.9	30.3	29.2	46.2	34.2	0.257	0.14	0.247	53.5	42.3	94.7	237	69	72.1	4.85	5.12	475	2820
Naphthalene-d8 % recovery**	91	88.4	93	90.2	87.2	85.7	87.8	91.5	90.6	86.5	87.2	84.2	85.5	90.9	86.2	89.3	85.9	86.6	91.4	88.9	85.7
Acenaphthene-d10 % recovery**	91	91.1	90.6	95	88.9	87.3	81.2	90.7	88.2	83.6	82	85.2	85.8	85	89.6	92.2	97.1	89.7	90.6	88.8	99.3
Phenanthrene-d10 % recovery**	89.5	88.9	87.3	98	88.7	89.4	89.2	87.3	85.4	91.4	87.6	86.3	85.1	88.4	91.5	89.6	87.8	88.5	93.4	85.4	85
Chrysene-d12 % recovery**	91.8	86.3	84.8	102	85.1	85.2	87.6	82.4	81.1	82.4	80.1	83.9	78.5	87.5	87.1	85.4	79.6	78.8	81.6	91.6	79.2
Perylene-d12 % recovery**	99.7	81.9	92.9	89.5	90	90.2	92.1	77.7	95	79.7	75.7	86.1	78.5	79.6	84.4	92.9	76.7	72.9	66.8	99.1	87.1
Total Aliphatics >C12-C44	190	39.3	244	281	387	828	270	331	4.02	3.33	6.74	31.2	305	177	681	852	2020	156	365	225	182
Total Aromatics >EC12-EC44	392	193	69.1	158	196	328	208	247	72.1	33.3	21.2	66.5	572	493	556	417	748	78.3	245	1390	2190
Total Aliphatics & Aromatics >C5-C44	582	234	313	439	583	1160	478	580	76.1	36.6	28	97.8	880	671	1240	1270	2770	235	609	1620	2380
Metals - (Solid)																					
Iron	139000	137000	83800	89500	211000	151000	130000	64000	20700	30600	32700	165000	292000	173000	131000	121000	123000	100000	243000	139000	133000
Manganese	24600	33500	2970	3240	20000	40900	33300	9590	196	200	481	31500	12200	21400	23000	25400	42100	6120	7520	24400	17300
Metals - (Liquid)																					
Calcium	82600	-	183000	-	259000	-	-	150000	-	-	-	-	208000	-	233000	138000	-	196000	-	76600	-
Magnesium	5730	-	40600	-	10900	-	-	16600	-	-	-	-	14900	-	12100	26600	-	28500	-	8790	-
Phenols																					
Phenol	0.0646	0.0204	0.05	0.01	0.01	0.01	0.01	0.0217	0.17	0.01	0.01	0.01	0.01	0.01	0.05	0.0224	0.0112	0.339	0.024	0.0336	0.1
Cresols	0.226	0.0511	0.05	0.01	0.01	0.01	0.01	0.0326	0.283	0.01	0.0167	0.01	0.01	0.01	0.05	0.0448	0.056	0.0113	0.204	0.0672	0.1
Xylenols	0.162	0.0307	0.075	0.015	0.015	0.015	0.015	0.0326	0.15	0.015	0.015	0.015	0.015	0.015	0.075	0.015	0.015	0.015	0.024	0.0784	0.15
Phenols, Total Detected monohydric	0.452	0.102	0.035	0.035	0.035	0.035	0.035	0.0868	0.452	0.035	0.035	0.035	0.035	0.035	0.035	0.0672	0.0672	0.35	0.252	0.179	0.035
Inorganics																					
Soluble Sulphate 2:1 extract as SO4 BRE																					
pH																					
Sulphate, Total																					
Sulphur, Total																					
Sulphate, Total potential																					
Sulphate, acid soluble (total)																					
Cyanide, Total																					
Exchangeable Ammonia as N																					
Asbestos																					
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	11/06/2018	-	11/06/2018	-	06/06/2018	-	-	11/06/2018	-	-	-	-	08/06/2018	-	11/06/2018	11/06/2018	-	11/06/2018	-	11/06/2018	-
Analysed By	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Marcin Magdziarek	-	-	Barbara Urbanek-Walsh	-	-	-	-	James Richards	-	Andrzej Ferfecki	James Richards	-	Renata Bozhkov	-	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048																					
Analysts Comments																					
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	Detected	-	-	-	-	Not Detected	-	Not Detected	Detected	-	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	-	Trace	Not Detected	-	Not Detected	-	Not Detected	-
Comments	0	-	0	-	0	-	-	Loose fibres in soil.	-	-	-	-	0	-	0	Fibre bundles in soil	-	0	-	0	-
Volatile Organic Compounds (VOCs)																					
Dibromofluoromethane**	109	99.4	99.7	101	109	103	98	94.3	104	109	111	110	107	92.1	102	101	94.6	102	106	102	78.3
Toluene-d8**	98.8	90	95.9	96	96.6	97.6	97.5	95.3	98.8	96.8	98.6	98.2	96.4	90.9	95	98	94.4	98.1	98.9	96.6	90.7
4-Bromofluorobenzene**	96.2	74.9	81	92.7	85.1	93.3	89.3	83.2	95.2	88.9	89.7	94.2	87.9	73.5	86.1	101	82.7	87.5	101	93.2	73.4
Methyl Tertiary Butyl Ether	2	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.2	2	2	2	0.1
Benzene	1.8	0.09	0.09	0.18	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.18	1.8	1.8	1.8	0.172
Toluene	1.4	0.07	0.07	0.14	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	1.4	0.14	1.4	1.4	1.4	0.116
Ethylbenzene	0.8	0.04	0.04	0.08	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.0592	0.04	0.04	0.04	0.8	0.08	0.8	0.8	0.8	0.04
p/m-Xylene	2	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.2	2	2	2	0.183
o-Xylene	2	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.2	2	2	2	0.1
Naphthalene	2.6	5.11	2.26	0.439	1.22	0.26	0.219	3.22	5.9	0.13	0.13	6.39	0.13	1.77	0.356	23.2	0.681	11.9	6.44	37.3	236
Sum of BTEX	8	0.4	0.4	0.8	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8	0.8	8	8	8	0.47
Subcontracted: Inorganics																					
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<u>Glan Llyn Residential Soil Data</u>

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	TP3BD1V	TP3BD2V	TP3BD3V	TP3BE1	TP3BE1	TP3BE1	TP3BE2	TP3BE2	TP3BE2	TP3BE2	TP3BE3	TP3BE3	TP3BE3	TP3BE1V	TP3BE2V	TP3BE3V
Depth	2.6	3	2.4	0.5	1	2	0.5	1	2	2.9	0.5	1	2	2.2	3	2.3
Sampled Date	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
Carbon																
Soil Organic Matter (SOM)	3.43	9.02	3.91	1.28	5.6	2.6	26.7	29.7	58.1	47.8	52.2	17.4	10.5	4.79	2.47	2.71
Metals (Solids)																
Arsenic	11.4	15.7	9.69	3.78	2.77	6	3.34	6	6	5.44	9.36	2.58	6	12.1	11.6	10.3
Cadmium	0.343	1.24	0.309	0.842	0.764	0.846	0.02	0.809	0.895	0.421	0.727	0.416	1.32	0.261	0.17	0.246
Chromium	30.9	54.6	35.2	269	313	399	60.9	245	373	161	35.9	178	222	28.4	32.2	37.4
Copper	16.9	22.7	15	12.2	12.3	14.7	4.28	24.5	14	15.3	31.1	11.1	20.4	20.8	19.6	15.4
Lead	28.7	66.7	36.7	17	17.7	31.7	8.62	21.4	19.6	27.7	66	9.68	55.5	28.2	25.8	26.6
Mercury	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4	0.569	1.58	0.14	1.4	0.14	0.14	0.14
Nickel	25.7	26.7	26.2	162	5.45	6.36	7.45	11.8	5.25	12.7	19	7.81	12.7	25.9	27.2	30.1
Selenium	1	1.79	1	11.1	12	19.8	3.44	10	12.1	5.1	1.93	10.8	10	1	1	1
Vanadium	50.7	98.5	55.5	2180	1550	2410	254	779	449	311	86.8	1890	1400	49.2	52.7	60
Zinc	137	209	132	46.4	53.6	52.5	46.9	62.6	69.6	106	230	42.7	118	129	119	126
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0526	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.0691	0.04	0.0727	0.04	0.0571	0.0403	0.04	0.0672	0.0784	0.193	0.0803	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.18	0.04	0.117	0.04	0.04	0.04	0.04	0.0516	0.0448	0.35	0.241	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.0451	0.574	0.04	0.617	0.04	0.157	0.0874	0.04	0.0912	0.212	3.88	5.17	0.04	0.04	0.04
Aliphatics >C12-C16	0.1	0.1	29.1	4.5	4.34	2.83	12.4	11.9	11.4	15.8	10.5	14.9	123	0.1	0.1	0.1
Aliphatics >C16-C21	0.133	3.56	264	18.2	18.3	11.2	75	138	64.7	167	71.6	57.6	2440	0.1	0.1	0.1
Aliphatics >C21-C35	2.39	6.04	56	99.8	64.5	63.4	266	92.2	65.3	113	106	114	856	8.89	0.37	0.1
Aliphatics >C35-C44	0.1	0.1	0.121	27.7	16.7	19.3	61.2	22.4	10.8	12.7	13.1	14.8	44.9	0.345	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.0571	0.04	0.04	0.04	0.0459	0.214	0.044	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.108	0.0429	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.409	0.04	0.104	0.04	0.056	0.0459	0.04	0.0564	0.0594	0.472	0.296	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.382	0.04	0.411	0.04	0.105	0.0582	0.04	0.06	0.141	2.59	3.45	0.04	0.04	0.04
Aromatics >EC12-EC16	0.346	0.1	16.1	1.2	10.5	3.41	34.5	23.7	33.1	63.1	38.7	489	160	0.58	0.332	0.477
Aromatics >EC16-EC21	1.69	2.53	111	14.8	49	21.6	205	155	163	446	203	1900	1050	0.771	0.805	1.7
Aromatics >EC21-EC35	15.9	21.7	45.1	84.3	154	72.8	441	298	400	874	406	2530	881	60.5	10.7	23.7
Aromatics >EC35-EC44	7.09	4.01	6.04	31	53.6	23.9	111	85.7	93.4	185	100	504	175	11.5	4.17	6.74
Aromatics >EC40-EC44	3.19	0.1	2.06	10.4	19.6	7.94	32.8	29.2	27	47.5	30.5	158	58.4	3.77	1.73	2.82
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	20.7	342	16.8	9610	1360	4980	15600	10600	16000	17900	39300	8530	12	12	12
Acenaphthene	25.9	8	619	144	1670	130	340	1380	313	906	1870	3270	840	8	57.3	8
Anthracene	16	30.1	169	230	10300	2200	5130	25200	10900	15700	18200	27000	8100	16	41.7	16
Benz(a)anthracene	44.5	80.9	27.1	1500	27200	5410	11500	48700	34100	43400	38400	40700	14500	39.4	91.5	14
Benzo(a)pyrene	28.5	72.8	15	1800	27100	4950	10100	42000	32000	40900	35700	32300	11600	35.4	72.8	15
Benzo(b)fluoranthene	45.8	135	32.2	2390	41100	7220	13400	52700	47600	61100	52500	46300	16700	57	108	15
Benzo(k)fluoranthene	14	40.9	14	960	13900	2510	5730	24200	15200	17300	17400	16400	6060	14	42.5	14
Benzo(g,h,i)perylene	24	61.9	24	1330	18600	3380	6700	27100	24400	31300	26300	20600	7710	24	48.8	24
Chrysene	40.5	80.9	26.7	1670	27400	4640	9310	40100	29800	36300	28600	31400	12000	34.1	91.8	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	227	4630	799	1660	7360	6270	7290	6230	4590	1700	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	64.7	0.018	1440	21500	3860	7710	29900	27500	34600	29200	21400	7980	27.9	43.5	0.018
Fluoranthene	112	233	204	2350	57600	14600	29800	129000	79400	103000	109000	135000	47700	90.5	192	0.017
Fluorene	19	25.7	930	68.7	4320	703	2730	13500	3440	8640	22700	39200	9200	10	45.5	10
Naphthalene	29	50.9	5920	162	39900	929	22000	23300	17700	34100	40600	110000	26100	57.8	68.2	12.5
Phenanthrene	87.1	164	1490	953	37600	6920	18600	79100	29100	56600	93100	142000	34800	51.1	204	15
Pyrene	0.0813	0.164	0.147	2.37	49.4	10.7	21.4	94.3	58.1	74.4	75.4	90.4	36.8	0.069	0.157	0.015
PAH, Total Detected USEPA 16	0.514	1.23	9.9	17.6	392	70.3	171	654	426	582	614	800	250	0.462	1.26	0.118
Naphthalene-d8 % recovery**	86.2	90	90.3	90	89	85.2	90.1	87.1	90.1	86.9	90.5	76.3	98.7	80.7	82	90.6
Acenaphthene-d10 % recovery**	83.3	83.9	91.2	83.9	86.6	84.6	89.5	87.8	89.4	89.5	90.7	87.8	106	83	84.5	87.3
Phenanthrene-d10 % recovery**	90.5	87.8	91.3	87.9	93.5	86.7	85.6	80.1	82	85.9	84.2	86	96.4	85.6	86.9	84.7
Chrysene-d12 % recovery**	83.1	81.2	80.2	85.7	85.1	87.6	81.3	77.9	82.7	86.4	82.3	82.2	87.9	83.9	81.8	81.4
Perylene-d12 % recovery**	84.7	79.4	80	84.7	86	92.3	76.1	100	92.4	85.9	89.9	70.6	86.4	89.2	80.3	89.7
Total Aliphatics >C12-C44	2.53	9.6	350	150	104	96.7	414	264	152	308	201	201	3470	9.24	0.37	0.1
Total Aromatics >EC12-EC44	25	28.2	179	131	267	122	791	563	689	1570	748	5420	2260	73.3	16	32.6
Total Aliphatics & Aromatics >C5-C44	27.6	37.9	530	282	372	218	1210	827	842	1880	950	5630	5740	82.5	16.4	32.6
Metals - (Solid)																
Iron	29600	25500	29600	160000	136000	149000	86300	105000	161000	80500	63400	69000	140000	31000	28200	29700
Manganese	282	1220	239	36400	37600	44100	9240	18700	29000	12900	3660	25700	26900	461	448	280
Metals - (Liquid)																
Calcium	186000	-	-	-												
Magnesium	12900	-	-	-												
Phenols																
Phenol	0.011	0.05	0.01	0.01												
Cresols	0.033	0.05	0.01	0.01												
Xylenols	0.033	0.075	0.015	0.015												
Phenols, Total Detected monohydric	0.077	0.035	0.035	0.035												
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE																
pH																
Sulphate, Total																
Sulphur, Total																
Sulphate, Total potential																
Sulphate, acid soluble (total)																
Cyanide, Total																
Exchangeable Ammonia as N																
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-												
Date of Analysis	11/06/2018	-	-	-												
Analysed By	Renata Bozhkov	-	-	-												
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-												
Additional Asbestos Components (Using TM048)																
Analysts Comments																
Asbestos Quantification - Total - %	-	-	-	-												
Chrysotile (White) Asbestos	Not Detected	-	-	-												
Amosite (Brown) Asbestos	Not Detected	-	-	-												
Crocidolite (Blue) Asbestos	Not Detected	-	-	-												
Fibrous Anthophyllite	Not Detected	-	-	-												
Fibrous Tremolite	Not Detected	-	-	-												
Fibrous Actinolite	Not Detected	-	-	-												
Non-Asbestos Fibre	Not Detected	-	-	-												
Comments	0	-	-	-												
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	104	105	108	113												
Toluene-d8**	94.1	96.9	100	98.3												
4-Bromofluorobenzene**	79.8	84.6	103	99												
Methyl Tertiary Butyl Ether	0.1	0.1	2	0.1												
Benzene	0.09	0.09	1.8	0.09												
Toluene	0.07	0.07	1.4	0.07												
Ethylbenzene	0.04	0.04	0.8	0.04												
p/m-Xylene	0.1	0.1	2	0.1												
o-Xylene	0.1	0.1	2	0.1												
Naphthalene	10.3	0.13	2.6	0.13												
Sum of BTEX	0.4	0.4	8	0.4												
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-												
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-												
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-												
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-												
Water Analytical M (ad)	-	-	-	-												
Water Gross M(ex)	-	-	-	-												
Water Total M(ar)	-	-	-	-												

Sample ID	TP3CB301	TP3CB302	TP3CB303	TP3CB501	TP3CB3V	TP3CB5V	TP3CD301	TP3CD302	TP3CD3V	TP3CM401	TP3CM402	TP3CM403	TP3CM4V
Depth	0.45	0.65	0.9	0.5	1.3	1.6	0.45	0.65	1.7	0.5	1.2	2	3.6
Sampled Date	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017
Carbon													
Soil Organic Matter (SOM)	8.59	46.7	3.86	7.02	4.52	1.78	2.98	3.5	0.888	4.19	>100	6.59	5.55
Metals (Solids)													
Arsenic	6	4.85	7.92	7.14	9.1	9.75	8.64	6	11.9	7.66	0.652	6	11.4
Cadmium	1.5	0.958	1.93	1.48	0.559	0.22	3.28	0.2	0.168	0.375	0.159	0.978	0.02
Chromium	252	80.3	227	265	33.8	46.4	10.1	137	19.5	25.3	3.01	637	72.8
Copper	28.9	21.7	109	30.5	24.5	18	1790	22.5	9.51	15.2	8.91	14	22.9
Lead	103	39.3	68.7	93.5	44.4	25.2	312	29.5	20.2	32.3	6.34	29.9	30.5
Mercury	1.4	0.14	1.4	1.4	0.663	0.645	1.4	1.4	0.526	0.69	0.14	1.4	0.856
Nickel	17.7	18.4	65	22.6	27.2	37.3	22.8	19.1	32.9	29.2	1.43	2.7	29.4
Selenium	10	9.64	14.4	12.6	1	1	10	10	1	1	1	13.1	1
Vanadium	756	91.8	454	333	66.9	66.4	59.1	223	46.6	48.6	8.94	528	100
Zinc	379	324	178	446	150	116	4930	94.8	82.9	146	17.8	56.6	120
TPH Criteria Working Group (TPH CWG)													
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.0158	0.0109	0.008	0.0101	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.537	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	2.81	4.11	0.1	4.18	0.1	0.1	10.8	10.9	0.1	0.1	37.6	0.166	1.26
Aliphatics >C16-C21	11	15.5	0.1	16.9	0.1	0.1	22.1	26	0.1	0.1	19.3	11.9	2.84
Aliphatics >C21-C35	89.9	78.3	0.1	91.1	4.33	1.83	112	114	0.708	9.47	22.3	28.4	20.8
Aliphatics >C35-C44	41.4	11.8	0.1	27.4	0.1	0.1	25.2	113	0.1	0.1	1.11	7.14	2.61
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.358	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	6.13	7.66	11.4	5.76	0.1	0.1	4.5	5.98	0.1	0.1	104	0.586	0.533
Aromatics >EC16-EC21	32.6	72	46.4	25.7	0.1	0.138	16	32.6	0.1	0.1	90.5	5.95	3.15
Aromatics >EC21-EC35	130	206	59.4	143	13.4	6.42	73.4	144	2.21	18.2	116	27.4	42.4
Aromatics >EC35-EC44	60.2	53.7	15.1	55.5	5.4	2.1	30.9	151	0.658	6.02	15.7	8.87	14.1
Aromatics >EC40-EC44	22.7	16.4	4.97	20.8	1.51	0.55	11.7	71.6	0.1	1.74	3.42	3.98	4.5
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	703	1170	622	291	26.2	12	157	38	12	12	127	12	12
Acenaphthene	105	51.1	19.9	139	8	15.4	43.8	144	8	8	257	57.4	8
Anthracene	1120	2490	415	523	24.4	20.9	293	256	16	16	529	81.8	16
Benz(a)anthracene	4210	7240	1490	3480	63.7	369	1170	3790	14	22.8	1130	527	218
Benzo(a)pyrene	4270	6630	1350	4950	66.6	528	1260	3850	15	20.7	787	513	272
Benzo(b)fluoranthene	6850	10700	2620	5570	83.1	689	1750	5270	15	31.5	1490	679	364
Benzo(k)fluoranthene	2200	4080	830	2400	32.9	299	651	2460	14	14	482	275	145
Benzo(g,h,i)perylene	3290	5400	1110	3400	60.1	400	1050	3170	24	24	562	411	226
Chrysene	3240	7060	1500	3450	34.6	431	1100	4040	10	23.4	1560	875	192
Dibenzo(a,h)anthracene	812	1410	304	815	0.023	98.5	233	839	0.023	0.023	209	102	0.023
Indeno(1,2,3-cd)pyrene	2870	4780	964	2730	43	326	820	2600	0.018	0.018	377	291	170
Fluoranthene	6750	14400	3570	4210	182	406	2280	8320	0.017	34.9	2210	798	268
Fluorene	437	696	259	325	41.6	10	93.1	66.7	10	10	686	30.4	10
Naphthalene	1710	1230	1480	2050	34.9	46.9	302	419	39.5	9	4140	117	59.6
Phenanthrene	3390	6310	2790	2220	251	135	973	3790	15	31.5	6470	633	136
Pyrene													
PAH, Total Detected USEPA 16	47	84.1	21.7	40.4	1.06	4.17	14.1	45.6	0.118	0.192	22.8	6.21	2.3
Naphthalene-d8 % recovery**	99.5	113	102	107	117	115	108	103	124	113	104	98.2	122
Acenaphthene-d10 % recovery**	94	107	97.1	102	112	105	104	93.7	111	102	103	94	118
Phenanthrene-d10 % recovery**	94.1	106	95.9	101	110	103	102	94.6	110	101	102	93.7	115
Chrysene-d12 % recovery**	98.7	108	95.1	105	103	102	104	100	107	97.3	103	96	114
Perylene-d12 % recovery**	104	112	97.1	112	107	95.1	111	94.4	99.3	89.5	100	98.9	121
Total Aliphatics >C12-C44	145	110	0.1	140	4.33	1.83	170	264	0.708	9.47	80.3	47.6	27.5
Total Aromatics >EC12-EC44	229	340	132	230	18.8	8.66	125	333	2.86	24.2	327	42.8	60.2
Total Aliphatics & Aromatics >C5-C44													
Metals - (Solid)													
Iron	128000	102000	276000	162000	34100	39700	169000	141000	36900	31800	1160	127000	39800
Manganese	19200	<0.13	26800	24000	807	1640	4020	15100	1590	750	133	28800	2460
Metals - (Liquid)													
Calcium	199000	102000	160000	169000	-	-	118000	174000	-	37200	2090	265000	-
Magnesium	14100	15000	5700	10200	-	-	18500	19000	-	11200	279	12700	-
Phenols													
Phenol	0.01	0.01	0.011	0.0112	0.01	0.01	0.01	0.0111	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.0224	0.01	0.01	0.01	0.01	0.01	0.0133	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	0.0933	0.111	0.0661	0.16	-	-	0.357	0.17	-	0.0972	0.0621	0.0917	-
pH	10.7	11.5	12.3	10.9	8.48	8.86	10.5	12.1	8.29	8.08	7.81	12.7	8.24
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.319	0.272	0.265	0.256	-	-	0.176	9.28	-	0.052	0.398	0.31	-
Sulphate, Total potential	0.957	0.816	0.795	0.768	-	-	0.528	27.8	-	0.156	1.19	0.93	-
Sulphate, acid soluble (total)	0.326	0.199	0.466	0.557	-	-	0.39	0.846	-	0.0481	0.02	0.628	-
Cyanide, Total	1	4.21	13.9	1.13	1	1	1	1.64	1	1	1	1	1
Exchangeable Ammonia as N	12	18.3	12	12	342	141	14.8	12	170	12	12	12	246
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	0.001	-	-	-	0.001	-	-	-	-	-	-
Date of Analysis	06/10/2017	06/10/2017	06/10/2017	06/10/2017	-	-	06/10/2017	06/10/2017	-	06/10/2017	06/10/2017	06/10/2017	-
Analysed By	Renata Hatos	Renata Hatos	Renata Hatos	Renata Hatos	-	-	Renata Hatos	Renata Hatos	-	Renata Hatos	Renata Hatos	Renata Hatos	-
Asbestos Quantification - PCOM Evaluation - %	-	-	0.001	-	-	-	0.001	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	None	-	-	-	None	-	-	-	-	-	-
Analysts Comments	-	-	N/C	-	-	-	N/C	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	0.001	-	-	-	0.001	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Detected	Not Detected	-	-	Trace	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Comments	0	0	Fibre bundles in soil	0	-	-	Loose fibres in soil	0	-	0	0	0	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CA1	3CA1	3CA1	3CA2	3CA2	3CA2	3CA3	3CA3	3CA3	3CA4	3CA4	3CA4	3CA5	3CA5	3CA5	3CA6	3CA6	3CA7	3CA7	3CA8	3CA8	3CA1V
Depth	0.5	1	1.5	0.5	1.5	2.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1.5	0.5	1.5	0.5	1	2.3
Sampled Date	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	30/07/2018	30/07/2018	07/08/2018
Carbon																						
Soil Organic Matter (SOM)	6.15	17.4	16.7	5.65	55.3	6.19	14.4	10.8	5.72	6.83	22.8	8.28	9.38	16.7	8.24	3.79	4.67	6.24	5.72	1.46	4.83	5.24
Metals (Solids)																						
Arsenic	8.07	4.25	4.94	8.52	3.53	7.05	6.25	18.6	12.8	9.27	7.43	6	9.35	7.92	6	6.29	6.77	9.54	2.62	5.12	12.6	12.6
Cadmium	0.114	0.02	0.142	0.02	0.0729	0.2	0.02	0.02	0.2	0.2	1.2	0.211	0.455	1.67	0.2	0.02	0.02	0.381	0.02	0.02	0.2	0.0351
Chromium	41.4	15.1	9.23	104	6.89	539	72	81.4	92.1	143	200	584	155	168	385	167	235	147	112	300	303	34.3
Copper	15.3	13.5	13.2	17.7	10.2	15.2	18.1	26.2	42	20.1	47.3	19	22.8	28.3	16.2	13.4	19.3	18.6	7.11	14.4	45.1	34.7
Lead	44.5	21.1	17.9	58.2	10.6	10.5	24.6	55.8	88	59.5	91.7	55.9	88.7	99.8	23.3	29.7	48.3	63.9	10.4	11.9	17.9	37.3
Mercury	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	1.4	0.14	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	1.4	0.14
Nickel	12	8.52	11.8	16.4	6.33	14.7	17.3	32.5	39.9	16.7	14.6	12.7	22.6	17.3	2.07	9.68	12.8	17.6	5.46	5.29	35.3	27.1
Selenium	1.2	1.44	1.5	2.99	1	13.3	1.89	4.2	10	10	12.6	15.5	10	12	10.6	3.84	4.84	10	3.92	9.33	10	1
Vanadium	67.4	20.2	20.9	149	17.1	454	261	165	613	210	223	415	304	302	291	230	369	213	167	244	338	49.8
Zinc	191	86.3	113	289	67.8	47.2	118	205	306	178	1050	227	308	635	175	122	296	218	51.3	56.6	108	136
TPH Criteria Working Group (TPH CWG)																						
Benzene																						
Toluene																						
Ethylbenzene																						
sum of detected mpo xylene by GC																						
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.0286	0.0106	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0136	0.0154	0.01	0.01	0.01	0.01	0.0241	0.01	0.01	0.01
Aliphatics >C8-C10	0.0456	0.01	0.0195	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0124	0.0143	0.01	0.01	0.01	0.01	0.0197	0.01	0.01	0.01
Aliphatics >C10-C12	0.134	0.01	0.0282	0.01	0.01	0.01	0.0132	0.01	0.01	0.0121	0.01	0.01	0.0249	0.0363	0.01	0.01	0.0134	0.0132	0.035	0.01	0.01	0.01
Aliphatics >C12-C16	3.97	1.62	2.28	5.62	8.91	0.1	3.27	2.28	2.96	2.34	4.95	9.14	1.86	2.52	0.298	1.52	3.04	2.14	0.768	0.786	1.34	0.1
Aliphatics >C16-C21	12.9	10.9	12.5	26	83.5	0.259	25.9	13.3	14.6	13.4	37.1	23.9	10.5	25	3	6.58	16.3	9.73	5.57	6.09	6.51	0.1
Aliphatics >C21-C35	74.5	34.7	43.2	146	65.7	16.5	89	51.7	65.1	51.2	66.5	47.9	60.7	53.9	31.3	45	73.6	47.9	25.4	28.7	32.1	1.04
Aliphatics >C35-C44	41.1	8.85	15.5	53.2	13.2	2.15	40.7	15.2	19.4	16.4	16.2	11.9	26.8	12.1	25.5	17.3	35	15.9	6.18	7.44	8.73	0.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.0308	0.01	0.013	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0131	0.01	0.01	0.01
Aromatics >EC10-EC12	0.0891	0.01	0.0184	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0158	0.0242	0.01	0.01	0.01	0.01	0.023	0.01	0.01	0.01
Aromatics >EC12-EC16	5.43	9.65	70.7	3.92	31.7	0.287	13	5.28	6.87	5.01	19.5	6.54	3.68	16.8	1.03	2.2	6.09	4.39	2.83	0.758	1.56	0.161
Aromatics >EC16-EC21	39.9	98.2	418	23.5	442	3.92	154	45.9	66.5	33.7	324	81.3	27.8	236	7.03	12.2	37.1	30.9	14.4	12.9	13.7	1.03
Aromatics >EC21-EC35	146	432	755	118	1420	26.6	500	161	241	109	1030	370	104	701	54.3	54.4	151	85.3	45.9	71.6	72.1	15.9
Aromatics >EC35-EC44	73.3	134	202	74	311	7.07	155	49.6	78.7	40.3	259	114	43.8	185	51.6	27	64.2	29.2	16.8	23.8	26.1	9.1
Aromatics >EC40-EC44	29.4	45.3	68.1	31.6	99.2	2.27	57.2	16.7	27.4	15.2	81.1	38.2	15.7	59.5	26.3	10.5	26.2	10.5	6.34	7.71	9.03	3.63
Polyaromatic Hydrocarbons (PAHs)																						
Acenaphthylene	890	1490	410	429	15600	382	3740	1480	1580	1060	9850	4600	962	5320	99.4	167	1120	533	801	12	249	12
Acenaphthene	172	314	114	77	647	21.3	557	137	129	185	393	215	138	263	80	26.4	180	89.4	135	275	114	8
Anthracene	1850	4560	1280	701	47500	529	6520	1940	2450	1450	14900	4310	1460	13900	224	186	1580	542	1030	472	550	16
Benz(a)anthracene	4290	18100	3790	1750	97300	1840	24000	5890	9560	4090	58600	22500	4080	29300	1630	596	4250	1720	2580	4180	2700	41.4
Benzo(a)pyrene	4010	13300	4770	1490	96900	2440	23300	6060	8290	4120	54200	28300	3740	26400	1950	584	3650	1660	2370	5300	2760	48.1
Benzo(b)fluoranthene	6510	24800	6120	2030	139000	3600	37800	8590	12900	6250	72400	48800	6010	40900	2740	946	5580	2440	4010	8100	3690	82
Benzo(k)fluoranthene	2280	10200	2330	533	46100	1110	12900	3190	4160	2460	28200	11700	2220	16200	1140	324	2200	778	1500	2540	1300	14
Benzo(g,h,i)perylene	2980	10100	3080	1040	76200	2010	18100	4270	6080	3190	37700	22800	2900	19900	1340	449	2630	1120	1790	3070	1840	41.3
Chrysene	4260	17500	3640	1560	95400	2420	23400	5160	8900	3910	54500	22700	3750	27100	1810	582	3750	1500	2330	4190	2270	58.3
Dibenzo(a,h)anthracene	736	3140	1030	231	18100	369	5320	1200	1700	896	11700	6230	839	5800	343	96.5	723	301	517	775	430	0.023
Indeno(1,2,3-cd)pyrene	2780	9880	3120	862	102000	2090	15900	5470	6980	2750	42800	19200	2530	25000	1270	580	2360	1590	1540	3780	1920	31.6
Fluoranthene	9660	21700	5490	2730	241000	2410	48200	12200	18400	8170	110000	32700	8980	59300	2300	1240	8550	3500	6150	5200	4940	86.6
Fluorene	735	1350	352	360	10600	21	1670	782	767	618	4330	910	584	4370	81.8	93.3	841	308	705	118	165	10
Naphthalene	977	1260	262	415	4090	56.3	2120	1790	1630	2330	3290	1590	1520	2900	148	384	2340	1240	1780	66.2	451	9
Phenanthrene	5670	14000	3300	2150	103000	141	13400	5630	5880	3860	38500	7470	4220	29900	895	617	4880	1850	3930	1990	2020	49.3
Pyrene	7.1	15.4	3.83	1.73	193	2.74	35.7	9.52	14.9	6.53	89	33.6	6.6	41.5	2.19	0.906	6.54	2.65	4.46	4.97	4.13	0.0756
PAH, Total Detected USEPA 16	54.9	167	42.9	18.1	1290	22.2	273	73.3	104	51.9	630	268	50.5	348	18.2	7.77	51.2	21.8	35.6	45	29.5	0.514
Naphthalene-d8 % recovery**	95.7	96.3	65.6	71	89.5	96.1	92.2	93.2	93	91.2	91.7	91.3	95.6	97.8	93	94.6	87.1	90	93.9	92.5	94	91.7
Acenaphthene-d10 % recovery**	107	92	85	106	72.5	91.1	97.9	95	95	99.5	88.5	98	98.1	96.3	94.8	92.8	89.4	90.5	96.1	95.1	91	95
Phenanthrene-d10 % recovery**	100	118	98.4	98.9	76.5	84.7	94.1	88.3	101	104	95.1	98.9	99.3	92.5	97.2	92.8	91.7	86.5	98.5	96	93.4	94.6
Chrysene-d12 % recovery**	96.3	117	71.9	89.1	79.5	81.5	98.9	94.8	95.2	110	95.3	106	103	97.4	90.9	86	95.4	92.1	100	92.2	92.8	95.1
Perylene-d12 % recovery**	95.1	93.9	80.3	88.7	91	79.5	112	107	92.9	114	113	120	109	108	88.8	87.5	95.5	96.6	106	105	93.1	102
Total Aliphatics >C12-C44	133	56.1	73.4	231	171	18.9	159	82.6	102	83.3	125	92.8	99.8	93.5	60.1	70.4	128	75.7	38	43	48.7	1.04
Total Aromatics >EC12-EC44	264	674	1450	219	2200	37.9	823	262	393	188	1630	572	180	1140	114	95.8	258	150	79.9	109	113	26.2
Total Aliphatics & Aromatics >C5-C44	397	731	1520	449	2370	56.8	981	344	495	272	1760	665	280	1230	174	166	386	226	118	152	162	27.2
Metals - (Solid)																						
Iron	45000	24100	15600	54800	8780	118000	68000	72900	185000	85700	102000	109000	97500	113000	124000	80400	75900	72800	44100	132000	255000	20700
Manganese	3730	2790	1890	10200	523	26200	7800	12700	9430	9510	33100	27600	11500	20800	21400	12300	14300	9310	9660	33900	21400	287
Metals - (Liquid)																						
Calcium	128000	-	211000	-	137000	-	194000	-	171000	85000	-	50200	57500	47900	-	-	-	-	-	-	-	-
Magnesium	21900	-	16000	-	14100	-	39500	-	9800	13900	-	4320	7310	8570	-	-	-	-	-	-	-	-
Phenols																						
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0104	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.114
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0103
Xylenols	0.0226	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.124
Inorganics																						
Soluble Sulphate 2:1 extract as SO4 BRE																						
pH																						
Sulphate, Total																						
Sulphur, Total																						
Sulphate, Total potential																						
Sulphate, acid soluble (total)																						
Cyanide, Total																						
Exchangeable Ammonia as N																						
Asbestos																						
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	10/08/2018	-	09/08/2018	-	10/08/2018	-	10/08/2018	-	01/08/2018	10/10/2018	-	10/10/2018	10/10/2018	10/10/2018	-	-	-	-	-	-	-	-
Analysed By	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	James Richards	Andrzej Ferfecki	-	Andrzej Ferfecki	James Richards	Marcin Magdziarek	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																						
Analysts Comments																						
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Comments	0	-	Loose fibres in soil	-	0	-	0	-	Material typical of asbestos cement debris	0	-	0	0	0	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																						
Dibromofluoromethane**	95.7	93.8	105	101	99.3	109	108	102	97.7	110	103	111	105	109	108	112	103	105	101	105	113	104
Toluene-d8**	95.1	91.5	94.4	102	94.6	96	97.9	98.7	93.6	95.9	98.8	99.2	94.9	98	99.3	97	100	99.1	109	99.9	100	98.9
4-Bromofluorobenzene**	87.6	86.3	98.1	95.1	89.9	87.4	85.8	95.8	81.2	93.6	94.2	96.3	85.8	95.9	89.9	96.6	98.9	96.9	99.8	102	99.7	90.3
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.303	0.758	0.13	0.13	0.825	0.28	0.318	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																						
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	3CA2V	3CA3V	3CA4V	3CA5V	3CA6V	3CA7V	3CA8V	3CB2	3CB2	3CB2	3CB6	3CB7	3CB7	3CB8	3CB9	3CB2V	3CB6V
Depth	2.9	2	2.2	1.8	2.2	2.2	1.8	1	2.2	2.8	0.5	0.5	0.9	0.3	0.5	3	1.2
Sampled Date	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	30/07/2018	13/08/2018	13/08/2018	13/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018	01/08/2018	13/08/2018	01/08/2018
Carbon																	
Soil Organic Matter (SOM)	5.9	1.36	1.43	6.62	1.72	1.57	1.91	5.59	74	30	7.12	5.67	5.88	4.9	7.55	0.893	0.75
Metals (Solids)																	
Arsenic	12.1	9.17	8.92	13.2	8.64	10.8	10.6	16.2	3.14	3.16	8.49	7.27	6.56	9.72	11.1	8.73	8.85
Cadmium	0.101	0.02	0.02	0.347	0.02	0.02	0.02	0.887	0.122	0.154	0.638	0.02	0.02	0.435	1.31	0.02	0.02
Chromium	34	34.2	36.7	24.8	34.7	29.6	36.8	127	12.2	15	100	120	271	33.8	113	25.2	35.7
Copper	24.2	20.1	21.2	27.5	20.1	13.6	16	18.6	16.5	10.5	15.6	13.6	15.5	16.4	22.1	8.86	13.1
Lead	40.1	22.9	20.9	45.3	21.1	21.3	25.9	84.4	30.1	23	77.5	40.2	28	59.4	319	14	22.8
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	28.7	36.6	37.4	29.3	33.4	29.9	28.5	19	7.25	8.2	21.6	11.6	12.3	16.9	17	27.6	25.3
Selenium	1	1	1	1	1	1	1	10	1	1	1.7	3.45	8.14	1.34	3.27	1	1
Vanadium	52.1	51.2	52.6	41.7	50.7	48	53.5	469	15.7	28.8	83.4	188	940	66.4	251	40.2	50.6
Zinc	149	109	125	145	123	90.2	104	292	105	92.5	222	191	109	258	1260	80.7	97.4
TPH Criteria Working Group (TPH CWG)																	
Benzene																	
Toluene																	
Ethylbenzene																	
sum of detected mpo xylene by GC																	
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.019	0.01	0.01	0.01	0.0257	0.0472	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0123	0.01	0.01	0.01	0.0185	0.0288	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0347	0.01	0.01	0.01	0.0534	0.0368	0.01	0.01	0.01
Aliphatics >C12-C16	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5.47	6.29	1.78	1.8	10.8	2.05	1.67	3.9	0.1	0.1
Aliphatics >C16-C21	0.1	0.1	0.1	0.1	0.1	0.1	0.1	27.6	62.8	17	6.84	4.17	12.8	8.42	12.2	0.1	0.131
Aliphatics >C21-C35	8.52	1.58	1.2	3.86	0.1	0.1	0.146	78.7	81.3	21.3	32.9	71.1	68.2	44.2	52.9	0.1	2.73
Aliphatics >C35-C44	1.73	0.1	0.1	0.1	0.1	0.1	0.1	39.6	19.5	1.99	12.5	66.3	23.8	15.3	23.6	0.1	0.276
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0123	0.0196	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0235	0.01	0.01	0.01	0.0349	0.0242	0.01	0.01	0.01
Aromatics >EC12-EC16	0.1	0.1	0.164	0.1	0.1	0.1	6.53	8.18	255	10.7	2.08	5.49	3.5	1.81	0.1	0.1	0.1
Aromatics >EC16-EC21	1.83	0.312	1.35	2.37	0.1	0.1	51.5	43.6	4330	172	10.8	28.9	22.7	9.02	4.63	0.32	0.1
Aromatics >EC21-EC35	20.4	4.22	8.13	21.9	3.99	3.02	160	152	5480	440	44.8	110	82.8	35	19	2.18	14.9
Aromatics >EC35-EC44	4.8	0.29	0.624	4.29	0.1	1.95	47.7	159	826	97.6	21	49.3	32.7	16.5	1.47	2.64	1.19
Aromatics >EC40-EC44	1.22	0.1	0.1	0.882	0.1	0.763	15.9	76.7	215	30.2	8.13	18.4	11.9	6.12	0.1	1.88	0.1
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	12	12	28.9	22	12	12	12	855	61500	1860	276	463	367	76.3	158	12	12
Acenaphthene	8	8	8	8	8	8	8	71.8	2720	61.4	33.7	75.4	87	20.3	31.8	8	8
Anthracene	16	16	22.3	27.4	16	16	16	1550	204000	4860	604	829	878	168	268	16	16
Benz(a)anthracene	76.3	65	100	223	14	14	38	4110	358000	14900	1610	2300	2440	378	940	21	14
Benzo(a)pyrene	109	64	124	245	15	15	43.3	3670	303000	13500	1360	2130	2090	335	754	20.9	15
Benzo(b)fluoranthene	148	98.5	190	356	15	15	63.7	4980	378000	21900	2100	3530	3680	611	1330	26.2	15
Benzo(k)fluoranthene	52.1	44.6	63.1	118	14	14	19.7	2040	159000	6810	726	1260	1210	161	406	14	14
Benzo(g,h,i)perylene	80.8	47.9	103	146	24	24	24	2600	223000	9860	814	1600	1550	224	516	24	24
Chrysene	88.6	55.4	103	246	10	10	37.7	3450	308000	14500	1340	2000	2100	366	770	25.1	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	35	0.023	0.023	0.023	675	46100	2340	201	469	454	59.5	124	0.023	0.023
Indeno(1,2,3-cd)pyrene	109	39.8	148	214	0.018	0.018	34.3	3210	194000	9140	752	1320	1330	276	422	0.018	0.018
Fluoranthene	114	118	169	394	0.017	0.017	55.1	9730	1260000	33800	3160	4470	5120	828	1740	56.9	0.017
Fluorene	10	10	10	10	10	10	10	609	76800	787	214	328	204	99.4	92.3	10	10
Naphthalene	9	9	9	13.2	9	9	9	719	13300	735	266	1350	1260	272	397	9	9
Phenanthrene	65.1	30.7	53.3	108	15	15	27.6	5290	831000	8420	1550	2830	2870	539	938	15	15
Pyrene	0.102	0.0953	0.166	0.325	0.015	0.015	0.0493	6.83	953	25.1	2.29	3.51	3.96	0.605	1.4	0.0404	0.015
PAH, Total Detected USEPA 16	0.945	0.659	1.27	2.47	0.118	0.118	0.369	50.4	5370	169	17.3	28.5	29.6	5.02	10.3	0.191	0.118
Naphthalene-d8 % recovery**	92.3	87.8	90	99.2	90.5	88	90.4	111	109	92.1	81.5	93.6	88.5	93.1	77.8	97.7	77.8
Acenaphthene-d10 % recovery**	91.7	88	82.3	98.3	87.7	84.1	85.6	116	116	96.4	86.5	87.6	85.9	91.8	83.3	94.7	79.1
Phenanthrene-d10 % recovery**	83.1	93.2	85.2	99.8	85.9	87.5	91.1	114	117	98.3	85.8	89.9	86	91.5	86.3	94	81.2
Chrysene-d12 % recovery**	94.7	96.2	89.9	93.7	79.4	83.7	87	100	111	102	74.7	79	76.1	88.6	75.8	85.5	76.7
Perylene-d12 % recovery**	94.2	101	91	93.6	81	85.4	95.9	100	105	94.4	70	77.2	75.5	97.9	69.5	85.7	81
Total Aliphatics >C12-C44	10.2	1.58	1.2	3.86	0.1	0.1	0.146	151	170	42	54	152	107	69.6	92.6	0.1	3.14
Total Aromatics >EC12-EC44	27	4.82	10.3	28.6	3.99	4.97	266	362	10900	720	78.7	194	142	62.3	25.1	5.14	16.1
Total Aliphatics & Aromatics >C5-C44	37.3	6.4	11.5	32.4	3.99	4.97	266	514	11100	762	133	346	249	132	118	5.14	19.2
Metals - (Solid)																	
Iron	27500	24200	29500	28000	21700	29400	32600	94800	12100	23000	53900	85900	112000	53000	109000	32100	31000
Manganese	417	383	472	776	487	941	332	12100	735	1910	4660	11800	26800	3940	10400	1030	418
Metals - (Liquid)																	
Calcium	175000	111000	164000	-	85500	-	74000	-	18000	-	94700	-	-	-	-	93200	-
Magnesium	14400	24500	17700	-	9830	-	6590	-	2820	-	13400	-	-	-	-	26200	-
Phenols																	
Phenol	0.236	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.0411	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0132	0.012	0.0108
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.277	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE																	
pH																	
Sulphate, Total																	
Sulphur, Total																	
Sulphate, Total potential																	
Sulphate, acid soluble (total)																	
Cyanide, Total																	
Exchangeable Ammonia as N																	
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	01/08/2018	01/08/2018	03/08/2018	-	09/10/2018	-	10/10/2018	-	10/10/2018	-	10/10/2018	-	-	-	-	01/08/2018	-
Analysed By	Lucy Caroe	James Richards	Andrzej Ferfecki	-	Marcin Magdziarek	-	Andrzej Ferfecki	-	James Richards	-	Lucy Caroe	-	-	-	-	Marcin Magdziarek	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																	
Analysts Comments																	
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Detected	-
Comments	Soil containing material typical of asbestos cement	0	0	-	Loose fibres in soil	-	0	-	0	-	0	-	-	-	-	0	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	104	105	102	103	105	103	104	107	105	111	103	106	106	106	106	109	103
Toluene-d8**	97.7	95.9	98.7	95	98.5	97.4	96.9	96.6	99.3	98.9	98.3	100	100	100	101	99.9	96.6
4-Bromofluorobenzene**	88.5	87.6	96.8	87.6	92	95.4	86.7	86.5	96.5	99.5	94.3	99.9	94.8	99.2	97.2	89.7	93.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.221	0.13	0.13	0.13	0.13	0.26	0.173	0.368	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.181	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CB7V	3CB8V	3CB9V	3CC2	3CC6	3CC6	3CC6	3CC7	3CC7	3CC8	3CC8	3CC9	3CC9	3CC2V	3CC6V	3CC7V	3CC8V
Depth	1	0.4	1	1	0.5	1	1.5	0.5	0.9	0.5	1	0.5	1	1.5	1.6	1	1.1
Sampled Date	30/07/2018	30/07/2018	01/08/2018	13/08/2018	01/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	01/08/2018	01/08/2018	13/08/2018	01/08/2018	30/07/2018	30/07/2018
Carbon																	
Soil Organic Matter (SOM)	4.59	4.74	3.28	46.7	2.34	5.91	4.03	5.65	4.29	25.3	11.2	2.78	3.29	1.32	0.922	0.89	1.55
Metals (Solids)																	
Arsenic	10.7	12.4	12	12.5	9.04	6	10.4	12.5	12.8	9.05	8.82	6.61	8.07	8.07	13.7	9.39	11.3
Cadmium	0.02	0.167	0.02	0.02	0.02	0.376	0.411	0.02	0.02	0.02	0.167	0.0399	0.172	0.02	0.02	0.02	0.02
Chromium	35.4	28.8	34.8	23.4	19.4	167	98.1	6.3	78.3	182	35.9	144	39.4	40.2	27.7	25.3	37.3
Copper	27.8	24.5	15	42.8	14.3	14.8	15.4	18.4	20.6	22.6	17.6	8.35	21.2	24.4	8.75	8.16	17.1
Lead	39	37	29.3	73	35	94.6	60.2	58.2	56.4	69.2	108	41	52.2	17.8	23.4	16.6	25.3
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	29.5	31.7	26.7	35.3	22.3	24.9	17.5	17.6	24.6	21.1	19.8	14.2	19.2	35.2	34.7	28.6	37.4
Selenium	1	1	1	1	1.02	3.9	2.39	1	1.03	1.82	1.04	6.62	1.03	1	1	1	1
Vanadium	63.3	45.8	52.4	47.9	76	164	122	71.7	132	247	101	130	63.5	51.2	48.1	41.1	54.2
Zinc	190	140	98.1	264	139	623	220	201	235	279	358	172	218	111	86.3	79.8	105
TPH Criteria Working Group (TPH CWG)																	
Benzene																	
Toluene																	
Ethylbenzene																	
sum of detected mpo xylene by GC																	
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0148	0.01	0.0234	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0117	0.01	0.0164	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0138	0.01	0.0351	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	1.13	0.1	0.1	2.13	0.1	0.1	0.1	1.84	2.24	5.47	1.65	0.201	2.27	0.1	0.698	0.1	0.1
Aliphatics >C16-C21	4.11	0.1	0.771	11.5	1.04	2.93	2.6	11.4	9.5	22.3	13.4	2.66	13.4	0.1	8.81	0.1	0.1
Aliphatics >C21-C35	38.9	7.12	1.62	28.7	8.16	24.7	24.9	46.2	37	52.5	40.4	23.2	61.2	0.1	52.6	0.1	0.1
Aliphatics >C35-C44	11.4	0.1	0.639	5.85	2.68	13.4	13.9	19.1	12.3	14.8	16.9	7.93	21.2	0.1	16.4	0.1	0.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0117	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0234	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	1.12	0.183	0.235	15.4	0.637	1.01	1.4	1.57	2.65	16.3	6	0.974	4.43	0.1	2.1	0.1	0.1
Aromatics >EC16-EC21	9.88	1.72	0.702	215	3.17	9	9.3	12.1	13.6	235	53.3	6.9	55.9	0.1	22.2	0.1	0.1
Aromatics >EC21-EC35	108	17	15.7	676	15	41.2	42.4	52.3	50.8	501	161	47.5	180	1.55	87.5	1.01	5.25
Aromatics >EC35-EC44	33.4	4.44	4.31	166	5.52	20.1	21.4	27.3	23	161	51.7	18.1	58.4	0.1	30.9	2.33	0.42
Aromatics >EC40-EC44	11.3	1.16	1.6	48.6	2.04	7.92	8.2	11.1	9.62	49.6	18	6.83	20.6	0.1	11.1	1.41	0.238
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	17.1	12	12	1220	26.8	498	159	171	255	1390	999	111	4830	12	12	12	12
Acenaphthene	124	13.8	8	150	8	130	14.5	25.4	31.1	80.8	111	9.61	215	8	8	8	8
Anthracene	192	48	16	3200	55.2	1720	351	354	406	1900	1440	153	5870	16	16	16	16
Benz(a)anthracene	1170	139	14	14200	199	3710	1130	1010	1150	7680	4610	501	23800	14	14	14	14
Benzo(a)pyrene	1520	131	15	11900	168	3080	964	820	976	7890	4420	526	22600	15	15	15	15
Benzo(b)fluoranthene	2140	216	15	18500	343	3680	1620	1380	1220	11800	7360	711	32200	15	15	15	15
Benzo(k)fluoranthene	730	62.6	14	6820	109	1490	626	517	447	3730	2170	224	10800	14	14	14	14
Benzo(g,h,i)perylene	964	78.8	24	7280	153	2150	621	579	713	5990	3320	472	16700	24	24	24	24
Chrysene	1100	142	10	12300	228	2930	1290	778	921	6920	3640	508	19600	10	10	10	10
Dibenzo(a,h)anthracene	248	0.023	0.023	2620	39.4	550	153	166	172	1600	899	115	4590	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	818	99.3	0.018	7720	121	2300	650	488	778	6830	2600	481	19000	0.018	0.018	0.018	0.018
Fluoranthene	1490	290	0.017	28100	358	7760	2350	2000	2470	14000	9940	942	46400	0.017	27.7	0.017	0.017
Fluorene	69.6	22	10	807	23.6	337	88.1	107	157	608	727	48.4	1780	10	10	10	10
Naphthalene	166	14.2	9	576	66.4	531	180	300	410	1390	2120	152	2790	9	9	9	9
Phenanthrene	693	212	15	8980	205	4410	933	856	1200	4650	4270	407	14500	15	15	15	15
Pyrene	1.41	0.215	0.015	19.9	0.269	6.06	1.73	1.49	1.89	10.6	7.44	0.727	35.4	0.015	0.0206	0.015	0.015
PAH, Total Detected USEPA 16	12.9	1.68	0.118	144	2.36	41.3	12.9	11	13.2	87	56.1	6.09	261	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	85.7	92	68.1	84.5	85	94.9	91.3	92.2	78.4	91.5	89.3	97.8	479	78.1	95	81.3	94.9
Acenaphthene-d10 % recovery**	82	89.6	70.8	88.7	85.5	96.8	87.3	87.1	79.1	93.1	87	97.8	490	76	95.7	86.7	87.6
Phenanthrene-d10 % recovery**	82.2	91.3	72.6	83	84.2	93.6	85.2	88.8	80.5	92.1	84.3	96.1	482	74.8	93.9	84.1	89.5
Chrysene-d12 % recovery**	75.3	87.8	70.8	92.4	69.4	84.8	81.2	76.4	75.9	87.6	75.6	91.7	437	81.4	89.3	81.7	91.1
Perylene-d12 % recovery**	72.6	98.8	68.1	82.2	68.9	86.6	72.6	71.9	71.3	108	72.9	91.7	462	80.9	88.6	76.1	90.1
Total Aliphatics >C12-C44	55.5	7.12	3.03	48.1	11.9	41.1	41.5	78.6	61	95.1	72.4	34	98	0.1	78.5	0.1	0.1
Total Aromatics >EC12-EC44	152	23.3	20.9	1070	24.4	71.3	74.5	93.3	90.1	914	272	73.4	298	1.55	143	3.34	5.67
Total Aliphatics & Aromatics >C5-C44	208	30.4	23.9	1120	36.2	112	116	172	151	1010	344	107	396	1.55	221	3.34	5.67
Metals - (Solid)																	
Iron	73900	32700	29600	46700	66900	78700	46000	102000	99600	114000	78400	47300	40500	32600	45900	36000	35200
Manganese	3080	919	335	2250	3580	11000	5480	5270	7510	10600	4510	16200	3530	577	493	881	607
Metals - (Liquid)																	
Calcium	89200	-	174000	-	42900	36700	-	-	17200	-	-	-	-	-	130000	60400	-
Magnesium	15400	-	6540	-	5800	3770	-	-	4450	-	-	-	-	-	32300	7110	-
Phenols																	
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.0217	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE																	
pH																	
Sulphate, Total																	
Sulphur, Total																	
Sulphate, Total potential																	
Sulphate, acid soluble (total)																	
Cyanide, Total																	
Exchangeable Ammonia as N																	
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	03/08/2018	-	09/10/2018	-	09/10/2018	10/10/2018	-	-	10/10/2018	-	-	-	-	-	08/08/2018	10/10/2018	-
Analysed By	Andrzej Ferfecki	-	Lucy Caroe	-	Marcin Magdziarek	Andrzej Ferfecki	-	-	Marcin Magdziarek	-	-	-	-	-	Lucy Caroe	Andrzej Ferfecki	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																	
Analysts Comments																	
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-
Comments	0	-	0	-	Loose fibre in soil	0	-	-	0	-	-	-	-	-	0	0	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	98.2	106	100	107	106	106	108	101	105	115	107	111	110	105	104	103	101
Toluene-d8**	96.4	98.1	99.9	99.3	98.9	97.4	97.6	97.2	100	94.6	97.3	97.8	101	97	99.5	97	97.8
4-Bromofluorobenzene**	86.3	96.2	96.6	96.4	97.6	94.6	93	90.1	96.2	87.5	94.5	94.3	99.6	89.5	95.3	95	90.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CC9V	3CD2	3CD2	3CD6	3CD6	3CD7	3CD8	3CD8	3CD9	3CD9	3CD2V	3CD6V	3CD7V	3CD8V	3CD9V	3CE2	3CE2
Depth	2	1	2	0.5	1	0.5	0.5	1	0.5	1	2.9	1.2	0.7	1.2	1.2	0.5	1
Sampled Date	01/08/2018	13/08/2018	13/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018	01/08/2018	01/08/2018	13/08/2018	01/08/2018	30/07/2018	30/07/2018	01/08/2018	13/08/2018	13/08/2018
Carbon																	
Soil Organic Matter (SOM)	2.38	>100	>100	7.67	4.55	2.83	14.6	7.78	4	5.09	1.88	6.59	7.14	0.729	1.2	98.8	>100
Metals (Solids)																	
Arsenic	9.43	8.61	2.38	10	6.27	12.2	10.8	10.6	9.65	9.46	8.6	14.8	13	9.62	9.46	9.67	11
Cadmium	0.02	0.063	0.02	0.0365	0.02	0.2	0.91	3.14	0.043	0.428	0.02	0.36	0.387	0.02	0.02	0.02	0.02
Chromium	35.3	5.58	9.08	93.2	207	96.7	77.5	250	104	62	37.6	37.8	32.3	39.4	32.2	0.9	9.65
Copper	15.1	23.6	14.6	18	12.3	23.3	22.2	29.4	20.4	28.6	23.9	18.4	18.8	18.8	10.5	28.2	42.5
Lead	26.4	10.2	6.14	64	40.5	77	304	537	89.4	128	19.1	46	44.2	20.6	19.6	208	73.8
Mercury	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	33.2	14.9	7.1	20.1	11.7	26.9	19.9	27.1	19.9	21.3	34.2	26.4	25	42.1	34.1	23.9	61.2
Selenium	1	1.23	1	1.86	4.47	10	2.72	10	3.49	1.33	1	1	1	1	1	1	1
Vanadium	52.8	14.5	7.28	154	224	375	314	573	139	96.1	52.3	58.2	52.4	52.6	52.6	40.2	69.3
Zinc	121	50.7	30.4	258	193	237	1050	1400	356	633	133	135	128	120	103	311	320
TPH Criteria Working Group (TPH CWG)																	
Benzene																	
Toluene																	
Ethylbenzene																	
sum of detected mpo xylene by GC																	
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.01	0.0152	0.0437	0.01	0.01	0.0151	0.01	0.01	0.034	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.01	0.0117	0.0345	0.01	0.01	0.0164	0.01	0.01	0.0202	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.01	0.0176	0.0403	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	1.81	3.71	1.82	4.21	2.67	1.9	3.22	5.28	1.02	1.93	0.1	0.1	0.1	0.1	0.1	8.76	3.1
Aliphatics >C16-C21	32	87.4	39.8	15	8.47	9.79	21.7	25.2	6.25	11	0.1	0.26	0.1	0.982	0.348	115	62.6
Aliphatics >C21-C35	23.2	33.6	24.9	42.4	34.4	52.2	95.4	88.1	28.8	63.2	0.1	3.36	9.92	1.47	1.62	92.7	68.8
Aliphatics >C35-C44	5.59	0.1	0.1	11.5	11.1	18.2	23.3	21.4	9.66	19.6	0.1	0.509	0.1	0.1	0.1	15.5	14.5
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.023	0.01	0.01	0.011	0.01	0.01	0.0126	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.0117	0.0265	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	1.03	13.7	5.88	3.34	3.08	1.49	6.78	0.1	2.38	0.1	0.1	0.661	0.1	0.1	0.1	8.43	3.8
Aromatics >EC16-EC21	10.6	65.5	37.2	18.7	20	8.42	69.8	0.1	20.2	2.63	0.1	1.16	1.98	0.1	0.501	40.9	34.8
Aromatics >EC21-EC35	17.5	99.6	70.7	58.4	74.6	34.7	193	4.17	81.7	23.1	0.1	31.3	30.9	3.3	2.38	137	75.4
Aromatics >EC35-EC44	5.94	13.5	13.9	25.8	25.8	16.6	57	0.389	28.1	0.371	0.1	5.34	13.2	0.1	0.714	31.9	15.9
Aromatics >EC40-EC44	2.41	3.52	5.6	10.2	9.26	6.18	20.7	0.219	10.6	0.1	0.1	1.92	5.42	0.1	0.105	10.1	4.66
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	12	41.6	69.3	397	199	49.5	1240	418	40.4	1020	12	12	12	12	12	171	41.1
Acenaphthene	8	39.4	70.7	91.4	37.8	18.2	129	60.8	9.09	36.6	8	8	8	8	8	13.7	15.7
Anthracene	16	181	432	1730	566	101	2730	741	65.3	3820	16	16	16	16	16	230	104
Benz(a)anthracene	40.2	367	1610	1980	1430	319	6660	3220	282	5950	14	14	25.3	14	14	942	420
Benzo(a)pyrene	28.2	347	1520	1550	1150	304	5000	2670	237	4130	15	15	24.9	15	15	1040	398
Benzo(b)fluoranthene	53.2	640	2650	2750	1950	410	7400	4230	445	6190	15	26.1	68.1	15	15	1740	689
Benzo(k)fluoranthene	14	198	709	1040	630	164	2000	1180	149	2420	14	14	20.8	14	14	562	239
Benzo(g,h,i)perylene	24	285	1060	988	756	238	3490	1780	166	2780	24	24	24	24	24	917	338
Chrysene	51.6	314	1300	1990	1160	324	5880	2400	220	4890	10	19.1	40.5	10	10	871	386
Dibenzo(a,h)anthracene	0.023	90.8	314	287	188	51.1	782	446	41.1	676	0.023	0.023	0.023	0.023	0.023	252	90.9
Indeno(1,2,3-cd)pyrene	0.018	220	893	842	652	229	3850	1840	144	2370	0.018	0.018	0.018	0.018	0.018	764	285
Fluoranthene	151	473	1760	4140	2490	738	16400	7420	482	16600	0.017	34.9	85.8	0.017	21.5	1350	892
Fluorene	10	95.6	197	548	203	32.8	1380	330	29.2	1260	10	10	10	10	10	49.6	43.8
Naphthalene	13.2	343	175	842	287	153	1210	794	89.8	244	20.2	9	9	9	9	986	423
Phenanthrene	62.4	720	1420	2690	1420	442	10800	3160	241	12300	15	15	47.1	15	15	647	694
Pyrene	0.133	0.374	1.36	3.05	1.89	0.593	11.3	5.48	0.385	11.3	0.015	0.0284	0.0595	0.015	0.015	1.2	0.701
PAH, Total Detected USEPA 16	0.532	-	-	24.9	15	4.17	80.3	36.2	3.02	75.9	0.118	0.118	0.372	0.118	0.118	11.7	5.76
Naphthalene-d8 % recovery**	89.3	-	-	83.6	80.4	94.4	85.2	92.2	82.7	80.8	81.6	74.4	87.5	93	91.5	86.7	86.5
Acenaphthene-d10 % recovery**	83	-	-	86.3	83.1	89.2	86.2	89.4	89.6	87.3	71.9	80.9	85.8	85.9	90.2	90.8	86
Phenanthrene-d10 % recovery**	89.4	-	-	89.8	83.4	93	86.2	92.5	90.8	87.5	81.4	83.4	89.2	89.9	97.3	91.6	78.3
Chrysene-d12 % recovery**	84.8	-	-	75.1	73.9	95.2	88	88.1	83.6	78.1	82.8	82.4	81.1	92.5	93.4	77.4	48.4
Perylene-d12 % recovery**	80	-	-	73.5	69	94.5	79.6	84.9	78.1	73	83.5	82.1	80.1	87.7	81.6	71.1	38.1
Total Aliphatics >C12-C44	62.6	125	66.6	73.2	56.6	82.1	144	140	45.8	95.8	0.1	4.13	9.92	2.45	1.97	232	149
Total Aromatics >EC12-EC44	35.1	192	128	106	123	61.2	326	4.56	132	26.1	0.1	38.5	46	3.3	3.6	218	130
Total Aliphatics & Aromatics >C5-C44	97.7	317	194	179	180	143	470	145	178	122	0.1	42.6	55.9	5.81	5.57	450	279
Metals - (Solid)																	
Iron	35700	14900	4370	69700	81600	207000	114000	162000	79800	63100	33800	30700	28800	42900	38100	129000	41400
Manganese	1010	885	237	6300	13600	11100	12300	18600	11500	4800	328	354	392	548	839	1720	906
Metals - (Liquid)																	
Calcium	92600	150000	-	57100	-	-	-	-	-	-	101000	-	167000	167000	-	-	-
Magnesium	17200	20000	-	7310	-	-	-	-	-	-	11400	-	26700	14800	-	-	-
Phenols																	
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.046	0.01	0.01	0.0104	0.0105	0.01	0.215
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0115	0.01	0.01	0.0104	0.01	0.01	0.157
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0575	0.035	0.035	0.035	0.035	0.035	0.372
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE																	
pH																	
Sulphate, Total																	
Sulphur, Total																	
Sulphate, Total potential																	
Sulphate, acid soluble (total)																	
Cyanide, Total																	
Exchangeable Ammonia as N																	
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	10/10/2018	10/10/2018	-	10/10/2018	-	-	-	-	-	-	01/08/2018	-	07/08/2018	10/10/2018	-	-	-
Analysed By	James Richards	James Richards	-	James Richards	-	-	-	-	-	-	Marcin Magdziarek	-	Renata Bozhkov	Andrzej Ferfecki	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																	
Analysts Comments																	
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	Detected	-	Not Detected	Not Detected	-	-	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Fibrous Anthophyllite	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Fibrous Tremolite	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Fibrous Actinolite	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Non-Asbestos Fibre	Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Detected	Not Detected	-	-	-
Comments	0	0	-	0	-	-	-	-	-	-	Loose fibre in soil	-	0	0	-	-	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	108	105	103	103	105	104	105	158	111	106	105	109	101	103	98.8	108	104
Toluene-d8**	97	93.8	98.9	98	98.9	100	99.5	99.6	98.9	98.7	97.4	98.1	99.3	94.1	96	95.8	98.4
4-Bromofluorobenzene**	92.2	89.2	96.1	93.5	99.5	96	99.1	104	97.1	95	85.9	91.1	93.2	89.4	92	92.1	93.2
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.183	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.462	0.13	0.18	0.235	0.226	0.13	0.679
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	3CE6	3CE6	3CE7	3CE7	3CE8	3CE8	3CE9	3CE9	3CE2V	3CE6V	3CE7V	3CE8V	3CE9V
Depth	0.5	1	0.5	0.9	0.5	1	0.5	1	1.6	1.1	1	1.5	1.7
Sampled Date	01/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	01/08/2018	01/08/2018	13/08/2018	01/08/2018	30/07/2018	30/07/2018	01/08/2018
Carbon													
Soil Organic Matter (SOM)	3.76	7.67	5.79	5.43	7.07	7.53	2.76	5.31	2.21	5	0.903	0.91	3.03
Metals (Solids)													
Arsenic	8.56	6.27	8.77	12.1	11.7	10.8	9.83	4.74	8.58	12.9	9.01	13.1	10.2
Cadmium	0.426	0.24	0.02	0.295	2.84	0.822	0.02	0.02	0.02	0.189	0.02	0.02	0.02
Chromium	107	169	102	64.8	41.6	84.4	304	110	43.4	47.7	34.7	38.9	45.7
Copper	12.6	9.96	15.7	27.3	23.8	26.6	16.2	10.7	20.9	18.3	12.5	13.6	10.4
Lead	84.4	38.8	82.6	182	189	204	36.1	21.5	23.2	81.2	27	23	21.2
Mercury	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	14.6	12.9	15	31.6	25.2	32.4	13.1	13.7	35.1	25.9	37.6	38	24.6
Selenium	3.17	4.24	2.35	10	10	10	4.98	4.48	1	1	1	1	1.35
Vanadium	272	204	164	266	217	257	417	313	53.9	63.2	51.1	54.2	96.2
Zinc	318	145	330	496	510	568	172	82.9	128	133	113	110	85.1
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.0655	0.01	0.01	0.0483	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.0555	0.01	0.01	0.0345	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.135	0.01	0.01	0.0426	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	0.868	5.6	2.81	2.19	5.87	2.58	9.01	5	0.1	0.192	0.1	0.1	0.248
Aliphatics >C16-C21	8.6	27.6	16.2	13.2	19.6	13.3	22.1	16.9	0.1	0.93	0.1	0.1	3.39
Aliphatics >C21-C35	37.5	73.4	81	68.8	68.7	50	96.8	121	0.547	5.2	0.931	0.1	4.33
Aliphatics >C35-C44	12.7	36.4	32.5	25.7	23.8	17.6	38	88.4	0.1	0.406	0.1	0.1	3.61
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.0366	0.01	0.01	0.023	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.0899	0.01	0.01	0.0288	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	5.46	55.4	3.88	2.73	2.46	4.25	1.73	3.83	0.401	0.676	0.1	0.1	0.822
Aromatics >EC16-EC21	44.5	0.1	24.9	21.1	19.9	33.3	8.35	29	0.697	2.91	0.218	0.301	2.17
Aromatics >EC21-EC35	111	182	92.6	68.8	73.4	95.6	52	169	3.52	24.7	2.68	3	6.86
Aromatics >EC35-EC44	39.9	85.2	45	31.7	32.1	37.7	32	105	0.1	4.05	4.29	2.97	5.62
Aromatics >EC40-EC44	13.7	34.6	18.4	13.2	12.8	14.7	13.6	40.5	0.1	0.945	2.4	1.61	2.71
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	607	408	729	292	204	558	58.1	292	12	12	12	12	12
Acenaphthene	38.9	70.8	56.1	57.4	48	67.8	21.8	55.1	8	8	8	8	130
Anthracene	1180	2030	1280	641	433	1030	118	580	16	16	16	16	68.6
Benz(a)anthracene	2840	3490	2540	1380	1230	3150	424	1800	14	74.9	14	14	76.9
Benzo(a)pyrene	2140	2380	2320	1320	1170	2930	349	1670	15	63.8	15	15	78.1
Benzo(b)fluoranthene	3810	4000	3530	2270	1980	4660	722	2590	15	67.4	15	15	66.4
Benzo(k)fluoranthene	1070	1420	973	674	574	1240	219	902	14	24.7	14	14	37.1
Benzo(g,h,i)perylene	1400	1490	1760	945	809	2040	312	1230	24	48.1	24	24	69.8
Chrysene	2640	2800	2300	1200	1090	2520	452	1610	10	88.4	10	10	86.1
Dibenzo(a,h)anthracene	392	403	424	254	226	568	77.7	309	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	1500	1290	1880	825	690	1770	242	1340	0.018	44.5	0.018	0.018	66.9
Fluoranthene	7030	6620	5720	2890	2550	6690	871	3810	0.017	192	28.4	0.017	280
Fluorene	431	522	555	251	145	365	49.8	210	10	10	10	10	95.9
Naphthalene	1040	549	1100	865	520	1180	107	601	9	18.1	9	9	176
Phenanthrene	3530	3260	3480	1530	1160	2880	397	1810	15	63.2	15	15	337
Pyrene	5.05	4.47	4.2	2.23	1.98	5.07	0.705	2.89	0.015	0.129	0.0227	0.015	0.224
PAH, Total Detected USEPA 16	34.7	35.2	32.8	17.6	14.8	36.7	5.13	21.7	0.118	0.814	0.118	0.118	1.79
Naphthalene-d8 % recovery**	89.4	77.3	85.5	91.4	92.6	83.7	86.4	95.6	91.7	101	88.2	81.8	102
Acenaphthene-d10 % recovery**	91.9	81.5	91	84.1	84	80.6	88.7	101	80.7	103	92.4	86.6	105
Phenanthrene-d10 % recovery**	108	85.3	91	84.3	87.7	79.5	84.4	102	79.4	99.9	95.6	87.2	101
Chrysene-d12 % recovery**	103	75.7	84.4	75.2	76.3	72.5	74.5	95	75.5	97	97.6	84.8	101
Perylene-d12 % recovery**	102	70.9	81.7	72.4	72.7	71.4	72.4	95.5	75.4	99.1	101	80.1	104
Total Aliphatics >C12-C44	59.7	143	133	110	118	83.5	166	231	0.547	6.73	0.931	0.1	11.6
Total Aromatics >EC12-EC44	201	322	166	124	128	171	94	307	4.62	32.3	7.19	6.27	15.5
Total Aliphatics & Aromatics >C5-C44	261	465	299	234	246	255	260	538	5.17	39.1	8.12	6.27	27
Metals - (Solid)													
Iron	54100	58700	71300	225000	174000	154000	118000	36500	36700	32600	38100	44200	38700
Manganese	8100	11800	8060	7300	7300	8630	16400	11100	677	776	280	434	3830
Metals - (Liquid)													
Calcium	-	-	-	-	24900	-	117000	125000	-	107000	-	104000	189000
Magnesium	-	-	-	-	7760	-	13100	15500	-	32300	-	11400	7230
Phenols													
Phenol	0.01	0.01	0.027	0.01	0.01	0.01	0.0118	0.01	0.0116	0.0113	0.0224	0.011	0.01
Cresols	0.0126	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potential													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	17/08/2018	-	03/08/2018	02/08/2018	-	01/08/2018	-	01/08/2018	16/10/2018
Analysed By	-	-	-	-	James Richards	-	Lucy Caroe	James Richards	-	Marcin Magdziarek	-	James Richards	Barbara Urbanek-Walsh
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Detected
Amosite (Brown) Asbestos	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Detected	-	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Anthophyllite	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Tremolite	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Actinolite	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Non-Asbestos Fibre	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Comments	-	-	-	-	0	-	0	0	-	Loose fibres in soil	-	0	Loose fibres in soil.
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	103	104	106	102	102	103	99.6	115	104	111	107	102	115
Toluene-d8**	99.8	100	99.5	98	86.5	98.8	96.3	99.5	99.6	99.1	98.1	98.2	98.5
4-Bromofluorobenzene**	96.2	96.7	92.8	96.5	82.6	91.9	88.5	98.3	95.7	93.6	92.7	87.2	93.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01
Benzene	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009
Toluene	0.07	0.07	0.07	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007
Ethylbenzene	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004
p/m-Xylene	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01
o-Xylene	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01
Naphthalene	0.13	0.13	0.13	2.6	0.13	0.13	0.491	0.13	0.13	0.13	0.907	0.148	0.013
Sum of BTEX	0.4	0.4	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CF2	3CF2	3CF6	3CF6	3CF7	3CF7	3CF8	3CF8	3CF9	3CF9	3CF9	3CF2V	3CF6V	3CF7V	3CF8V	3CF9V
Depth	0.5	1	0.5	0.8	0.5	1	0.5	1	0.5	1	1.6	1.5	0.9	1.9	1.6	1.7
Sampled Date	13/08/2018	13/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	13/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018
Carbon																
Soil Organic Matter (SOM)	74.6	>100	8.93	11.8	3.59	2.91	6.96	8	4.02	3.59	4.52	2.97	5.98	2.83	1.6	7.03
Metals (Solids)																
Arsenic	8.55	5	5.9	8.39	10.2	11.4	9.48	9.86	9.81	12	11.8	11.4	12.9	11	9.31	11.9
Cadmium	0.02	0.02	0.02	1.3	0.02	0.02	0.02	0.2	0.171	0.288	0.0459	0.02	0.108	0.02	0.02	0.157
Chromium	48.7	7.82	489	84.9	67.9	8.22	141	196	24.7	35.3	39	34.2	42.4	38.4	38.7	38.2
Copper	27.4	20	12.2	17.4	19.2	16.8	24.1	38.4	23	28.2	24.2	20.9	18.5	18.1	18.8	18.4
Lead	40.8	14.5	138	238	54.9	38.8	159	111	48.8	96.2	89.5	23.4	37.4	21.8	20.9	39.4
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	20.3	9.53	8.3	17	14.2	20	47.4	25	22.6	24.2	26.7	32.8	26.2	29.4	40.5	25.4
Selenium	1	1	11.3	2.61	1.17	1	4.37	10	1	10.4	1.35	1	1	1	1	1
Vanadium	77.1	21.5	1720	242	301	129	615	485	40.9	49.8	72.9	48.2	63.3	55.3	52	60.2
Zinc	185	93.9	731	1140	204	169	636	346	164	335	308	116	128	116	104	134
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0116	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1
Aliphatics >C6-C8	0.038	0.01	0.01	0.01	0.0283	0.0161	0.0196	0.0452	0.01	0.0269	0.044	0.01	0.01	0.01	0.01	0.298
Aliphatics >C8-C10	0.0152	0.01	0.01	0.01	0.0215	0.0173	0.015	0.029	0.01	0.0582	0.0242	0.01	0.01	0.01	0.01	10.1
Aliphatics >C10-C12	0.0109	0.01	0.01	0.01	0.0339	0.038	0.0161	0.0186	0.01	0.133	0.0374	0.01	0.01	0.01	0.01	60.2
Aliphatics >C12-C16	7.77	2.32	1.07	12.1	6.14	4.85	1.51	2.32	1.72	24.2	3.95	0.1	0.1	0.413	0.1	514
Aliphatics >C16-C21	22.5	45.8	8.24	106	23.2	11.8	9.01	12.2	8.15	167	14.9	0.1	0.354	0.536	0.1	3530
Aliphatics >C21-C35	38.6	44.2	21.3	97.5	79.7	51.5	38.5	46.6	48.6	88.4	80.1	3.17	3.28	5.55	0.1	700
Aliphatics >C35-C44	5.95	11.7	5.47	31.6	33.9	21.4	10	13.9	18.4	21.2	36.9	0.1	0.1	0.315	0.1	0.2
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.0147	0.0115	0.01	0.0197	0.01	0.0392	0.0165	0.01	0.01	0.01	0.01	6.75
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.0226	0.0253	0.0115	0.0128	0.01	0.0885	0.0253	0.01	0.01	0.01	0.01	40.2
Aromatics >EC12-EC16	15.9	4.36	2.74	21.4	2.57	1.7	3.96	17.2	1.55	13.7	2.54	0.1	0.1	0.582	0.1	461
Aromatics >EC16-EC21	41.8	29	24.4	224	11.5	9.21	24.6	105	7.18	57.9	11.4	0.1	0.816	1.43	0.1	1050
Aromatics >EC21-EC35	117	87.6	56	433	54.4	41.4	75.4	206	40.2	65.1	50.9	9.45	21.6	32.2	3.61	309
Aromatics >EC35-EC44	28.6	70.7	16.3	124	38.4	22.1	23.2	58.9	22.3	27.1	35.8	1.28	2.64	4.51	1.37	20.8
Aromatics >EC40-EC44	8.97	33	5.57	42.1	17.2	8.9	8	19.2	8.94	11	16	0.1	0.566	1.16	0.323	7.36
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	196	81	636	807	67.7	60	508	489	76.6	256	143	12	12	12	12	1780
Acenaphthene	35.9	36.4	98.9	239	44.1	40	62.2	54.1	29.9	222	64.7	8	8	8	8	36700
Anthracene	475	222	2370	1530	162	195	997	1540	410	519	339	16	16	16	16	3170
Benz(a)anthracene	2560	654	2620	3660	502	466	2250	3590	579	1030	875	37.7	14	14	14	173
Benzo(a)pyrene	2330	673	2240	3120	453	385	2060	2370	470	878	775	40.7	22.4	15	15	109
Benzo(b)fluoranthene	3970	1440	1910	5200	513	714	2410	4140	863	1240	1270	59.8	24.3	15	15	170
Benzo(k)fluoranthene	1410	417	1150	1690	224	305	990	1380	251	332	330	21.8	14	14	14	50.3
Benzo(g,h,i)perylene	1770	697	1640	2090	327	320	1490	1670	292	656	495	38.3	24	24	24	68
Chrysene	2460	606	2590	3730	467	440	2160	2640	536	894	709	40.3	21.9	10	10	187
Dibenzo(a,h)anthracene	582	179	447	569	73.5	0.115	342	426	82.6	146	140	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	1770	562	1770	2490	432	256	1940	1440	270	706	469	40.9	0.018	0.018	0.018	80.8
Fluoranthene	4650	900	6530	8240	1070	999	5780	8520	1220	2680	1740	85.9	51.8	0.017	0.017	2030
Fluorene	136	68.1	579	681	75	101	562	629	111	296	161	10	10	10	10	18800
Naphthalene	725	377	1320	1290	151	163	323	384	181	2460	560	9	422	27.2	9	172000
Phenanthrene	2190	1060	3470	3970	591	552	3470	4980	743	1610	985	49.3	40.7	26.5	15	24500
Pyrene	3.47	0.73	4.67	6.23	0.788	0.793	3.98	5.71	0.88	1.94	1.25	0.0668	0.0414	0.015	0.015	1.06
PAH, Total Detected USEPA 16	28.7	-	34	45.5	5.94	5.69	29.3	40	7	15.9	10.3	0.482	0.624	0.118	0.118	261
Naphthalene-d8 % recovery**	89.1	-	87.7	92	88.1	84.3	91.1	76.6	87.6	83.8	88.1	105	87.6	82.6	79.8	69.6
Acenaphthene-d10 % recovery**	83	-	81.1	98	85.8	91.4	90.8	78.7	93.1	87.7	96	108	94.2	81	80.7	91.7
Phenanthrene-d10 % recovery**	90.7	-	86.5	108	83.1	84.6	90.7	85.2	95.5	85	100	106	94.3	80.4	86.8	68.8
Chrysene-d12 % recovery**	85.4	-	76.6	97.5	73.5	84.2	83.7	75.3	94.7	79.3	96.7	94.7	91.3	78.7	87.3	82.3
Perylene-d12 % recovery**	73.1	-	76.8	93.7	70.7	83.2	80.8	71.7	96	72.4	95	96.5	92.3	82.1	85.2	83.4
Total Aliphatics >C12-C44	74.9	104	36.1	247	143	89.6	59	75	76.8	301	136	3.17	3.63	6.81	0.1	4740
Total Aromatics >EC12-EC44	203	192	99.5	803	107	74.3	127	387	71.3	164	101	10.7	25.1	38.7	4.98	1840
Total Aliphatics & Aromatics >C5-C44	278	296	136	1050	250	164	186	462	148	465	237	13.9	28.7	45.5	4.98	6710
Metals - (Solid)																
Iron	102000	15600	150000	74100	163000	112000	144000	143000	40100	67700	76700	35500	32700	33300	33700	35200
Manganese	3950	682	36400	7930	9360	4980	16700	16100	2340	25900	6450	476	687	356	418	392
Metals - (Liquid)																
Calcium	146000	-	82700	-	-	138000	-	151000	-	136000	-	121000	-	102000	-	196000
Magnesium	31300	-	6460	-	-	11400	-	10900	-	13400	-	15000	-	16500	-	13600
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0585	0.06	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0585	0.06	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE																
pH																
Sulphate, Total																
Sulphur, Total																
Sulphate, Total potential																
Sulphate, acid soluble (total)																
Cyanide, Total																
Exchangeable Ammonia as N																
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	09/10/2018	-	09/10/2018	-	-	09/10/2018	-	08/10/2018	-	08/10/2018	-	02/08/2018	-	01/08/2018	-	17/10/2018
Analysed By	Lucy Caroe	-	James Richards	-	-	Marcin Magdziarek	-	Andrzej Ferfecki	-	Andrzej Ferfecki	-	Andrzej Ferfecki	-	Marcin Magdziarek	-	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																
Analysts Comments																
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Comments	0	-	0	-	-	Loose fibres in soil	-	0	-	0	-	0	-	Loose fibres in soil	-	
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	91.4	108	99.1	104	107	109	103	100	103	98.5	98.6	102	106	104	107	106
Toluene-d8**	90	97.8	94.8	98.7	97.9	99	94.5	93.1	95	94.4	95.3	98.5	98.4	99.2	98.8	92.7
4-Bromofluorobenzene**	73.8	95.2	88.1	94.1	95	91.2	87.3	86	83.2	87.6	83	92	94.8	87.1	95.7	81.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.55	0.644	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CG2	3CG2	3CG6	3CG6	3CG6	3CG7	3CG7	3CG8	3CG8	3CG9	3CG9	3CG2V	3CG6V	3CG7V	3CG8V	3CG9V
Depth	0.5	0.9	0.5	1	1.5	0.5	0.9	0.5	1	0.5	1	1.1	2	1	1.3	1.2
Sampled Date	13/08/2018	13/08/2018	01/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	13/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018
Carbon																
Soil Organic Matter (SOM)	69.5	70.7	31.9	4.76	31.4	2.91	4.28	6.91	11.6	5.55	1.06	6.4	4.07	0.876	0.767	6.96
Metals (Solids)																
Arsenic	7.65	6.53	7.07	7.07	2.25	10	7.73	10.4	9.89	10.8	9.62	13	10.3	8.68	11.2	14.4
Cadmium	0.0331	0.2	0.02	0.02	0.02	0.02	0.02	0.32	0.878	0.408	0.02	0.242	0.136	0.02	0.02	0.199
Chromium	8.06	31.3	275	314	85.2	79.3	30.4	122	112	68.9	27.8	39.4	44.4	32.3	38.7	38.6
Copper	25.5	26.9	24.2	27	6.48	27.2	19.2	21.6	48.6	19.1	24.3	32.3	20.9	11	15.9	20.3
Lead	33.1	34.8	36.8	24.1	16	39.3	26.1	168	231	88.1	32.5	49	36.8	19.6	22.8	37.9
Mercury	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	15.2	24.5	17.6	14.7	3.66	30.9	11.7	18.7	25.4	18.3	28.7	33.9	30.7	41.4	40.9	30.7
Selenium	1	10	5.98	7.62	3.64	1	1	3.08	10	1.63	1	1	1	1	1	1
Vanadium	29.1	84.7	793	1150	138	228	67.2	286	250	96	36.4	55.5	62.2	54.8	56.3	61.3
Zinc	118	131	203	127	82.1	212	134	677	636	309	131	167	144	105	122	142
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.013	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.0573	0.0102	0.01	0.01	0.0399	0.01	0.01	0.0152	0.0324	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.0162	0.01	0.01	0.01	0.0399	0.01	0.01	0.014	0.0312	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.0847	0.01	0.01	0.0222	0.0516	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	10.2	4.13	4.41	1.04	8.15	4.02	3.41	2.93	1.25	3.36	0.1	0.1	0.995	0.1	0.1	0.1
Aliphatics >C16-C21	18.3	83.3	15.4	8.43	40.5	3.88	15.9	15.6	9.81	13.4	0.1	0.1	0.956	0.1	0.1	1.21
Aliphatics >C21-C35	39.9	76.6	51.4	46.7	74.4	19.3	55.4	44	38.5	58.6	6.39	1.85	3.09	0.614	0.1	8.35
Aliphatics >C35-C44	7.1	11.3	15.4	16.1	28.3	4.59	27	11.1	10.2	17.5	0.1	0.1	0.907	0.1	0.1	0.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.0108	0.01	0.01	0.01	0.0266	0.01	0.01	0.01	0.0204	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.0569	0.01	0.01	0.0152	0.0336	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	20.3	6.86	5.97	2.95	35.9	1.97	6.58	4.44	2.7	1.74	14.7	0.1	4.09	0.124	0.1	0.1
Aromatics >EC16-EC21	53.7	81.9	66.4	39.1	315	9.51	44.1	32.5	21.2	9.59	201	1.8	6.51	0.278	0.1	2.53
Aromatics >EC21-EC35	169	153	183	144	959	41.1	122	101	121	48.2	724	13.2	36.4	2.17	4.32	32.9
Aromatics >EC35-EC44	36.1	37.5	43.5	44.6	305	20.4	52.6	32.4	86.8	23.4	275	2.04	4.21	1.87	2.74	7.91
Aromatics >EC40-EC44	10.3	10.6	12.6	15.1	100	8.11	20.6	11.2	37.6	9.36	113	0.298	0.217	0.772	0.914	2.65
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	3520	866	1010	1640	3800	509	176	329	455	119	12	12	12	12	12	12
Acenaphthene	177	160	120	125	261	74.2	44	68	47.6	21.8	8	8	8	8	8	23.5
Anthracene	7580	3200	2720	3530	8430	633	378	628	806	228	16	16	16	16	16	16
Benz(a)anthracene	16100	7000	7690	9930	19500	7980	1090	2010	2430	705	19.4	45.9	30.1	14	14	57.4
Benzo(a)pyrene	12400	5970	6010	8390	16200	5570	1080	1780	2060	652	23.1	47.6	26.6	15	15	58.9
Benzo(b)fluoranthene	16900	9630	9130	11900	24600	10600	1860	2980	2280	1090	40.4	72	34.2	15	15	107
Benzo(k)fluoranthene	5560	3850	3550	4200	7940	3160	561	1020	778	385	14	27.6	14	14	14	40.3
Benzo(g,h,i)perylene	7700	6920	4400	6170	11500	3220	780	1350	1330	461	24	42.9	24	24	24	53.3
Chrysene	13300	6900	6380	8590	17200	5690	1010	1650	1950	640	26.5	60.1	29.4	10	10	79.7
Dibenzo(a,h)anthracene	2460	1740	1110	1700	3100	1400	216	366	310	127	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	9630	7510	3750	6820	12800	4050	694	1110	1820	391	0.018	46.5	0.018	0.018	0.018	41.2
Fluoranthene	39000	28000	18100	20800	47700	9910	2250	3570	5620	1350	47	138	100	0.017	0.017	167
Fluorene	2650	390	917	826	2890	182	121	273	343	47.6	10	10	10	10	10	25.4
Naphthalene	1840	1280	884	1020	2510	337	437	1230	2120	272	20.6	16.4	48.8	9	9	106
Phenanthrene	25200	16800	8990	6260	20900	1770	1130	1750	2720	519	24.9	80.7	70.9	15	15	105
Pyrene	25.1	16.3	12.7	15.1	32.1	7.3	1.74	2.66	4.02	1.04	0.0375	0.113	0.0747	0.015	0.015	0.12
PAH, Total Detected USEPA 16	189	117	87.5	107	232	62.4	13.6	22.8	29.1	8.04	0.239	0.691	0.415	0.118	0.118	0.984
Naphthalene-d8 % recovery**	92.8	94.9	80.3	94.6	89.9	93.5	94.9	92.7	83.9	91.6	89.2	96.8	97.2	91.6	89.8	89.8
Acenaphthene-d10 % recovery**	95.8	96.4	86.4	88.7	88.9	92.4	87.9	94.2	80.3	82.6	78.8	97.1	99.8	86.9	85.7	89
Phenanthrene-d10 % recovery**	90.9	95.2	87.3	93.4	89.3	95.7	89.3	94.3	84.5	88.5	85.2	93.8	97.5	87.1	87.3	89.2
Chrysene-d12 % recovery**	75.3	78.1	79.6	79.2	77.8	92.2	81	86.6	81.2	77.8	78.7	83.9	95.1	85.5	87	84
Perylene-d12 % recovery**	75.9	82.2	76.9	80.3	80.9	94.5	78.1	86.7	74.7	74.2	77.7	84.4	96.2	84.3	85.9	82.2
Total Aliphatics >C12-C44	75.5	175	86.7	72.3	151	31.8	102	73.6	59.8	92.8	6.39	1.85	5.94	0.614	0.1	9.56
Total Aromatics >EC12-EC44	279	280	299	230	1610	73	225	171	232	83	1220	17.1	51.2	4.44	7.06	43.3
Total Aliphatics & Aromatics >C5-C44	355	455	386	303	1770	105	327	244	292	176	1220	18.9	57.2	5.05	7.06	52.8
Metals - (Solid)																
Iron	49500	138000	100000	141000	40400	169000	74100	126000	166000	68900	38000	33700	32600	40300	39000	33900
Manganese	1190	3940	18000	25700	8550	7380	4130	11100	8750	5520	1260	321	393	437	280	574
Metals - (Liquid)																
Calcium	-	200000	159000	-	77000	-	64100	-	-	-	-	-	44500	8210	-	22500
Magnesium	-	13000	12700	-	9830	-	5710	-	-	-	-	-	7310	6510	-	3160
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.0102	0.01	0.01	0.01	0.01	0.01	0.058	0.0236	0.01	0.0109	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0846	0.01	0.278	0.142	0.0126	0.0109	0.023
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.116	0.0236	0.0378	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0846	0.035	0.452	0.189	0.0504	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE																
pH																
Sulphate, Total																
Sulphur, Total																
Sulphate, Total potential																
Sulphate, acid soluble (total)																
Cyanide, Total																
Exchangeable Ammonia as N																
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	16/10/2018	08/10/2018	-	09/10/2018	-	08/10/2018	-	-	-	-	-	29/10/2018	29/10/2018	-	29/10/2018
Analysed By	-	Lucy Caroe	Lucy Caroe	-	Lucy Caroe	-	Andrzej Ferfecki	-	-	-	-	-	Christian Hallam	Christian Hallam	-	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																
Analysts Comments																
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	-	Detected	Not Detected	-	Detected	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected
Comments	-	-	0	-	0	-	0	-	-	-	-	-	0	0	-	0
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	109	77.2	95	106	102	100	98.8	107	109	101	105	94.5	86	105	102	88.5
Toluene-d8**	95.9	94.3	93.3	93.6	97.8	98.4	98.2	98	94.3	97.9	95.7	96.9	92.8	98.5	98.7	89.6
4-Bromofluorobenzene**	85.2	85.9	78	82.9	91.8	94.5	92.1	92.1	79.7	91.2	85.1	88.7	82.5	99.7	95.6	73.3
Methyl Tertiary Butyl Ether	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.01	0.1	0.1	0.1
Benzene	0.09	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.009	0.09	0.09	0.114
Toluene	0.07	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.12	0.0284	0.07	0.07	0.146
Ethylbenzene	0.04	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.004	0.04	0.04	0.04
p/m-Xylene	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.144	0.0519	0.1	0.1	0.1
o-Xylene	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.01	0.1	0.1	0.1
Naphthalene	0.13	0.013	0.13	0.13	0.13	0.13	0.13	0.13	0.013	0.13	0.13	579	411	0.13	0.13	8.18
Sum of BTEX	0.4	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.4	-	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	18.4	-	-	18.1
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	15.3	-	-	15.6
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	18.2	-	-	17.8
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	14.7	-	-	15
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	1.01	-	-	0.86
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	16.1	-	-	12.8
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	17	-	-	13.5

Sample ID	3CH6	3CH7	3CH8	3CH8	3CH9	3CH9	3CH4
Depth	0.5	0.5	0.5	1	0.5	1	0.5
Sampled Date	13/08/2018	01/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	17/10/2018
Carbon							
Soil Organic Matter (SOM)	8.5	1.27	12.7	14.7	3.19	3.9	8.98
Metals (Solids)							
Arsenic	10.3	6.65	7.92	7.09	7.5	8.7	15.1
Cadmium	0.435	0.02	0.722	0.0699	0.854	0.935	0.931
Chromium	232	156	62.3	28.4	48.3	48	56.4
Copper	45.2	33.3	14.1	13.7	17	61.6	26.2
Lead	146	42.5	158	70.7	129	169	131
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	21.4	19.9	13.5	15.2	14	46	28.9
Selenium	6.44	2.87	2.44	1	2.38	1.92	1
Vanadium	274	155	134	49.3	72.2	76.6	75.5
Zinc	670	201	579	476	482	686	555
TPH Criteria Working Group (TPH CWG)							
Benzene							
Toluene							
Ethylbenzene							
sum of detected mpo xylene by GC							
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.0129	0.01	0.01	0.01	0.0196	0.01	0.01
Aliphatics >C8-C10	0.0164	0.01	0.01	0.01	0.015	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.0161	0.01	0.01
Aliphatics >C12-C16	0.1	3.47	6.11	3.94	1.53	1.95	0.1
Aliphatics >C16-C21	3.44	16.2	34.1	12.9	11.2	13.1	0.407
Aliphatics >C21-C35	15.7	90.8	89.4	44.5	60.8	70.8	8.23
Aliphatics >C35-C44	4.27	46.2	10.9	7.37	16.8	23.6	1.11
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.0105	0.01	0.01	0.01	0.0104	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.0104	0.01	0.01
Aromatics >EC12-EC16	1.58	1.35	14.1	92.2	1.16	2.13	0.1
Aromatics >EC16-EC21	7.89	8.45	121	536	6	22.2	0.1
Aromatics >EC21-EC35	34.5	53.4	300	803	37	69.4	15.3
Aromatics >EC35-EC44	10	32.4	82.9	215	21	31.8	1.16
Aromatics >EC40-EC44	3.2	13.4	26.5	66.8	8.69	13.6	0.1
Polyaromatic Hydrocarbons (PAHs)							
Acenaphthylene	268	44.7	1090	730	85.5	141	38.4
Acenaphthene	31.7	23.6	97.9	87	34.3	33.5	8
Anthracene	464	86.9	2470	1220	336	344	32.3
Benz(a)anthracene	1250	330	7580	4020	790	798	134
Benzo(a)pyrene	1170	302	6680	3300	657	681	200
Benzo(b)fluoranthene	1750	610	8710	5820	1070	1250	242
Benzo(k)fluoranthene	615	194	3030	1890	398	377	75
Benzo(g,h,i)perylene	885	265	4420	2600	452	501	199
Chrysene	1140	367	5790	3440	849	717	152
Dibenzo(a,h)anthracene	239	66.6	1250	686	130	141	35.9
Indeno(1,2,3-cd)pyrene	1090	195	5080	2150	373	410	141
Fluoranthene	2710	614	15500	8500	1380	1630	265
Fluorene	180	32.9	608	504	92.2	102	10
Naphthalene	253	109	1060	1400	229	245	35.8
Phenanthrene	1310	305	6570	3430	668	793	133
Pyrene	1.9	0.482	12	6.32	1.1	1.27	0.224
PAH, Total Detected USEPA 16	15.2	4.03	81.9	46.1	8.65	9.43	1.91
Naphthalene-d8 % recovery**	103	84.5	84.5	78	91.3	88.7	90.6
Acenaphthene-d10 % recovery**	102	87.6	84.3	81.8	88.5	84.1	86.5
Phenanthrene-d10 % recovery**	102	83.2	85.1	84.6	85.5	83.9	82.9
Chrysene-d12 % recovery**	91.9	75.8	79.2	70.6	75.7	77.2	80.5
Perylene-d12 % recovery**	93.6	74.1	82.1	71.8	71.8	72.3	86.1
Total Aliphatics >C12-C44	23.4	157	140	68.7	90.4	109	9.75
Total Aromatics >EC12-EC44	54	95.6	518	1650	65.1	126	16.4
Total Aliphatics & Aromatics >C5-C44	77.5	252	658	1710	156	235	26.2
Metals - (Solid)							
Iron	84800	93000	86400	65000	55100	69500	36200
Manganese	15000	9880	7030	3110	6250	5840	1530
Metals - (Liquid)							
Calcium	96000	-	-	60200	127000	132000	-
Magnesium	12500	-	-	7720	22600	17900	-
Phenols							
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics							
Soluble Sulphate 2:1 extract as SO4 BRE							
pH							
Sulphate, Total							
Sulphur, Total							
Sulphate, Total potential							
Sulphate, acid soluble (total)							
Cyanide, Total							
Exchangeable Ammonia as N							
Asbestos							
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-
Date of Analysis	16/10/2018	-	-	17/10/2018	16/10/2018	16/10/2018	-
Analysed By	Barbara Urbanek-Walsh	-	-	Andrzej Ferfecki	James Richards	Lucy Caroe	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)							
Analysts Comments							
Asbestos Quantification - Total - %	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Comments	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)							
Dibromofluoromethane**	103	105	118	115	117	111	110
Toluene-d8**	94.2	96.5	96	96.2	95.5	97.1	97.1
4-Bromofluorobenzene**	78.1	83.4	78.9	90.2	86.6	87.6	89
Methyl Tertiary Butyl Ether	0.2	0.1	0.1	0.2	0.1	0.1	0.1
Benzene	0.18	0.09	0.09	0.18	0.09	0.09	0.09
Toluene	0.14	0.07	0.07	0.14	0.07	0.07	0.07
Ethylbenzene	0.08	0.04	0.04	0.08	0.04	0.04	0.04
p/m-Xylene	0.2	0.1	0.1	0.2	0.1	0.1	0.1
o-Xylene	0.2	0.1	0.1	0.2	0.1	0.1	0.1
Naphthalene	0.26	0.13	0.13	0.26	0.13	0.13	0.13
Sum of BTEX	0.8	0.4	0.4	0.8	0.4	0.4	0.4
Subcontracted: Inorganics							
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	3CH4	3CH4	3CH5	3CH5	3CH5	3CH4V	3CH5V
Depth	1	2	0.3	0.8	1.5	2.7	2.7
Sampled Date	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Carbon							
Soil Organic Matter (SOM)	81.2	74.3	4.9	2.81	62.2	1.76	4.71
Metals (Solids)							
Arsenic	8.2	9.64	13.4	6	7.13	11	12.9
Cadmium	0.386	0.532	0.0891	0.2	0.144	0.02	1.31
Chromium	53.9	73.8	41.3	460	42.3	43.9	46.8
Copper	29.5	33.8	22	14	42.9	22.2	27.7
Lead	2080	96.7	40.4	52.4	44.8	22	342
Mercury	0.14	0.14	0.14	1.4	0.14	0.14	0.14
Nickel	13.8	17.8	26.2	10.1	14.8	33.8	19.2
Selenium	2.03	2.23	1	14.4	1.24	1	1.31
Vanadium	56.6	73.7	65.6	427	28.7	80.3	76.9
Zinc	634	594	140	400	245	124	2560
TPH Criteria Working Group (TPH CWG)							
Benzene							
Toluene							
Ethylbenzene							
sum of detected mpo xylene by GC							
Aliphatics >C5-C6	0.303	0.2	0.01	0.01	0.023	0.01	0.01
Aliphatics >C6-C8	1.62	0.775	0.01	0.01	0.0771	0.0181	0.01
Aliphatics >C8-C10	2.94	1.26	0.01	0.01	0.069	0.0155	0.01
Aliphatics >C10-C12	108	38.5	0.01	0.01	0.161	0.143	0.01
Aliphatics >C12-C16	14.8	16.5	0.1	0.1	8.96	0.206	1.11
Aliphatics >C16-C21	120	96.4	0.1	3.36	92.2	0.868	15.7
Aliphatics >C21-C35	152	212	6.31	51.7	109	5.67	79
Aliphatics >C35-C44	33.4	91.3	0.1	5.84	29.9	0.935	21.9
Aromatics >EC5-EC7	0.2	0.2	0.01	0.01	0.0426	0.01	0.01
Aromatics >EC7-EC8	0.2	0.2	0.01	0.01	0.0322	0.01	0.01
Aromatics >EC8-EC10	1.96	0.839	0.01	0.01	0.046	0.0103	0.01
Aromatics >EC10-EC12	71.7	25.7	0.01	0.01	0.107	0.0955	0.01
Aromatics >EC12-EC16	509	542	0.1	0.1	63.6	0.1	2.92
Aromatics >EC16-EC21	1350	1570	1.82	0.384	499	0.369	21.9
Aromatics >EC21-EC35	2090	2240	20.3	7.9	1530	6.57	112
Aromatics >EC35-EC44	477	522	10	0.1	444	3.53	47.1
Aromatics >EC40-EC44	126	142	4.46	0.1	116	1.15	15.9
Polyaromatic Hydrocarbons (PAHs)							
Acenaphthylene	20700	70400	12	51.2	24900	48.2	483
Acenaphthene	27600	20300	8	8	2010	35.6	18.7
Anthracene	32300	66600	16	33	45200	71.8	243
Benz(a)anthracene	33900	82800	80.5	162	111000	136	1110
Benzo(a)pyrene	24900	59900	82.5	214	92300	103	1540
Benzo(b)fluoranthene	36200	67600	130	285	96300	116	1560
Benzo(k)fluoranthene	9930	32600	39.7	99.4	45500	47.5	730
Benzo(g,h,i)perylene	15800	39300	72.9	261	66200	75.9	1730
Chrysene	27600	74400	87.1	155	89700	107	1040
Dibenzo(a,h)anthracene	11.5	6730	0.023	48.9	16500	0.023	323
Indeno(1,2,3-cd)pyrene	14500	50200	44.3	199	51100	101	1450
Fluoranthene	101000	274000	146	260	289000	363	1570
Fluorene	32300	56800	10	14.5	20900	71.8	59.4
Naphthalene	418000	1360000	29	101	18400	518	474
Phenanthrene	109000	214000	102	152	152000	312	537
Pyrene	66.1	187	0.107	0.204	203	0.226	1.31
PAH, Total Detected USEPA 16	970	2660	0.921	2.24	1320	2.33	14.2
Naphthalene-d8 % recovery**	135	86	91.5	92	87.5	81.1	90.6
Acenaphthene-d10 % recovery**	155	98	89.6	86.6	88.5	82.2	90.2
Phenanthrene-d10 % recovery**	158	96	91.5	83.3	87	88.2	91.6
Chrysene-d12 % recovery**	188	84	88.3	80.4	95	88.8	91.5
Perylene-d12 % recovery**	210	69	88.8	83.3	79	86.9	88.1
Total Aliphatics >C12-C44	321	416	6.31	60.9	240	7.68	118
Total Aromatics >EC12-EC44	4420	4870	32.1	8.29	2540	10.5	184
Total Aliphatics & Aromatics >C5-C44	4930	5360	38.4	69.2	2780	18.4	302
Metals - (Solid)							
Iron	42900	39100	25000	158000	52100	28200	68300
Manganese	3550	4970	891	35200	2190	891	4440
Metals - (Liquid)							
Calcium	-	140000	57200	108000	-	-	-
Magnesium	-	15800	10200	12700	-	-	-
Phenols							
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics							
Soluble Sulphate 2:1 extract as SO4 BRE							
pH							
Sulphate, Total							
Sulphur, Total							
Sulphate, Total potential							
Sulphate, acid soluble (total)							
Cyanide, Total							
Exchangeable Ammonia as N							
Asbestos							
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-
Date of Analysis	-	17/10/2018	17/10/2018	09/10/2018	-	-	-
Analysed By	-	Andrzej Ferfecki	Andrzej Ferfecki	Andrzej Ferfecki	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)							
Analysts Comments							
Asbestos Quantification - Total - %	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	Not Detected	Not Detected	-	-	-
Amosite (Brown) Asbestos	-	Not Detected	Not Detected	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	Not Detected	Not Detected	-	-	-
Fibrous Anthophyllite	-	Not Detected	Not Detected	Not Detected	-	-	-
Fibrous Tremolite	-	Not Detected	Not Detected	Not Detected	-	-	-
Fibrous Actinolite	-	Not Detected	Not Detected	Not Detected	-	-	-
Non-Asbestos Fibre	-	Not Detected	Not Detected	Not Detected	-	-	-
Comments	-	-	-	0	-	-	-
Volatile Organic Compounds (VOCs)							
Dibromofluoromethane**	111	106	110	94.4	101	113	102
Toluene-d8**	96.1	95.4	96.2	93.2	93.4	99.5	96.7
4-Bromofluorobenzene**	82.4	84.3	81.1	83.2	78.3	94.4	89.3
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.161	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics							
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-

Sample ID	3CH6V	3CH7V	3CH8V	3CH9V	3CI7	3CI7	3CI8	3CI8	3CI8	3CI9	3CI9	3CI4
Depth	0.8	0.9	1.1	1.3	0.5	1	0.5	1	2	0.5	1	0.5
Sampled Date	13/08/2018	01/08/2018	01/08/2018	30/07/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	17/10/2018
Carbon												
Soil Organic Matter (SOM)	5.4	4.79	1.9	1.91	12.8	2.52	4.52	9.53	10.9	7.57	4.53	6.19
Metals (Solids)												
Arsenic	11.5	21.2	13.6	13.2	6.89	5.14	9.73	8.48	9.84	7.89	9.63	18.1
Cadmium	0.109	0.02	0.02	0.02	0.17	0.02	0.02	0.0231	0.225	0.316	0.172	0.388
Chromium	44.6	41.6	39.3	43.3	89.8	65.1	32.2	82.3	121	54.4	104	35.1
Copper	21.5	31.9	17.6	18	12.6	13	16.1	15.4	20	15.9	24.5	19.4
Lead	30.2	139	24.9	26.6	53.3	46.1	53.4	129	180	169	448	52.6
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	29.9	28.4	38.5	35.9	17.3	12.2	19.3	18.2	17.6	14.9	18.8	28.9
Selenium	1	1	1	1	2.24	1.89	1	1	3.31	1.82	2.25	1
Vanadium	63.5	83.5	55.2	61.2	109	108	52.3	137	213	111	116	63.7
Zinc	141	194	106	128	197	187	234	458	716	319	316	179
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0383	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0325	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.051	0.01
Aliphatics >C12-C16	0.1	0.601	0.1	0.1	2.41	2.92	1.25	1.85	2.11	3.95	2.66	0.1
Aliphatics >C16-C21	0.1	1.06	0.1	0.1	12.4	13.1	9.49	11.2	18.2	20.6	9.08	0.1
Aliphatics >C21-C35	3.79	5.07	1.07	0.1	62.6	72.6	60.2	49.2	60.6	79.1	45	5.69
Aliphatics >C35-C44	0.1	0.432	0.1	0.1	22	31	11.5	16.7	12.1	23.1	18.5	0.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.022	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0336	0.01
Aromatics >EC12-EC16	0.1	0.342	0.297	0.1	2.83	3	2.8	9.13	7.09	5.02	1.23	0.1
Aromatics >EC16-EC21	0.1	1.98	0.915	0.1	17.7	21.9	19.3	63.8	56	33.6	5.25	1.28
Aromatics >EC21-EC35	13.2	48.9	9.89	5.33	76.9	90.8	87.6	152	185	119	24.9	25.5
Aromatics >EC35-EC44	2.05	7.32	4.61	0.689	34.6	41.5	35.9	59	58.8	44.5	13.4	7.38
Aromatics >EC40-EC44	0.407	1.77	1.9	0.1	13.2	16.1	14.5	21.8	19.6	16.7	5.35	2.53
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	12	12	12	12	398	206	203	686	610	520	124	12
Acenaphthene	8	8	8	8	81.4	33.1	40	72.5	62.6	151	60.9	8
Anthracene	16	16	16	16	665	455	393	1210	933	882	359	16
Benz(a)anthracene	39	14	14	14	1700	1330	1240	3680	2520	2810	760	31.2
Benzo(a)pyrene	38.6	15	15	15	1550	1080	1090	3520	2490	2470	696	30.9
Benzo(b)fluoranthene	64.9	32.6	15	15	2560	1920	2040	4560	3040	4010	1110	29.2
Benzo(k)fluoranthene	24.4	14	14	14	867	637	705	1670	1240	1160	403	14
Benzo(g,h,i)perylene	24	24	24	24	1120	762	838	2640	1840	1660	422	24
Chrysene	47.4	21.7	10	10	1590	1160	1320	3120	2250	2610	744	30.9
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	297	201	220	688	464	489	116	0.023
Indeno(1,2,3-cd)pyrene	43	0.018	0.018	0.018	960	670	687	2870	1900	1430	366	31.2
Fluoranthene	101	37.5	0.017	0.017	3650	2760	2660	7730	5780	5320	1710	63.4
Fluorene	10	10	10	10	450	196	132	441	397	374	181	10
Naphthalene	14.3	9	9	9	497	351	380	877	744	1410	344	9
Phenanthrene	57.2	22.5	15	15	2130	1450	1150	3460	2440	2510	1270	25.2
Pyrene	0.0728	0.0293	0.015	0.015	2.7	2.04	1.99	5.96	4.38	4.09	1.26	0.0492
PAH, Total Detected USEPA 16	0.502	0.144	0.118	0.118	21.2	15.3	15	43.2	31.1	31.9	9.93	0.291
Naphthalene-d8 % recovery**	95.5	82.3	92.7	88.2	89.5	88.4	83.3	96.3	95.8	91.1	92.4	83.5
Acenaphthene-d10 % recovery**	98.4	86	101	82	89.6	96.1	90.3	94.6	91.6	91.5	86.5	85
Phenanthrene-d10 % recovery**	94.1	88.1	103	86.1	90.9	97.5	89.2	91.8	93.3	82.2	86.5	90.3
Chrysene-d12 % recovery**	83.8	77.6	100	83.8	79.7	86.1	84	87.7	85.4	76.5	76.9	88.8
Perylene-d12 % recovery**	86.2	82.4	95.1	82.2	75.4	87.8	80.9	89	86.4	71.1	72.8	85.6
Total Aliphatics >C12-C44	3.79	7.16	1.07	0.1	99.5	120	82.5	79	93	127	75.2	5.69
Total Aromatics >EC12-EC44	15.3	58.5	15.7	6.01	132	157	146	284	307	202	44.7	34.1
Total Aliphatics & Aromatics >C5-C44	19.1	65.7	16.8	6.01	232	277	228	363	400	329	120	39.8
Metals - (Solid)												
Iron	32900	29100	36700	44600	55000	63900	54800	120000	131000	55200	86500	26700
Manganese	377	381	351	850	5720	6270	2580	5830	12200	5730	7800	792
Metals - (Liquid)												
Calcium	190000	-	108000	-	93600	171000	72900	-	149000	105000	-	157000
Magnesium	24900	-	13500	-	14600	22600	19100	-	15500	9870	-	24500
Phenols												
Phenol	0.01	0.01	0.01	0.0111	0.022	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.022	0.01	0.062	0.0444	0.022	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.062	0.0555	0.0439	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE												
pH												
Sulphate, Total												
Sulphur, Total												
Sulphate, Total potential												
Sulphate, acid soluble (total)												
Cyanide, Total												
Exchangeable Ammonia as N												
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	29/10/2018	-	29/10/2018	-	29/10/2018	29/10/2018	16/10/2018	-	17/10/2018	17/10/2018	-	16/10/2018
Analysed By	Christian Hallam	-	Christian Hallam	-	Christian Hallam	Christian Hallam	Barbara Urbanek-Walsh	-	Lucy Caroe	Lucy Caroe	-	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)												
Analysts Comments												
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Detected	Detected	-	Detected
Comments	0	-	0	-	0	0	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	101	89.4	102	94	99.1	88.8	105	110	87.3	93.7	103	105
Toluene-d8**	98.7	90.9	99.1	92.8	98.6	91.1	94.8	93.6	88.7	91	94.3	96.3
4-Bromofluorobenzene**	102	81.1	93	75.9	95.8	70.9	82.7	84.2	70	70.4	77.8	86.1
Methyl Tertiary Butyl Ether	2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.2	0.2	0.1
Benzene	1.8	0.09	0.09	0.09	1.8	0.18	0.18	0.09	0.18	0.18	0.18	0.09
Toluene	1.4	0.07	0.07	0.07	1.4	0.14	0.14	0.07	0.14	0.14	0.14	0.07
Ethylbenzene	0.8	0.04	0.04	0.04	0.8	0.08	0.08	0.04	0.08	0.08	0.08	0.04
p/m-Xylene	2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.2	0.2	0.1
o-Xylene	2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.2	0.2	0.1
Naphthalene	2.6	0.13	0.13	0.13	4.59	0.327	0.26	0.13	0.26	0.26	0.26	0.597
Sum of BTEX	8	0.4	0.4	0.4	8	0.8	0.8	0.4	0.8	0.8	0.8	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CI4	3CI4	3CI5	3CI5	3CI5	3CI5	3CI4V	3CI5V	3CI6V	3CI7V	3CI8V	3CI9V
Depth	1	2	0.3	0.8	1.5	2	3.4	3.2	0.2	2	2.6	1.3
Sampled Date	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	01/08/2018	01/08/2018	01/08/2018	30/07/2018
Carbon												
Soil Organic Matter (SOM)	0.35	5.84	6.96	29.3	54.5	26.7	0.597	6.69	4.76	4.97	1.4	2.43
Metals (Solids)												
Arsenic	3.86	6	15	7.15	4.03	3.32	14.2	14.3	9.99	8.02	15.2	12
Cadmium	0.02	0.2	2.41	0.02	0.02	0.02	0.02	0.02	0.02	0.052	0.02	0.02
Chromium	464	734	276	220	165	49.4	35.1	77.4	91.3	68.6	35.9	33.8
Copper	10.3	17.5	55.7	17.8	11.4	6.46	11.8	19.1	14.3	14	16	19
Lead	8.94	17.2	423	142	13.5	13.1	24.6	33.1	30.1	52.2	25.5	27.6
Mercury	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	3.82	8.02	43.5	11.3	7.78	3.31	34.2	26.5	25	15.4	38.4	28.9
Selenium	6.41	15	10	4.62	4.61	4.01	1	1.49	1.12	2.56	1	1
Vanadium	406	631	249	217	161	59.6	55.2	119	159	119	52.9	53.2
Zinc	63.1	111	2610	1270	92	88.4	103	132	135	217	111	132
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.0417	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.0176	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.0143	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	7.21	2.1	0.787	2.33	17.8	2.65	0.1	0.1	0.511	5.49	0.1	0.1
Aliphatics >C16-C21	13.4	10.8	11.1	10	27.4	14	0.1	0.1	2	16.2	0.1	0.1
Aliphatics >C21-C35	68.1	56.7	76.8	77	69.8	13.1	0.1	4.38	11.7	99.3	1.11	0.1
Aliphatics >C35-C44	6.44	11.1	27.6	12.6	7.15	1.3	0.1	0.1	4.34	51.8	0.1	0.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.0121	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	16.4	0.182	2.03	0.165	19.6	6.1	0.1	0.1	0.498	3.19	0.286	0.1
Aromatics >EC16-EC21	23.2	4.8	11.7	3.58	42.4	88.3	0.1	0.1	4.04	21	0.718	0.1
Aromatics >EC21-EC35	53.7	18.6	93.7	19	79.6	167	2.45	26.6	21	114	6.53	12.6
Aromatics >EC35-EC44	12.3	1	56.3	1.73	20.7	41	0.1	3.34	7	68.3	3.23	4.2
Aromatics >EC40-EC44	3.51	0.1	20.8	0.1	6.69	12.5	0.1	0.1	2.59	28.4	1.22	1.65
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	47.2	17.4	288	225	1090	143	12	12	133	244	12	12
Acenaphthene	23.9	19.4	11.6	19.6	67	17.1	8	8	33.6	42.4	8	8
Anthracene	106	55.3	148	191	1050	284	16	16	244	478	16	16
Benz(a)anthracene	312	286	816	667	2080	908	14	112	862	1340	14	14
Benzo(a)pyrene	238	222	1040	723	1460	832	15	136	768	1190	15	15
Benzo(b)fluoranthene	385	307	1110	877	2550	1040	15	150	1350	2150	15	15
Benzo(k)fluoranthene	119	124	454	309	831	361	14	59	450	683	14	14
Benzo(g,h,i)perylene	171	180	1120	654	787	716	24	97.8	531	935	24	24
Chrysene	405	381	716	599	1820	792	10	135	847	1340	10	10
Dibenzo(a,h)anthracene	48.2	39.7	213	129	248	152	0.023	0.023	142	236	0.023	0.023
Indeno(1,2,3-cd)pyrene	135	267	928	880	1250	549	0.018	78.5	614	794	0.018	0.018
Fluoranthene	708	678	1050	1240	6280	2020	0.017	173	1720	2660	0.017	0.017
Fluorene	91.1	22.1	37.6	111	791	95.4	10	10	107	172	10	10
Naphthalene	474	91	262	847	8430	498	9	33.6	254	379	9	9
Phenanthrene	949	516	367	736	5610	922	15	101	757	1260	15	15
Pyrene	0.528	0.533	0.855	0.946	4.19	1.52	0.015	0.159	1.36	2.01	0.015	0.015
PAH, Total Detected USEPA 16	4.74	3.74	9.42	9.16	38.5	10.9	0.118	1.23	10.2	15.9	0.118	0.118
Naphthalene-d8 % recovery**	93.6	79	94.1	78.3	92.4	92.2	93.9	94.8	92.2	84.1	65.2	86.1
Acenaphthene-d10 % recovery**	92.3	82.9	94.3	84.3	89.4	87.5	91	95.1	102	87.5	71.7	73.6
Phenanthrene-d10 % recovery**	89.3	85.8	96.3	88.1	89.6	83.8	89.3	96.5	101	89.5	82.8	83.4
Chrysene-d12 % recovery**	83.7	81.7	101	88.1	78.2	74.9	88.4	102	101	77.2	84.6	79.6
Perylene-d12 % recovery**	75.7	77.6	98.7	84.7	70.4	74.6	92.4	100	94.1	73	82.3	77.9
Total Aliphatics >C12-C44	95.2	80.6	116	102	122	31.1	0.1	4.38	18.6	173	1.11	0.1
Total Aromatics >EC12-EC44	106	24.6	164	24.5	162	302	2.45	30	32.6	206	10.8	16.8
Total Aliphatics & Aromatics >C5-C44	201	105	280	126	284	333	2.45	34.4	51.1	379	11.9	16.8
Metals - (Solid)												
Iron	132000	154000	130000	106000	59600	20700	35400	32100	78400	41400	36000	41000
Manganese	20600	18600	11900	17200	8780	6630	492	2910	4010	5980	382	884
Metals - (Liquid)												
Calcium	-	-	109000	193000	160000	118000	-	23400	-	64700	124000	-
Magnesium	-	-	13600	31500	23000	16400	-	3870	-	15200	12200	-
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.0875	0.13	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.0219	0.59	0.01	0.0114	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	1.16	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.109	1.88	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE												
pH												
Sulphate, Total												
Sulphur, Total												
Sulphate, Total potential												
Sulphate, acid soluble (total)												
Cyanide, Total												
Exchangeable Ammonia as N												
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	16/10/2018	29/10/2018	24/10/2018	24/10/2018	-	17/08/2018	-	07/08/2018	07/08/2018	-
Analysed By	-	-	Lucy Caroe	Christian Hallam	Paul Poynton	Paul Poynton	-	Andrzej Ferfecki	-	Renata Bozhkov	Renata Bozhkov	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)												
Analysts Comments												
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Comments	-	-	-	0	0	0	-	0	-	0	0	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	109	101	111	114	105	96.5	98.4	73.7	95	100	97	104
Toluene-d8**	96.3	94.5	95.1	91.3	97.3	92.8	96.4	96.2	93.8	98.2	95.8	98.3
4-Bromofluorobenzene**	83.7	79.7	80.5	98.6	99.8	85.1	88.7	70.5	75.1	91	84.5	94.7
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.947	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.501	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0661	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.33	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.59	0.1	0.1	0.1	0.1
Naphthalene	0.73	0.244	0.13	0.13	0.13	0.13	0.13	2.6	0.13	0.13	0.205	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.51	0.4	0.4	0.4	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CJ5	3CJ5	3CJ5	3CJ5	3CJ6	3CJ6	3CJ6	3CJ6	3CJ7	3CJ7	3CJ8	3CJ4	3CJ4	3CJ4	3CJ4V	3CJ5V	3CJ6V	3CJ7V	3CJ8V
Depth	0.5	1.2	1.9	2.2	0.3	0.6	1.1	2	0.5	1	0.5	0.5	0.7	1.8	3.7	2.3	2.3	1.4	0.8
Sampled Date	13/08/2018	13/08/2018	13/08/2018	13/08/2018	13/08/2018	13/08/2018	13/08/2018	13/08/2018	01/08/2018	01/08/2018	01/08/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	13/08/2018	13/08/2018	01/08/2018	01/08/2018
Carbon																			
Soil Organic Matter (SOM)	6.5	1.74	79	53.1	3	>100	76.9	52.6	21	3.28	4.76	6.1	14.9	1.14	3.57	3.83	3.53	9.83	1.76
Metals (Solids)																			
Arsenic	19.5	6	7.18	10.4	6	5.35	4.29	8.83	4.67	7.66	9.33	10.9	2.79	4.42	12.7	7.64	11.8	14.5	11.6
Cadmium	9.59	0.596	3.09	0.564	0.2	0.02	0.02	0.0858	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.211	0.02
Chromium	185	471	32	22.2	842	212	148	54.7	225	58.3	150	28.8	338	627	39.6	37.6	36.8	42.1	34
Copper	91.3	20.3	43	41.5	22.3	21.7	35.9	34.7	12.5	13.6	15.5	13.9	2.1	8.18	17.8	12.9	11.3	19.1	18.3
Lead	1330	175	385	105	10.3	31.3	24.7	56.1	22.2	32.1	137	36.1	14.4	5.03	30.2	28.3	25.5	41.6	21.1
Mercury	1.4	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	62.1	15.2	30.5	20.7	7.82	10.2	10.1	16.8	23.8	26.7	14.1	29.4	18.7	1.62	29.9	36.8	27.2	24.7	36.9
Selenium	10	11.1	10	3.14	13.8	4.38	4.32	2.41	4.76	1	3.98	1	6.6	8.12	1	1	1	1	1
Vanadium	147	375	67.5	48.4	614	195	168	53	182	65.8	160	48.5	371	499	64.3	53.4	56.6	63.1	52.4
Zinc	7680	1140	2140	479	69.8	159	86.7	161	101	168	586	178	83.5	28.8	147	118	99.7	128	108
TPH Criteria Working Group (TPH CWG)																			
Benzene																			
Toluene																			
Ethylbenzene																			
sum of detected mpo xylene by GC																			
Aliphatics >C5-C6	0.0106	0.01	0.112	0.0267	0.01	0.0147	0.01	0.01	0.01	0.01	0.01	0.01	0.0149	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.0378	0.0142	0.424	0.126	0.0196	0.0622	0.01	0.01	0.01	0.01	0.01	0.01	0.0352	0.01	0.01	0.0191	0.01	0.01	0.01
Aliphatics >C8-C10	0.0448	0.0197	2.17	0.674	0.0185	0.0509	0.01	0.01	0.01	0.01	0.01	0.0113	0.0277	0.01	0.01	0.0203	0.01	0.01	0.01
Aliphatics >C10-C12	0.0389	0.0153	162	25.4	0.0309	0.052	0.01	0.01	0.01	0.01	0.01	0.0127	0.0363	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	0.1	3.01	40.4	13.3	2.88	20.4	5.6	3.7	0.65	0.54	2	0.1	7.7	2.4	0.1	0.495	0.1	0.247	0.1
Aliphatics >C16-C21	8.92	8.4	176	58.9	5.7	176	29.9	14.7	7.31	3.5	14.5	0.1	24.5	17.9	0.1	0.1	0.1	1.11	0.1
Aliphatics >C21-C35	45.9	63.8	80.9	39.1	28.4	154	53.2	38.5	33.7	24.5	52.2	8.7	71.5	106	2.3	0.889	1.66	11.6	0.538
Aliphatics >C35-C44	6.43	8.22	11.8	2.66	4.82	34.4	11.5	6.88	10.5	8.77	14.2	0.1	7.52	27.3	0.985	0.1	0.1	0.795	0.1
Aromatics >EC5-EC7	0.01	0.01	0.64	0.408	0.01	0.0158	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.511	0.254	0.01	0.0316	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.0307	0.0131	1.45	0.449	0.0123	0.0339	0.01	0.01	0.01	0.01	0.01	0.01	0.0181	0.01	0.01	0.014	0.01	0.01	0.01
Aromatics >EC10-EC12	0.026	0.0109	108	16.9	0.0206	0.035	0.01	0.01	0.01	0.01	0.01	0.01	0.0245	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	0.337	2.75	344	120	2.88	76.5	18.9	8.41	2.36	0.1	2.79	0.815	17.8	1.78	0.1	0.1	0.1	0.865	0.184
Aromatics >EC16-EC21	4.46	6.75	816	292	12.2	1060	182	43.7	13.9	3.33	23.1	2.13	104	18.8	0.1	0.343	0.851	4.9	0.687
Aromatics >EC21-EC35	23.1	26.5	826	327	32.6	3020	464	122	63.2	12.1	92.4	35.8	279	83.9	7.8	4.18	21.7	71.8	11.6
Aromatics >EC35-EC44	0.1	7.97	129	49.6	8.43	569	90.4	15.2	25.4	0.1	32.4	6.33	63.8	26.4	3.83	0.1	2.76	14.4	7.18
Aromatics >EC40-EC44	0.1	2.59	32.8	13.5	2.76	151	23.9	4.54	9.1	0.1	12	1.99	18.1	9.21	1.58	0.1	0.606	4.67	3.53
Polyaromatic Hydrocarbons (PAHs)																			
Acenaphthylene	24.2	12	99000	13900	91.9	25400	1860	952	582	48.8	545	12	3640	15.2	12	12	12	121	12
Acenaphthene	8	8	5550	849	11.7	768	101	126	77.8	18.2	70.2	8	129	92.8	8	8	8	14	8
Anthracene	52.3	31.4	81100	11600	153	42600	3550	1890	1480	102	1430	16	4980	142	16	16	16	325	16
Benz(a)anthracene	133	62.6	59600	8660	415	137000	12600	4650	2600	305	3540	74.7	15700	1250	14	14	31.9	813	14
Benzo(a)pyrene	116	51.7	39300	6110	362	108000	9400	3490	2270	264	2830	65.1	13700	981	15	15	28.7	645	15
Benzo(b)fluoranthene	224	97.5	57100	9500	578	63400	17500	6060	3880	461	4860	101	17000	1700	15	15	43.7	1050	15
Benzo(k)fluoranthene	67.9	29.9	20000	3570	201	70500	4750	1930	1550	138	1490	30.8	5960	513	14	14	14	302	14
Benzo(g,h,i)perylene	107	52.3	19300	3460	244	62400	5000	1830	1660	193	2010	57.5	8300	755	24	24	24	387	24
Chrysene	132	87.5	44600	8470	428	110000	12400	4390	2760	278	2850	75.4	11300	1590	10	10	28.9	815	10
Dibenzo(a,h)anthracene	31.4	0.023	5990	1.15	69.8	22100	1910	634	442	50.2	481	0.023	2560	189	0.023	0.023	0.023	111	0.023
Indeno(1,2,3-cd)pyrene	83.5	50.1	18400	3180	244	74800	5550	1650	1940	165	1680	49	6800	577	0.018	0.018	0.018	427	0.018
Fluoranthene	311	163	208000	29000	882	232000	23400	11900	6340	551	7140	138	35300	1850	0.017	0.017	59.6	1980	0.017
Fluorene	10	19.1	90600	12300	41	13200	1210	831	598	38.8	458	10	1770	54.9	10	10	10	48.8	10
Naphthalene	1180	166	2480000	588000	381	11400	1550	1070	445	113	642	45.1	2080	67.1	20.7	50	221	37.7	9
Phenanthrene	234	208	307000	39700	534	84900	7140	5480	4560	272	3410	96.1	11300	1140	15	15	35.3	331	15
Pyrene	0.263	0.135	129	18.7	0.635	162	18	8.18	4.71	0.416	5.28	0.0985	25.2	1.76	0.015	0.015	0.0442	1.46	0.015
PAH, Total Detected USEPA 16	2.96	1.15	3660	757	5.27	1220	126	55	35.9	3.42	38.7	0.831	166	12.7	0.118	0.118	0.493	8.87	0.118
Naphthalene-d8 % recovery**	91.1	95	87.5	104	96.1	93.9	88.2	83.3	88.1	85.5	74.8	94.9	94.7	92.6	80.2	96.2	91.7	93.1	92.6
Acenaphthene-d10 % recovery**	90.9	90.8	135	113	90	92.6	96.9	76.7	96.4	85.3	78.5	95.4	95	89.8	83	88.6	88.6	95	99.5
Phenanthrene-d10 % recovery**	99.8	89	127	100	98.8	92.6	98.4	96.6	105	91.2	84.9	94.8	97.3	89.3	89.4	86.1	89.3	106	101
Chrysene-d12 % recovery**	83.4	80.7	100	78.8	110	75.6	96	93.1	95.2	80.4	73.8	100	98.2	94.1	87.7	81.3	96.8	102	93.7
Perylene-d12 % recovery**	73.8	75.6	88.5	66.6	109	108	89.7	80.6	89.3	81.3	66.5	97.9	86.8	98.6	84.7	78.1	98.7	98.6	88.4
Total Aliphatics >C12-C44	61.2	83.4	309	114	41.8	384	100	63.8	52.2	37.3	83	8.7	111	154	3.28	1.38	1.66	13.7	0.538
Total Aromatics >EC12-EC44	27.9	44	2120	788	56.2	4720	754	189	105	15.4	151	45.1	465	131	11.6	4.53	25.3	91.9	19.6
Total Aliphatics & Aromatics >C5-C44	89.3	128	2700	947	98.1	5110	855	253	157	52.8	234	53.8	577	285	14.9	5.96	27	106	20.2
Metals - (Solid)																			
Iron	225000	153000	87900	47100	155000	80500	41900	25100	67800	43000	150000	26400	107000	153000	30000	25200	37300	27100	38500
Manganese	8030	27400	1900	1790	29500	10900	9530	2460	13400	2910	15500	1040	20900	24500	477	340	234	397	955
Metals - (Liquid)																			
Calcium	233000	215000	114000	196000	-	127000	-	118000	-	78700	142000	157000	-	188000	160000	194000	-	156000	178000
Magnesium	45600	11700	17100	17500	-	22900	-	15500	-	12600	8530	27800	-	7390	31800	21700	-	27200	16100
Phenols																			
Phenol	0.0747	0.0105	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.214	0.01	0.01	0.01	0.01
Cresols	0.0213	0.01	0.01	0.01	0.01	0.0116	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0238	0.01	0.0111	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0333	0.015	0.015
Phenols, Total Detected monohydric	0.096	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.238	0.035	0.0444	0.035	0.035
Inorganics																			
Soluble Sulphate 2:1 extract as SO4 BRE																			
pH																			
Sulphate, Total																			
Sulphur, Total																			
Sulphate, Total potential																			
Sulphate, acid soluble (total)																			
Cyanide, Total																			
Exchangeable Ammonia as N																			
Asbestos																			
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	29/10/2018	24/10/2018	29/10/2018	29/10/2018	-	29/10/2018	-	29/10/2018	-	24/10/2018	24/10/2018	29/10/2018	-	24/10/2018	18/06/2018	21/06/2018	-	21/06/2018	21/06/2018
Analysed By	Christian Hallam	Paul Poynton	Christian Hallam	Christian Hallam	-	Paul Poynton	-	Christian Hallam	-	Paul Poynton	Paul Poynton	Christian Hallam	-	Paul Poynton	Christian Hallam	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	James Richards
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																			
Analysts Comments																			
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Detected	Not Detected	-	Detected	Not Detected
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	Not Detected	-	Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected
Comments	0	0	0	0	-	0	-	0	-	0	0	0	-	0	Loose fibres in soil.	0	-	Loose fibres in soil.	0
Volatile Organic Compounds (VOCs)																			
Dibromofluoromethane**	81.9	101	92.2	90.4	102	91.8	101	98	103	97.1	97.5	108	105	112	114	105	105	103	107
Toluene-d8**	87.4	100	89.8	95.2	96.4	91.7	94.1	95	96.1	92.9	95.5	95.9	97.4	101	96.9	95.9	95.5	101	95.9
4-Bromofluorobenzene**	64.5	102	80.3	89.5	98.5	86.9	87.4	88.6	94.9	89.8	83.7	97	92.3	102	86.8	96.4	92.5	94.6	89.7
Methyl Tertiary Butyl Ether	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.18	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.14	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.08	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.26	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.8	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-	0.4	-	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																			
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	3CB1	3CB1	3CB1	3CB3	3CB3	3CB3	3CB4	3CB4	3CB5	3CB5	3CB1V	3CB3V	3CB4V
Depth	0.5	0.8	1.2	0.5	1	1.9	0.7	1.4	0.5	1	1.65	2.4	2.4
Sampled Date	23/10/2018	23/10/2018	23/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	23/10/2018	19/10/2018	19/10/2018
Carbon													
Soil Organic Matter (SOM)	2.59	0.934	1.95	13	40.2	12.9	9.14	1.95	6.74	3.03	4.14	1.88	6.47
Metals (Solids)													
Arsenic	6.25	8.04	9.6	41.1	23.9	17	5.97	6	9	12.2	9.16	12.1	14.2
Cadmium	0.345	0.404	0.398	0.02	0.2	0.2	0.766	0.2	0.02	0.2	0.02	0.02	0.16
Chromium	75.5	7.58	12.8	61.9	184	127	79.8	366	170	174	34.6	32	37.4
Copper	15.8	11.3	14.8	27.8	47.7	38.4	19.3	40.7	18.8	57	20.2	18.8	23.2
Lead	28.6	99.6	29.8	198	45.3	25.9	43	18.6	81.5	54.6	24.1	19.8	46.7
Mercury	0.14	0.14	0.14	0.14	1.4	1.4	1.32	1.4	0.14	1.4	0.14	0.14	0.14
Nickel	17.7	28.2	26.8	18.9	35.6	25.7	14.7	29.2	13.9	38.4	25.3	37.4	25.4
Selenium	2.02	1	1	2.01	16.5	10	1.37	14.1	5.13	10	1	1	1
Vanadium	235	15	27.1	189	107	97.5	160	377	231	275	53.2	48.5	63.5
Zinc	121	117	91	745	240	83.1	446	70.5	492	302	106	107	164
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.0341	0.0305	0.02	0.02	0.02	0.02	0.02	0.02	0.0231
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.0737	0.0502	0.02	0.02	0.02	0.02	0.02	0.02	0.0631
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.044	0.0295	0.02	0.02	0.02	0.02	0.02	0.02	0.0724
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.0539	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0816
Aliphatics >C12-C16	1.11	0.1	0.1	2.97	7.12	1.7	2.29	0.1	1.75	1.66	0.1	0.1	0.1
Aliphatics >C16-C21	5.16	0.1	1.1	10.4	24.3	5.31	8.32	0.1	8.01	12.3	0.1	0.1	0.1
Aliphatics >C21-C35	33.8	0.1	7.85	58.9	128	28.1	37.7	2.4	44.1	82.4	3.73	1.8	4.63
Aliphatics >C35-C44	11.9	0.1	0.1	20.9	17.7	3.78	9.83	0.1	18.2	31.3	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.0286	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0493
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.0352	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0539
Aromatics >EC12-EC16	1.94	0.1	0.1	5.23	5.47	1.31	3.3	0.1	13.2	2.54	0.1	0.1	0.1
Aromatics >EC16-EC21	9.01	0.1	2.01	31.4	30.4	7	18.5	2.07	307	22.7	0.1	0.1	2.17
Aromatics >EC21-EC35	30.7	0.1	11.8	116	101	21.9	98.6	8.39	634	133	14.6	1.54	20.7
Aromatics >EC35-EC44	11	0.1	1.41	40.5	23.4	4.67	31.6	6.95	175	47.7	0.944	0.1	4.01
Aromatics >EC40-EC44	3.67	0.1	0.1	13.4	6.04	1.42	9.87	3.29	53	15.9	0.1	0.1	1.24
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	127	12	17.2	678	1400	467	429	15.9	4040	131	12	12	12
Acenaphthene	28.5	8	8	82.6	60.7	8	25.5	8	913	156	8	8	8
Anthracene	227	16	41.3	989	2700	900	474	34.8	17600	372	16	16	16
Benz(a)anthracene	646	23	62.2	3090	6190	2080	1440	214	63600	2850	14	39	77.5
Benzo(a)pyrene	571	16.3	54.4	2840	5110	1870	1900	105	58700	3760	15	15	44.4
Benzo(b)fluoranthene	752	32.8	83.5	4520	8880	3210	2700	258	88100	5310	15	23.6	76
Benzo(k)fluoranthene	325	14	25.6	1730	3290	1140	845	106	28900	2060	14	14	26.4
Benzo(g,h,i)perylene	524	24	47.4	2240	4190	1280	1770	102	42700	2590	24	24	101
Chrysene	641	22.9	70.3	2640	5440	2240	1570	312	58900	3220	10	41.3	101
Dibenzo(a,h)anthracene	116	0.023	0.023	609	1100	300	439	26.4	10200	648	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	507	19	45.3	2790	4760	1630	2140	81.9	50600	2910	0.018	0.018	33.4
Fluoranthene	1500	48.3	207	6830	14300	4620	2710	389	197000	3670	0.017	107	240
Fluorene	77.8	10	19.5	358	850	10	103	10	7450	123	10	10	10
Naphthalene	358	15.9	87.1	689	1110	537	252	39.7	11900	498	9	9	9
Phenanthrene	945	45.9	186	2730	8150	1940	809	357	101000	1470	15	15	67.6
Pyrene	1.12	0.0356	0.15	5.04	10.7	3.56	2.43	0.258	133	3.69	0.015	0.089	0.171
PAH, Total Detected USEPA 16	8.47	0.26	1.1	37.9	78.2	25.8	20	2.3	875	33.5	0.118	0.3	0.837
Naphthalene-d8 % recovery**	91.1	99.5	90.2	92.8	90.1	89.5	77.9	87.9	97.1	93.7	86.9	87.2	87.6
Acenaphthene-d10 % recovery**	90.5	98.3	88.5	91.8	90.9	87.3	90.4	92.2	91.8	90.5	88.4	90.7	92.9
Phenanthrene-d10 % recovery**	88.5	103	85.2	89.9	86.5	88.9	95.3	92.6	90.2	90.1	86.4	91	94.4
Chrysene-d12 % recovery**	87.1	81	80.2	87.3	74.6	85.5	76.8	86.3	85.6	87	84.4	84.8	90.8
Perylene-d12 % recovery**	80.9	75.9	78.4	84.1	73.7	75.6	71.5	76.7	96.4	90.9	83.1	76.6	83.1
Total Aliphatics >C12-C44	51.9	0.1	8.95	93.2	177	38.9	58.2	2.4	72.1	128	3.73	1.8	4.63
Total Aromatics >EC12-EC44	52.6	0.1	15.2	193	160	34.9	152	17.4	1130	206	15.5	1.54	26.9
Total Aliphatics & Aromatics >C5-C44	105	0.1	24.2	286	337	73.9	210	19.8	1200	333	19.3	3.33	31.8
Metals - (Solid)													
Iron	54200	17100	23800	61800	162000	209000	46100	214000	113000	245000	32400	34400	36600
Manganese	6440	541	1150	8440	25600	10100	8760	26300	10700	19800	195	501	792
Metals - (Liquid)													
Calcium	90900	-	52000	78300	-	59600	148000	-	-	135000	-	-	-
Magnesium	16400	-	13800	10400	-	7650	47900	-	-	10200	-	-	-
Phenols													
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0116	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.194	0.01	0.0113	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.0363	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.23	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	0.0393	-	0.182	0.134	-	0.0526	0.144	-	-	0.239	-	-	-
pH	11	8.25	8.38	7.97	10.8	9.93	7.87	12.5	8.79	11	7.62	8.25	7.87
Sulphate, Total													
Sulphur, Total	0.108	-	0.0983	0.163	-	0.207	0.105	-	-	0.401	-	-	-
Sulphate, Total potential	0.324	-	0.295	0.489	-	0.621	0.315	-	-	1.2	-	-	-
Sulphate, acid soluble (total)	0.253	-	0.104	0.155	-	0.152	0.163	-	-	0.759	-	-	-
Cyanide, Total	1	1	1	4.05	1	2	142	1	1.98	2.01	1	1	1.18
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	375	265	234
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Date of Analysis	06/11/2018	-	06/11/2018	05/11/2018	-	05/11/2018	05/11/2018	-	-	05/11/2018	-	-	-
Analysed By	James Richards	-	James Richards	Lucy Caroe	-	Andrzej Ferfecki	Christian Hallam	-	-	Lucy Caroe	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	None	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	N/C	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-
Comments	-	-	-	Fibre bundles in soil	-	0	0	-	-	0	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	105	108	116	97.9	101	108	102	80	103	106	112	107	108
Toluene-d8**	96	98	98.3	89.4	89.6	96.5	95.2	99.9	96.2	94.4	101	99.5	97.8
4-Bromofluorobenzene**	81.6	103	89.5	73.1	70.4	76.8	87.7	95	85.1	84.9	92.7	94.9	91.4
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.18	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.14	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.08	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.469	0.309	0.13	0.13	0.214	0.151	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.8	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CB5V	3CC1	3CC1	3CC3	3CC3	3CC3	3CC4	3CC4	3CC5	3CC5	3CC1V	3CC3V	3CC4V
Depth	1.4	0.5	1	0.5	1	1.5	0.7	1.4	0.5	1	1.451.45	2.2	2.4
Sampled Date	18/10/2018	23/10/2018	23/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	23/10/2018	19/10/2018	19/10/2018
Carbon													
Soil Organic Matter (SOM)	2.31	0.391	2.28	61.9	4.45	0.36	9.26	0.828	19.7	7.84	2.31	1.32	1.01
Metals (Solids)													
Arsenic	12.6	6.61	8.01	12.4	20.7	7.04	14.7	6	19.3	9.45	9.11	10.6	9.1
Cadmium	0.02	0.893	0.02	1.59	0.919	0.2	1.16	1.25	10.1	1.9	0.02	0.02	0.02
Chromium	30.3	34.5	99.6	195	192	465	32	516	115	204	27.6	34.7	22.4
Copper	18.4	14.3	10.2	30.4	188	42.5	42.4	15.3	44.9	69	17.8	17.5	7.35
Lead	26.9	44.4	13.7	182	70	7	369	34.6	1320	190	18.8	21	23.5
Mercury	0.14	1.4	0.14	1.4	1.4	1.4	0.14	1.4	1.4	1.4	0.14	0.14	1
Nickel	31.9	29.3	16.3	36	137	32.5	27.5	10.7	40.2	59.9	31.8	36.8	25
Selenium	1	10	3.26	10	10	15.3	1.82	14.6	10	10	1	1	1
Vanadium	53	67.4	259	155	344	460	64.7	693	195	399	46.7	53.6	41.1
Zinc	127	153	82.5	812	190	29.2	2870	89.1	5610	749	101	104	114
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
Aliphatics >C12-C16	0.1	5.68	2.96	3.7	0.305	0.1	0.1	3.96	2.83	2.82	0.1	0.1	0.1
Aliphatics >C16-C21	0.1	24.6	9.5	24.2	1.07	0.1	1.53	10.5	11.7	12.1	0.1	0.1	0.1
Aliphatics >C21-C35	0.1	93.4	35.4	88.6	6.77	59.6	23.3	52.9	53.1	87.3	0.1	0.1	0.1
Aliphatics >C35-C44	0.1	33.2	12.6	33.9	1.78	50.3	5.73	11.1	11.8	35.4	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
Aromatics >EC12-EC16	0.1	3.23	3.1	29.5	1.5	0.1	0.15	1.14	3.92	1.73	0.1	0.1	0.1
Aromatics >EC16-EC21	0.1	15.4	14.4	371	14.8	0.637	2.33	13.8	37.4	14.2	0.1	0.1	0.1
Aromatics >EC21-EC35	6.66	59	37.2	1010	51.7	15.4	24.2	136	111	106	3.05	1.89	3.64
Aromatics >EC35-EC44	0.702	27.7	12.5	263	15.1	9.4	4.11	45.2	26.5	44.6	0.1	0.1	0.1
Aromatics >EC40-EC44	0.1	9.72	4.21	66.2	6.83	3.47	0.1	16.3	7.91	17.4	0.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	12	226	208	10300	334	12	68.7	12	535	194	12	12	17.9
Acenaphthene	8	42.4	44.6	342	13.8	8	8	139	27.9	95.8	8	8	8
Anthracene	16	454	425	12700	330	16	42	152	531	375	16	16	16
Benz(a)anthracene	22.4	872	806	43600	1350	136	271	2740	2120	2680	14	27.8	111
Benzo(a)pyrene	24.4	727	649	36800	1430	76.3	237	4710	1790	3510	15	22	120
Benzo(b)fluoranthene	36	860	956	64100	2360	955	444	4710	2360	4650	15	33.4	167
Benzo(k)fluoranthene	14	413	302	21800	797	333	115	2030	1010	1940	14	14	81.7
Benzo(g,h,i)perylene	23.3	612	554	29900	1110	560	239	3640	1300	2480	24	24	84
Chrysene	23.3	795	744	42300	1120	586	223	2900	1480	3010	10	22.9	123
Dibenzo(a,h)anthracene	0.023	137	124	6970	243	110	40.1	643	334	374	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	645	531	33100	1600	250	232	3810	1180	2300	0.018	0.018	65.4
Fluoranthene	28.2	2140	2130	99000	3070	287	398	2700	4370	3650	0.017	35.7	186
Fluorene	10	193	206	4060	106	10	10	52.9	238	101	10	10	10
Naphthalene	9	671	655	3050	206	24.9	77.7	48.3	387	162	9	9	9
Phenanthrene	15	1690	1780	32900	982	81.1	164	732	1800	1170	15	15	33.3
Pyrene	0.0262	1.52	1.5	72.8	2.35	0.21	0.297	2.97	3.23	3.34	0.015	0.0298	0.146
PAH, Total Detected USEPA 16	0.161	12	11.6	514	17.4	3.61	2.85	32	22.7	30	0.118	0.172	1.13
Naphthalene-d8 % recovery**	95.5	94.7	93.2	87.6	91	82.6	87.3	74.5	94.4	91.3	89.2	82.4	80.7
Acenaphthene-d10 % recovery**	96.1	94.5	93.2	98	89.9	83.4	93.3	82.4	93.6	92.2	89	93.6	82.2
Phenanthrene-d10 % recovery**	97	93.3	92.8	91.7	88.2	82.2	93.1	81.2	94.1	93.3	87.8	97.7	84.9
Chrysene-d12 % recovery**	93.1	91.9	91.9	78	85.1	83	91.5	70.5	87.2	87.6	85.9	80.3	84
Perylene-d12 % recovery**	91.5	87.5	88.2	81.1	89.2	78	81.6	77.8	75.6	89	76.6	74.8	80.6
Total Aliphatics >C12-C44	0.1	157	60.5	150	9.92	110	30.5	78.4	79.5	137	0.1	0.1	0.1
Total Aromatics >EC12-EC44	7.37	105	67.2	1680	83.1	25.5	30.8	196	179	167	3.05	1.89	3.64
Total Aliphatics & Aromatics >C5-C44	7.37	262	128	1830	93	135	61.3	275	259	305	3.05	1.89	3.64
Metals - (Solid)													
Iron	45300	60400	54900	113000	424000	190000	87800	120000	175000	252000	27700	22600	31500
Manganese	1220	3460	6260	13200	19400	28700	3320	58200	10700	17900	710	405	1060
Metals - (Liquid)													
Calcium	-	89800	-	-	86600	-	-	245000	-	132000	-	-	-
Magnesium	-	8920	-	-	4950	-	-	11400	-	8300	-	-	-
Phenols													
Phenol	0.01	0.01	0.01	0.0122	0.0327	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.0122	0.0436	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.0762	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.149	-	-	0.0927	-	-	0.201	-	0.294	-	-	-
pH	7.96	8.87	9.42	8.06	11.8	8.03	7.84	11.7	8.4	11.3	7.38	7.82	8.6
Sulphate, Total													
Sulphur, Total	-	0.0703	-	-	0.161	-	-	0.24	-	0.298	-	-	-
Sulphate, Total potential	-	0.211	-	-	0.483	-	-	0.72	-	0.894	-	-	-
Sulphate, acid soluble (total)	-	0.265	-	-	0.263	-	-	0.662	-	0.932	-	-	-
Cyanide, Total	1	1	1	3.74	4.86	1	5.33	1	8.51	18.7	1	1	1
Exchangeable Ammonia as N	226	12	12	12	12	12	12	12	12	12	205	213	47.9
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	06/11/2018	-	-	05/11/2018	-	-	05/11/2018	-	05/11/2018	-	-	-
Analysed By	-	Lucy Caroe	-	-	Barbara Urbanek-Walsh	-	-	James Richards	-	Lucy Caroe	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-
Amosite (Brown) Asbestos	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-
Fibrous Anthophyllite	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-
Fibrous Tremolite	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-
Fibrous Actinolite	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-
Non-Asbestos Fibre	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-
Comments	-	-	-	-	0	-	-	0	-	0	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	107	113	111	95.4	103	109	115	112	93	109	120	102	107
Toluene-d8**	99.8	98.1	98.6	85.9	99	98.4	96.8	102	91.8	95.9	101	96.1	99.9
4-Bromofluorobenzene**	92.7	85.2	86.8	70.1	91.7	97.8	87.2	102	75.9	91.6	94.7	76.4	97.1
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.446	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CD1	3CD1	3CD1	3CD3	3CD3	3CD4	3CD4	3CD5	3CD5	3CD1V	3CD3V	3CD4V	3CD5V
Depth	0.3	0.7	1.2	0.8	1.5	0.5	1	0.8	1.6	1.65	1.9	2.5	2.6
Sampled Date	23/10/2018	23/10/2018	23/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	23/10/2018	19/10/2018	19/10/2018	18/10/2018
Carbon													
Soil Organic Matter (SOM)	2.72	3.91	0.35	0.35	5.57	4.9	3	12.6	2.88	1.52	1.57	6.6	2.05
Metals (Solids)													
Arsenic	24.5	13.1	9.34	21.5	8.76	11.9	5.3	9.01	12.9	11.3	11.6	14.4	10.6
Cadmium	0.796	0.02	0.456	0.2	0.02	0.02	0.02	0.192	0.02	0.02	0.02	0.224	0.02
Chromium	12.9	0.9	20.6	91.7	145	31.9	352	45	318	31.3	32.8	31.4	38.8
Copper	13	23.4	11.4	35.6	8.58	20.7	6.4	23	8.21	20.4	12.7	20.9	17.6
Lead	53.5	21.3	15.5	13.2	8.27	35.6	13.9	84.5	21.5	21.8	20.8	43.7	30.6
Mercury	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	14.1	36.9	28	14.1	7.17	32.3	3.97	19.7	5.25	36	33.1	28.8	30.2
Selenium	1	1	1	10	4.72	1	7.89	1.45	8.45	1	1	1	1
Vanadium	30.1	25.5	35	163	192	53.5	318	67.7	307	49	54.6	51	60.3
Zinc	206	320	53.5	144	108	144	82.9	300	66	103	96.9	139	126
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.02	0.02	0.02	0.0407	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.14	0.043	0.0219	0.0217	0.02	0.02	0.02	0.02	0.02	0.0224
Aliphatics >C8-C10	0.02	0.02	0.02	0.162	0.0368	0.02	0.0206	0.02	0.02	0.02	0.02	0.02	0.0251
Aliphatics >C10-C12	0.02	0.02	0.02	0.176	0.0808	0.02	0.0733	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	1.49	0.1	0.1	5.24	22.2	0.1	5.18	1.07	16.7	0.1	0.1	0.167	0.1
Aliphatics >C16-C21	5.78	2.97	0.1	14.1	16.5	0.1	9.21	7	19.3	0.1	0.688	0.604	0.1
Aliphatics >C21-C35	33.7	8.1	0.1	98.4	77.2	4.95	142	24.7	86.5	0.1	0.901	3.77	0.1
Aliphatics >C35-C44	12.9	2.46	0.1	119	90.4	0.1	201	10.6	180	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.108	0.0246	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.117	0.0542	0.02	0.0485	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	2.45	0.1	0.1	2.6	6.73	0.1	2.48	2.64	5.31	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	9.67	1.33	0.1	17	16.7	0.1	18.7	30.9	21	0.1	0.1	0.1	0.1
Aromatics >EC21-EC35	33.5	5.53	0.1	120	102	8.55	173	122	131	0.1	1.7	12	3.72
Aromatics >EC35-EC44	13.2	1.39	0.1	110	91.3	1.38	172	43.8	219	0.1	0.1	1.63	4.04
Aromatics >EC40-EC44	4.75	0.1	0.1	47.1	38.3	0.1	77.1	14.8	109	0.1	0.1	0.1	1.92
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	102	12	12	60	66	12	60	4020	60	12	12	12	12
Acenaphthene	21.9	8	8	89.9	131	8	80.9	101	40	8	8	8	8
Anthracene	213	23.4	16	181	288	16	265	2830	142	16	16	16	16
Benz(a)anthracene	429	48.7	14	2220	2620	21.2	2110	14800	2570	14	20.5	125	48.3
Benzo(a)pyrene	363	41.7	15	3090	2920	19.4	2050	14700	1810	15	20.1	61.7	36.6
Benzo(b)fluoranthene	453	77.9	15	3270	5000	27.9	3190	18900	3870	15	22.2	111	55.3
Benzo(k)fluoranthene	182	24.4	14	1700	1870	14	1190	6950	1590	14	14	33.5	20.7
Benzo(g,h,i)perylene	312	32.9	24	2700	2420	24	1380	10500	1690	24	24	49.8	24
Chrysene	398	49.2	10	2500	3450	23	2190	12200	3080	10	24.1	175	51.2
Dibenzo(a,h)anthracene	63.2	0.023	0.023	421	386	0.023	315	2690	293	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	295	50.7	0.018	2570	2260	0.018	1090	9990	1270	0.018	0.018	42.9	0.018
Fluoranthene	1100	125	0.017	2990	3630	34.1	3240	27800	2680	0.017	53.7	266	102
Fluorene	89.5	10	10	50	50	10	50	590	50	10	10	10	10
Naphthalene	354	37.6	9	192	625	9	201	1330	45	9	9	50.2	9
Phenanthrene	823	99	15	934	1620	15	1290	5310	914	15	21.1	94.5	42.2
Pyrene	0.79	0.0793	0.015	3.37	3.75	0.0289	3.73	21.7	3.87	0.015	0.0435	0.211	0.087
PAH, Total Detected USEPA 16	5.99	0.69	0.118	26.2	31	0.155	22.3	154	23.8	0.118	0.205	1.22	0.443
Naphthalene-d8 % recovery**	90.2	82.7	94.2	88.5	89.6	82.6	84.4	104	85.8	85.1	87.1	84.6	90.2
Acenaphthene-d10 % recovery**	88.8	81.4	92.6	88.7	95.1	83.5	83.6	103	89.7	89.6	88.6	91.7	93.4
Phenanthrene-d10 % recovery**	87.2	88.9	89.6	88	95.4	91.4	84.6	102	87.9	97.2	90.3	92.9	95.7
Chrysene-d12 % recovery**	84.1	72.1	86.5	83.7	103	94.7	87.9	92.4	91.9	105	85.9	87	86.3
Perylene-d12 % recovery**	79.4	71.7	85.4	79.9	90.6	85.1	78.3	92.9	87	101	90.9	77.7	79.1
Total Aliphatics >C12-C44	53.9	13.5	0.1	237	206	4.95	357	43.3	303	0.1	1.59	4.54	0.1
Total Aromatics >EC12-EC44	58.9	8.25	0.1	249	217	9.93	366	200	376	0.1	1.7	13.6	7.76
Total Aliphatics & Aromatics >C5-C44	113	21.8	0.1	487	423	14.9	723	243	679	0.1	3.29	18.1	7.76
Metals - (Solid)													
Iron	30000	63700	20700	277000	118000	31300	126000	51100	106000	29500	32600	22700	38300
Manganese	2260	2340	1260	20500	20200	668	20500	3250	26000	376	1300	297	1200
Metals - (Liquid)													
Calcium	118000	-	18700	91800	-	9350	-	83400	-	-	-	-	-
Magnesium	36500	-	11900	7500	-	9760	-	17900	-	-	-	-	-
Phenols													
Phenol	0.01	0.01	0.01	0.129	0.0102	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.107	0.0102	0.0129	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.075	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.311	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	0.106	-	0.0225	0.0968	-	0.0515	-	0.114	-	-	-	-	-
pH	9.07	7.89	8.33	7.98	12.4	8.38	11.5	8.41	12	7.17	8.44	7.96	8.32
Sulphate, Total													
Sulphur, Total	0.261	-	0.02	0.0831	-	0.0403	-	0.219	-	-	-	-	-
Sulphate, Total potential	0.783	-	0.06	0.249	-	0.121	-	0.657	-	-	-	-	-
Sulphate, acid soluble (total)	0.417	-	0.02	0.445	-	0.0282	-	0.119	-	-	-	-	-
Cyanide, Total	1	1	1	1.99	1.98	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	24.5	12	12	12	12	15.1	12	95.5	111	124	185
Asbestos													
Asbestos Quantification - Gravimetric - %	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	06/11/2018	-	06/11/2018	05/11/2018	-	05/11/2018	-	05/11/2018	-	-	-	-	-
Analysed By	Barbara Urbanek-Walsh	-	James Richards	Marcin Magdziarek	-	Lucy Caroe	-	Christian Hallam	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	None	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	N/A	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Comments	Loose fibres in soil.	-	-	0	-	0	-	0	-	-	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	129	114	146	103	112	111	109	103	125	115	105	118	113
Toluene-d8**	98.8	99.9	100	94.2	95.7	100	93.5	96.2	93.8	99.6	99.3	99.6	99.8
4-Bromofluorobenzene**	89	90.7	97.8	81.9	83.4	95	86.8	82.6	79.6	92.9	96.9	102	99.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.013	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CE1	3CE1	3CE3	3CE3	3CE4	3CE4	3CE5	3CE5	3CE5	3CF1	3CF1	3CF3	3CF3
Depth	0.4	1	0.5	1	0.5	1	0.5	1.5	2	0.3	1	0.5	1
Sampled Date	23/10/2018	23/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	18/10/2018	23/10/2018	23/10/2018	22/10/2018	22/10/2018
Carbon													
Soil Organic Matter (SOM)	3.15	4.52	9	0.688	2.91	3.05	3.57	0.984	0.35	0.35	1.79	13.3	26.4
Metals (Solids)													
Arsenic	7.53	10.9	7.93	8.19	12	5.1	10.4	6	6	6	24.1	15.8	13.6
Cadmium	0.256	1.05	0.02	0.583	0.565	0.02	0.02	0.5	1.06	1.04	0.02	6.44	4.95
Chromium	27.9	35.4	265	531	35.4	381	58.1	636	623	86	4.81	217	110
Copper	14.4	18.8	15.1	36.3	22.7	14	17	14	26.9	19.2	17.5	44.5	83.7
Lead	33.3	65.3	22.6	13.9	47.3	31.2	27	17.8	16.3	37	63.7	737	518
Mercury	0.14	1.4	0.14	1.4	0.14	0.14	0.14	1.4	1.4	1.4	0.14	1.4	1.4
Nickel	20.7	34.1	15	25.4	30.5	8.93	20.7	11.3	27.2	33.9	44.3	35.5	31.8
Selenium	1.03	10	5.08	11.8	1	13.6	1.45	10.8	10	10	1	10	10
Vanadium	71.1	85	262	629	49.7	741	105	940	1180	82.5	19.9	284	141
Zinc	147	149	106	190	149	102	113	190	45.4	128	195	3440	2600
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.02	0.02	0.0214	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aliphatics >C6-C8	0.02	0.02	0.0655	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aliphatics >C8-C10	0.02	0.02	0.0567	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aliphatics >C10-C12	0.02	0.02	0.0353	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aliphatics >C12-C16	3.36	1.94	1.89	0.1	0.1	2.63	0.1	0.1	0.1	1.22	0.1	1.52	0.1
Aliphatics >C16-C21	12	6.47	21.4	0.1	0.1	9.69	1.35	0.1	0.1	3.89	2.82	8.74	6.85
Aliphatics >C21-C35	70.9	36.3	39.1	0.1	3.53	76.3	16.5	0.1	2.42	17.7	12.3	44.6	37
Aliphatics >C35-C44	26.2	13.1	8.97	0.1	0.1	25.3	8.17	0.1	0.1	5.63	5.46	7.66	3.24
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aromatics >EC8-EC10	0.02	0.02	0.0378	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aromatics >EC10-EC12	0.02	0.02	0.0239	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aromatics >EC12-EC16	4.89	2.57	4.17	0.1	0.1	2.03	0.1	0.1	0.1	1.27	0.1	4.09	4.2
Aromatics >EC16-EC21	23.6	10.8	24.1	0.1	1.63	21.9	1.33	1.75	0.1	5.76	0.9	36	34.9
Aromatics >EC21-EC35	74	37.4	81.4	0.1	14.8	127	29.3	12.5	1.44	17.8	5.41	124	123
Aromatics >EC35-EC44	28.1	15.2	27.4	0.1	5.06	51.8	19	6.23	0.1	4.69	2.02	32.6	33.4
Aromatics >EC40-EC44	9.88	5.39	9.53	0.1	1.88	19.5	7.78	2.67	0.1	1.32	0.1	11.1	11.8
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	301	175	184	12	12	12	14.4	12	16.2	86.9	12	613	761
Acenaphthene	59.6	28.4	77.6	8	8	82.1	24.6	8.74	8	16.4	8	37.4	31.8
Anthracene	685	326	550	16	16	206	44.3	17.3	39	222	16	754	1010
Benz(a)anthracene	1610	586	949	55.6	53.9	1900	327	221	293	399	21.3	2670	3690
Benzo(a)pyrene	1340	504	817	28.3	53	2100	493	245	235	317	15	2420	3380
Benzo(b)fluoranthene	2070	602	1290	125	97.4	3880	572	490	347	306	24.6	3760	5560
Benzo(k)fluoranthene	729	303	479	41.4	36.4	1520	208	171	107	171	14	1190	2090
Benzo(g,h,i)perylene	910	424	572	94.9	47.2	1710	360	368	167	250	24	1810	2460
Chrysene	1510	565	1100	143	64.6	2580	349	340	401	360	23	2820	4000
Dibenzo(a,h)anthracene	246	87	119	0.023	0.023	342	85.9	75	27.5	62.3	0.023	374	550
Indeno(1,2,3-cd)pyrene	1220	426	600	27.4	35	1360	402	206	159	258	0.018	2050	2650
Fluoranthene	3490	1570	1780	93.5	88.1	3990	450	375	653	1070	46	5130	7470
Fluorene	297	138	204	10	10	29	16	10	10	78	10	172	274
Naphthalene	878	487	568	9	9	79.6	30	27.3	49.3	305	22.8	432	608
Phenanthrene	2410	1110	1430	36.9	31.6	2020	184	241	194	770	40.8	1790	2920
Pyrene	2.54	1.12	1.4	0.0762	0.0709	3.3	0.448	0.299	0.514	0.743	0.0349	3.95	5.67
PAH, Total Detected USEPA 16	20.3	8.44	12.1	0.722	0.578	25.1	4.01	3.08	3.2	5.42	0.213	30	43.2
Naphthalene-d8 % recovery**	85.9	89.1	80.1	83	79.5	80.4	79.6	79.2	80.7	93.1	101	80	88.8
Acenaphthene-d10 % recovery**	92.6	90.9	88.9	86.7	80.3	80.7	91.7	84.9	88.2	91.5	84	88.2	92.8
Phenanthrene-d10 % recovery**	96.8	89.8	94.1	88.4	83	89.5	96.7	87.8	90.1	86.9	88.9	89.7	94.1
Chrysene-d12 % recovery**	104	85	88.7	82.3	78.5	92.3	78.5	78	81.2	81.2	83.1	78.5	86.2
Perylene-d12 % recovery**	91.4	79.2	76.4	84.4	76.1	85.4	71	77.9	70	76.6	81.5	70.2	76.7
Total Aliphatics >C12-C44	113	57.8	71.4	0.1	3.53	114	26	0.1	2.42	28.4	20.5	62.5	47.1
Total Aromatics >EC12-EC44	131	66	137	0.1	21.5	202	49.6	20.5	1.44	29.5	8.33	197	196
Total Aliphatics & Aromatics >C5-C44	243	124	209	0.1	25.1	316	75.6	20.5	3.86	58	28.9	259	243
Metals - (Solid)													
Iron	56900	74900	75100	177000	24700	126000	39100	136000	175000	108000	41400	202000	223000
Manganese	3740	3920	24000	35700	1380	47200	3020	37700	37200	7190	947	17700	20000
Metals - (Liquid)													
Calcium	-	44600	-	225000	37000	-	-	247000	255000	42300	-	101000	-
Magnesium	-	7470	-	9530	14500	-	-	7750	800	8220	-	12900	-
Phenols													
Phenol	0.01	0.01	0.0252	0.01	0.01	0.044	0.01	0.0211	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.0504	0.01	0.01	0.01	0.0112	0.0211	0.01	0.01	0.01	0.01	0.0115
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.0756	0.035	0.035	0.044	0.035	0.0423	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.0879	-	0.151	0.0368	-	-	0.0438	0.289	0.0267	-	0.117	-
pH	10.9	9.64	8.37	12.1	8.63	12.8	8.12	12.2	10.9	9.06	8.51	7.86	8.36
Sulphate, Total													
Sulphur, Total	-	0.101	-	0.462	0.0826	-	-	0.2	0.302	0.0707	-	0.184	-
Sulphate, Total potential	-	0.303	-	1.39	0.248	-	-	0.6	0.906	0.212	-	0.552	-
Sulphate, acid soluble (total)	-	0.205	-	0.863	0.0677	-	-	0.314	0.495	0.108	-	0.117	-
Cyanide, Total	1	1	1	1	1	4.03	1	1	1	1	1	10.5	9.68
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	12	12	12
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	0.001	-	-	-	-	0.001	-	-	-	-
Date of Analysis	-	06/11/2018	-	05/11/2018	05/11/2018	-	-	05/11/2018	05/11/2018	06/11/2018	-	05/11/2018	-
Analysed By	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	Christian Hallam	-	-	Lucy Caroe	Marcin Magdziarek	Renata Bozhkov	-	Lucy Caroe	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	0.001	-	-	-	-	0.001	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	None	-	-	-	-	None	-	-	-	-
Analysts Comments	-	-	-	N/C	-	-	-	-	N/C	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	0.001	-	-	-	-	0.001	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	Detected	Not Detected	-	-	Not Detected	Detected	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Tremolite	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Actinolite	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Comments	-	-	-	Loose fibres in soil.	0	-	-	0	Soil containing ACM debris	-	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	112	109	103	113	107	116	105	99.2	107	126	108	119	107
Toluene-d8**	97.9	96.6	96.9	99.9	95.6	101	99.1	97.2	99.6	98.3	99.5	101	95.8
4-Bromofluorobenzene**	82.5	82.5	79.9	98.8	80.5	98.8	90	92.9	94.3	84.7	90.6	87.5	74.4
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.147	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.224	0.16	0.173	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.174
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	3CF3	3CF4	3CF4	3CF4	3CF5	3CF5	3CF5	3CF1V	3CF3V	3CF4V	3CF5V	3CG1	3CG1	3CG3	3CG3	3CG3
Depth	2	0.5	1.1	1.5	0.5	1	2	1.75	2.8	2.7	3.4	0.5	1	0.5	1	1.5
Sampled Date	22/10/2018	22/10/2018	22/10/2018	22/10/2018	18/10/2018	18/10/2018	18/10/2018	23/10/2018	22/10/2018	22/10/2018	18/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018
Carbon																
Soil Organic Matter (SOM)	0.49	2.95	42.6	8.91	5.02	4.57	11.3	1.01	2.02	6.33	1.09	5.45	1.21	10.5	19.5	24.8
Metals (Solids)																
Arsenic	9.29	15.4	8.21	11.1	7.96	7.96	6	9.06	13.2	13.6	13.5	9.3	10.6	11.1	6	8.52
Cadmium	0.2	0.02	0.02	0.2	0.902	0.89	0.2	0.02	0.02	0.096	0.02	1.22	0.0723	1.25	0.2	0.2
Chromium	619	29.1	110	459	39.3	592	430	21.6	59.8	44	34.6	83.2	24.4	122	444	300
Copper	29.7	11.2	13.4	36.3	24.2	28.8	28.3	8.96	21.4	23.8	9.84	23.8	19.9	24.6	14	16.6
Lead	46.2	19.1	22	16.8	50.3	36	39.8	14.2	27.5	36.8	21.3	74.9	47.9	162	20.1	59.5
Mercury	1.4	0.14	0.14	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	1.4
Nickel	20.6	31.7	22.9	27.7	18.4	26.5	31.8	26.6	35.1	26.5	33.7	25.9	33.5	18.4	14.3	16.9
Selenium	22	1	2.75	15.9	1.18	10	17.6	1	1	1	1	10	1.01	4.67	11.7	10
Vanadium	830	55.5	106	654	45.8	970	880	38.3	91.9	65.5	60.4	141	39.5	211	305	248
Zinc	395	107	78	65.8	181	190	118	81.6	132	124	86.3	236	131	689	102	311
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.0684
Aliphatics >C6-C8	0.02	0.01	0.0454	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.194
Aliphatics >C8-C10	0.02	0.01	0.0216	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.147
Aliphatics >C10-C12	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.174
Aliphatics >C12-C16	0.1	0.1	4.77	3.06	0.1	5.15	4.79	0.1	0.1	0.1	0.1	2.3	0.525	2.19	5.28	6.98
Aliphatics >C16-C21	0.1	0.563	16.7	15.1	0.1	10.1	13.2	0.1	0.1	0.1	0.1	7.65	1.18	11.4	19.6	29.4
Aliphatics >C21-C35	5.07	1.75	90.8	56.3	30.7	50.7	57.2	0.1	0.288	4.13	0.1	43.4	1.83	27.9	82.5	114
Aliphatics >C35-C44	0.1	0.1	13.1	8.84	17.9	11.7	14.2	0.1	0.1	0.1	0.1	14.3	0.1	5.8	11.3	16.8
Aromatics >EC5-EC7	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.0456
Aromatics >EC7-EC8	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.0661
Aromatics >EC8-EC10	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.098
Aromatics >EC10-EC12	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.116
Aromatics >EC12-EC16	0.1	0.1	2.26	2.5	0.1	2.84	5.53	0.1	0.1	0.1	0.1	4.03	0.1	3.54	5.34	6.91
Aromatics >EC16-EC21	0.426	0.1	12.2	16.5	2.78	33	74.4	0.1	0.1	1.29	0.1	18.2	0.1	18.8	22.7	36.3
Aromatics >EC21-EC35	9.2	12	46.5	53.3	47	148	167	0.1	2.29	24.1	3.28	59.3	0.121	63.7	73.4	93.7
Aromatics >EC35-EC44	3.06	0.982	4.48	17.5	47.9	53.6	56.2	0.1	0.248	1.98	0.1	26.4	0.1	14.3	18.3	29.6
Aromatics >EC40-EC44	3.52	0.1	0.1	6.32	21.1	20.1	20.7	0.1	0.1	0.1	0.1	10.9	0.1	3.71	5.14	12.3
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	91.5	12	206	60	60	100	411	12	12	12	12	2600	81.8	148	450	1400
Acenaphthene	10.4	8	28.2	44.4	40	107	163	8	8	8	8	392	8	38.4	31.3	51
Anthracene	158	16	287	300	80	329	2410	16	16	16	16	5190	349	221	878	1890
Benz(a)anthracene	336	14	955	2750	192	3560	8610	14	33.7	75.4	18.6	8370	325	858	3030	4510
Benzo(a)pyrene	306	15	841	3170	134	4420	6520	15	43.8	69.6	19.7	6180	248	669	2400	3510
Benzo(b)fluoranthene	669	15	1470	3410	208	6680	11100	15	99.6	111	26.4	9970	445	1190	4210	6060
Benzo(k)fluoranthene	223	14	551	1390	70	2870	5930	14	42.7	41	14	3660	146	416	1610	2090
Benzo(g,h,i)perylene	293	24	604	2690	120	3660	4760	24	50.3	55.5	24	3810	174	475	1770	2250
Chrysene	426	10	1100	3000	239	4050	8940	10	55.9	93.6	20.2	8490	393	885	2680	4730
Dibenzo(a,h)anthracene	70.4	0.023	161	526	0.115	872	1220	0.023	0.023	0.023	0.023	765	41.8	100	504	587
Indeno(1,2,3-cd)pyrene	234	0.018	490	2560	90	4420	5650	0.018	61.5	63.1	0.018	3400	277	502	2120	1970
Fluoranthene	807	22.4	1890	5760	334	6740	21600	0.017	44.2	159	30.8	21800	946	1660	6230	12900
Fluorene	81.4	10	83.8	50	50	61.1	107	10	10	10	10	3460	67.3	197	142	378
Naphthalene	91.8	9	517	219	45	231	301	9	15.5	18.8	9	4110	266	818	814	2460
Phenanthrene	488	15	1060	4270	75	5580	18100	15	15	83.5	15	18700	840	1060	2420	6920
Pyrene	0.542	0.0178	1.46	5.09	0.275	5.76	17.2	0.015	0.0428	0.132	0.0263	15.1	0.614	1.29	4.66	9.2
PAH, Total Detected USEPA 16	4.83	0.118	11.7	35.2	1.38	49.4	113	0.118	0.49	0.903	0.142	116	5.21	10.5	33.9	60.9
Naphthalene-d8 % recovery**	81.3	88.9	70.8	116	89.3	88.9	82.7	86.4	81.2	83.2	84.9	96	91.8	91.2	92.1	77.4
Acenaphthene-d10 % recovery**	79.6	91.4	77.2	109	93.8	90.5	87.4	91.7	84.2	86.5	86.1	101	89.7	95.5	90.1	79.7
Phenanthrene-d10 % recovery**	78.2	92.7	68.6	123	95.6	93.3	94.8	98.2	87.1	89.7	85.4	103	91.9	96.5	88.7	84.8
Chrysene-d12 % recovery**	75	99.3	58.3	126	100	87.6	98.3	109	92.2	84.6	83	112	85.9	95.7	78.6	82.6
Perylene-d12 % recovery**	73.6	94.4	53.1	122	83	99.1	92.8	100	91.4	82.3	80.3	90.1	84.9	84.1	74.2	73.2
Total Aliphatics >C12-C44	5.07	2.32	125	83.3	48.6	77.6	89.4	0.1	0.288	4.13	0.1	67.7	3.53	47.3	119	167
Total Aromatics >EC12-EC44	12.7	12.9	65.4	89.8	97.7	237	303	0.1	2.53	27.4	3.28	108	0.121	100	120	167
Total Aliphatics & Aromatics >C5-C44	17.8	15.3	191	173	146	315	393	0.1	2.82	31.5	3.28	176	3.66	148	238	334
Metals - (Solid)																
Iron	205000	29600	58400	187000	21400	163000	149000	26300	51900	31800	31200	84100	45900	62000	145000	144000
Manganese	48300	551	6120	35000	3170	31300	26300	1040	1810	1140	657	10600	1660	10300	19700	29900
Metals - (Liquid)																
Calcium	189000	22900	-	181000	114000	191000	-	-	-	-	-	128000	-	85100	-	139000
Magnesium	8530	10300	-	8320	23400	9860	-	-	-	-	-	20500	-	7810	-	24900
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.0108	0.066	0.01	0.01	0.01	0.01	0.01	0.01	0.0351	0.01	0.01
Cresols	0.0113	0.0111	0.0108	0.01	0.01	0.01	0.022	0.01	0.01	0.01	0.01	0.0109	0.01	0.117	0.0113	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0351	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.088	0.035	0.035	0.035	0.035	0.035	0.035	0.187	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	0.0949	0.0789	-	0.0261	0.0351	0.0276	-	-	-	-	-	0.147	-	0.308	-	0.115
pH	12.1	8.53	9.99	12.8	8.14	12.8	13	8.42	9.07	8	8.42	10.6	8.61	8.03	10.2	12.1
Sulphate, Total																
Sulphur, Total	0.212	0.0885	-	0.199	0.109	0.383	-	-	-	-	-	0.321	-	0.178	-	0.154
Sulphate, Total potential	0.636	0.266	-	0.597	0.327	1.15	-	-	-	-	-	0.963	-	0.534	-	0.462
Sulphate, acid soluble (total)	0.651	0.0361	-	0.488	0.0901	0.597	-	-	-	-	-	0.575	-	0.177	-	0.291
Cyanide, Total	1.72	1	1	1	1	1.21	2.96	1	1	1	1	1	1	2.46	1	1.34
Exchangeable Ammonia as N	12	12	12	12	12	12	12	23.8	195	234	154	12	12	12	12	12
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	05/11/2018	05/11/2018	-	05/11/2018	05/11/2018	05/11/2018	-	-	-	-	-	05/11/2018	-	05/11/2018	-	05/11/2018
Analysed By	Barbara Urbanek-Walsh	Lucy Caroe	-	Christian Hallam	Christian Hallam	Lucy Caroe	-	-	-	-	-	James Richards	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	Not Detected	Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected
Comments	-	-	-	-	0	0	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	116	124	119	114	113	104	85.7	115	118	126	113	107	121	100	108	100
Toluene-d8**	102	104	91.4	103	96.5	98	95.1	99.5	103	104	99.2	96	101	95	89.8	93.9
4-Bromofluorobenzene**	101	91.5	74.9	85.7	91.7	96.2	87.4	94.2	91.3	88.6	98.7	83.8	95	98.3	73.8	82.2
Methyl Tertiary Butyl Ether	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Benzene	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09
Toluene	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07
Ethylbenzene	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04
p/m-Xylene	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
o-Xylene	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Naphthalene	0.13	0.13	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.426	0.13	0.355	0.13	0.586
Sum of BTEX	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CG4	3CG4	3CG4	3CG5	3CG5	3CG5	3CG1V	3CG4V	3CG5V	3CH1	3CH1	3CH1	3CH2	3CH2	3CH2	3CH3	3CH1V
Depth	0.5	1	2	0.5	1	1.5	1.7	3.1	3	0.25	0.5	1	0.5	1	2	0.5	1.251.25
Sampled Date	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	22/10/2018	18/10/2018	18/10/2018	22/10/2018	22/10/2018	22/10/2018	19/10/2018	19/10/2018	19/10/2018	22/10/2018	22/10/2018
Carbon																	
Soil Organic Matter (SOM)	2.69	50.3	11	2.93	20.2	7.05	0.912	1.09	4.21	3.22	1.65	3.36	8.45	90.2	5.86	3.81	3.24
Metals (Solids)																	
Arsenic	12.7	6	6	6	6	6	9.98	12.6	12.5	11.1	20.4	14.1	10.4	9.64	12.9	6	13.4
Cadmium	0.201	0.67	0.2	0.2	0.2	0.808	0.02	0.204	0.363	0.02	0.252	1.01	0.0482	0.02	0.053	0.2	0.02
Chromium	28.7	166	680	537	743	760	24.3	44	41.6	49.7	11.7	10.1	26.3	14.9	28.6	678	35.1
Copper	15.4	14	17.9	14	16.5	14	12.3	11.3	20.4	17.7	15.6	17.8	31.7	37.4	41.9	14	21.5
Lead	49.4	23.1	7.14	11.8	25	13.3	21.5	34.5	34.1	20.8	38.4	31.7	30.9	69	34.1	7	21.9
Mercury	0.14	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14
Nickel	31.6	7.27	11.6	8.47	7.75	9.41	32.5	36.1	30.2	21.1	16.5	17.7	20.4	19.2	26.7	6.26	26.3
Selenium	1	10	18.1	11.9	22.6	13.3	1	1	1	2.25	3.21	2.45	1	1.1	2.04	14.6	1
Vanadium	50.8	194	578	364	635	865	43.3	64.5	61.8	187	53.3	30.4	52.7	45	55.7	512	58.7
Zinc	153	24.8	37.5	131	190	50	92.1	129	123	98.7	168	227	158	335	105	46.2	90.6
TPH Criteria Working Group (TPH CWG)																	
Benzene																	
Toluene																	
Ethylbenzene																	
sum of detected mpo xylene by GC																	
Aliphatics >C5-C6	0.02	0.0451	0.02	0.0203	0.01	0.0366	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0232	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.157	0.02	0.0857	0.0337	0.071	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.126	0.0223	0.02	0.02
Aliphatics >C8-C10	0.02	0.0748	0.02	0.0568	0.021	0.0548	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.288	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.0693	0.02	0.0482	0.0168	0.0688	0.02	0.02	0.02	0.02	0.02	0.02	0.02	4.68	0.0211	0.02	0.02
Aliphatics >C12-C16	0.1	12.3	6.19	6.54	12.2	5.54	0.1	0.1	0.1	0.766	0.1	0.1	2.38	31.1	2.51	0.1	0.1
Aliphatics >C16-C21	0.1	23.4	13.7	10.4	53	22.6	0.1	0.767	0.254	2.79	0.1	0.1	10.5	123	48.6	1.98	0.1
Aliphatics >C21-C35	2.53	61	106	55.3	82.3	108	1.1	9.78	9.83	10.3	3.98	5.34	41.8	194	36.2	19	1.05
Aliphatics >C35-C44	0.646	11.2	56.6	4.12	16.8	46.1	0.529	4.57	10.1	3.32	0.31	0.1	13.2	53.3	6.75	0.654	0.1
Aromatics >EC5-EC7	0.02	0.0209	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0255	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.0418	0.02	0.0257	0.0126	0.0215	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0499	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.0506	0.02	0.0375	0.0147	0.0366	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.191	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.0462	0.02	0.0321	0.0116	0.0462	0.02	0.02	0.02	0.02	0.02	0.02	0.02	3.12	0.02	0.02	0.02
Aromatics >EC12-EC16	0.1	9.52	5.2	6.51	11.7	6.5	1.59	0.1	0.36	0.564	0.1	0.1	10.8	356	32.2	0.1	0.1
Aromatics >EC16-EC21	0.1	25.2	24.8	20.3	73.3	31.6	0.1	1.6	1.55	2.97	0.535	1.19	145	3100	343	0.1	0.1
Aromatics >EC21-EC35	3.7	66.7	107	48.1	157	112	3.24	9.84	24.5	6.78	0.1	15	371	3690	570	4.35	9.76
Aromatics >EC35-EC44	0.1	16.5	58.4	12.8	37.3	52.4	0.191	5.11	17.2	0.588	0.1	1.39	91.4	688	126	2.03	0.511
Aromatics >EC40-EC44	2.5	4.58	21.7	4.38	11.2	19.4	0.1	2.03	7.65	0.1	0.1	0.1	23.3	159	31.1	3.06	0.1
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	12	289	56.6	307	1560	364	12	12	12	128	12	12	364	1950	7410	43.6	12
Acenaphthene	8	41.2	77.4	26.5	156	162	8	8	8	24.7	8	8	46.6	227	431	8	8
Anthracene	16	665	179	1240	2510	414	16	16	16	235	16	16	1300	4350	12600	64.5	16
Benz(a)anthracene	25.2	1780	1480	1890	3800	1340	14	96.1	47.7	589	38	42.8	6340	8840	31300	137	14
Benzo(a)pyrene	22.6	1480	1100	1430	3650	1180	15	73.9	27.1	453	30	33.1	5150	8040	28000	119	15
Benzo(b)fluoranthene	29.6	2740	1940	2240	4290	1590	15	110	38.7	846	52	64.7	8700	10900	38000	209	15
Benzo(k)fluoranthene	14	991	726	919	1750	645	14	49.6	14	275	20.6	26.6	2870	4240	12500	84.2	14
Benzo(g,h,i)perylene	24	920	887	746	2590	828	24	56.2	24	326	33.3	35.9	3660	5640	19000	106	24
Chrysene	26.8	1720	1900	2070	3510	1220	10	106	49.4	606	39.2	46.5	6640	7730	27500	149	10
Dibenzo(a,h)anthracene	0.023	279	157	226	472	149	0.023	0.023	0.023	76.7	0.023	0.023	793	993	4300	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	1260	874	1000	2900	847	0.018	46.6	0.018	352	27.3	31.2	3920	7060	22500	69.3	0.018
Fluoranthene	179	3860	4960	5210	10100	3390	39.1	179	78.1	1420	87	72.5	14400	30900	93100	353	0.017
Fluorene	10	429	71.5	620	1950	320	10	10	10	134	10	10	298	2970	6430	10.7	10
Naphthalene	9	782	292	727	1620	512	9	9	9	443	26.1	16.3	561	1320	5100	167	9
Phenanthrene	63.2	1980	7440	3510	8020	3010	15	136	67	1080	74.8	66.2	6640	22100	50800	239	15
Pyrene	0.129	2.95	3.4	3.51	7.19	2.52	0.0326	0.142	0.0656	0.981	0.0644	0.0692	10.6	22.2	66.7	0.254	0.015
PAH, Total Detected USEPA 16	0.475	22.2	25.5	25.7	56	18.5	0.118	0.997	0.374	7.97	0.493	0.505	72.2	139	426	2.01	0.118
Naphthalene-d8 % recovery**	86.5	93.1	83.5	80.4	77.8	80	75.6	91.5	90.7	82.7	85	80.6	90.1	92.4	89.4	81.1	92.1
Acenaphthene-d10 % recovery**	84.5	96.4	92.1	84.8	85.1	84.5	83.4	90.7	89.8	89.3	86.1	85.4	95.3	100	91.8	82.3	92.1
Phenanthrene-d10 % recovery**	86.9	94.4	91.3	86.2	87.6	87.1	79.5	88.4	89.2	87	87.5	88.1	96.4	96.6	94.5	83.7	88.3
Chrysene-d12 % recovery**	80	76.2	85.5	88.8	72.8	76	71.2	85.1	87.1	80.3	80.1	95.5	96.8	89.8	98.3	83.1	84.1
Perylene-d12 % recovery**	81.3	66.7	73.8	80.2	73.4	77.5	70.9	78.9	82.7	76.6	78.6	88.4	91.7	89.4	91.1	74.2	84.5
Total Aliphatics >C12-C44	3.17	108	182	76.3	164	182	1.63	15.1	20.2	17.2	4.29	5.34	67.9	401	94.1	21.7	1.05
Total Aromatics >EC12-EC44	3.7	118	195	87.8	279	202	5.02	16.6	43.6	10.9	0.535	17.6	619	7830	1070	6.38	10.3
Total Aliphatics & Aromatics >C5-C44	6.87	226	377	164	444	385	6.65	31.7	63.8	28.1	4.82	23	686	8240	1160	28	11.3
Metals - (Solid)																	
Iron	23800	57200	144000	152000	165000	142000	37300	25900	25200	51200	22600	27800	29600	68300	22100	165000	39800
Manganese	784	15600	35900	31000	40700	47200	621	791	590	4470	3790	2500	1320	1780	1210	29900	286
Metals - (Liquid)																	
Calcium	-	111000	237000	192000	-	238000	-	-	-	-	107000	-	100000	-	18300	201000	-
Magnesium	-	15600	9810	38100	-	22000	-	-	-	-	18800	-	7920	-	3880	33800	-
Phenols																	
Phenol	0.01	0.01	0.0107	0.0214	0.021	0.0215	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0116	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.0107	0.0105	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0348	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0464	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.0868	0.0236	0.052	-	0.0222	-	-	-	-	0.101	-	0.146	-	0.349	0.0353	-
pH	8.42	11.7	12.9	12.3	12.9	12.6	8.08	8.93	8.46	8.9	8.38	7.53	8.7	8.24	7.61	12.6	7.48
Sulphate, Total																	
Sulphur, Total	-	0.397	0.398	0.214	-	0.191	-	-	-	-	0.365	-	0.199	-	0.127	0.126	-
Sulphate, Total potential	-	1.19	1.19	0.642	-	0.573	-	-	-	-	1.1	-	0.597	-	0.381	0.378	-
Sulphate, acid soluble (total)	-	0.334	0.456	0.305	-	0.445	-	-	-	-	0.33	-	0.112	-	0.17	0.292	-
Cyanide, Total	1	1.13	1	1	1.17	1	1	1	1	1	1	1	1	8.59	2.85	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	79.3	164	12	12	12	12	12	12	12	12	116
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	05/11/2018	05/11/2018	05/11/2018	-	05/11/2018	-	-	-	-	05/11/2018	-	05/11/2018	-	05/11/2018	05/11/2018	-
Analysed By	-	Marcin Magdziarek	Barbara Urbanek-Walsh	Lucy Caroe	-	Barbara Urbanek-Walsh	-	-	-	-	Marcin Magdziarek	-	James Richards	-	Lucy Caroe	Marcin Magdziarek	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-
Comments	-	0	0	0	-	0	-	-	-	-	-	-	0	-	0	-	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	112	107	95.8	99.8	99.6	99.4	112	112	110	109	113	112	108	116	122	112	112
Toluene-d8**	100	101	97.2	95.6	96.5	95.7	101	99.1	99.5	99.4	101	99.6	96.8	92.8	96.1	96.3	99.9
4-Bromofluorobenzene**	99.3	101	93.8	109	69.5	79.6	101	94.1	95.7	87.4	98.2	94	81.9	82.2	74.6	93.1	96.2
Methyl Tertiary Butyl Ether	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	1.8	0.09	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.136	0.2	0.09	0.09
Toluene	0.07	1.4	0.07	1.4	0.11	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.8	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	2.6	0.13	2.6	0.279	0.288	0.13	0.13	0.13	0.13	0.13	0.13	0.13	32.2	0.793	0.13	0.13
Sum of BTEX	0.4	8	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CH2V	3CI1	3CI1	3CI1	3CI2	3CI2	3CI2	3CI3	3CI3	3CI1V	3CI2V	3CJ1	3CJ1	3CJ1	3CJ2	3CJ2
Depth	2.3	0.5	1	1.5	0.5	1	2	0.5	1.5	1.7	2.3	0.5	1	1.5	0.5	1
Sampled Date	19/10/2018	22/10/2018	22/10/2018	22/10/2018	19/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	22/10/2018	19/10/2018	22/10/2018	22/10/2018	22/10/2018	19/10/2018	19/10/2018
Carbon																
Soil Organic Matter (SOM)	2.16	1.05	2	6	6.79	9.76	31.5	19	0.35	0.609	1.81	4.43	1.56	5.05	>100	65.7
Metals (Solids)																
Arsenic	10.8	6.3	10.7	9	9.71	12.6	10.1	2.93	6	7.45	14.6	9.52	6.55	8.91	10.5	13.6
Cadmium	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.2	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Chromium	40	64.5	12.7	11.7	24.7	25.8	5.1	192	554	21.4	33	23.4	118	13.3	77	264
Copper	26.4	13.2	15.3	17.6	16.3	18	35.2	3.28	14	8.03	22.5	18.3	15.2	24	98.5	72.6
Lead	21.3	19.2	37.2	26.7	34.8	27.2	28.1	5.52	7	13	18.2	27.6	37.6	24.7	138	65
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.06
Nickel	39	10.4	33.9	19.1	22.5	23.6	22.7	4.3	10.4	25.3	31.7	20.5	13.6	30.1	72.1	125
Selenium	1	1.4	1	1	1	1	1	5.24	13.1	1	1	1.28	2.57	1	1	1
Vanadium	58.3	93.3	31.2	46.4	45.4	44.8	63	198	394	35.8	57.4	57	144	33.5	28.7	43.7
Zinc	114	87.9	118	95.9	179	144	127	55.2	67.4	71.1	116	116	94.2	70.3	691	549
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.01	0.02	0.02	0.02	0.02	0.0219	0.02	0.0662	0.02	0.02	0.01	0.02	0.02	0.02	0.0365	0.02
Aliphatics >C8-C10	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.403	0.02	0.02	0.01	0.02	0.02	0.02	0.0277	0.02
Aliphatics >C10-C12	0.01	0.02	0.02	0.02	0.02	0.02	0.02	1.33	0.02	0.02	0.01	0.02	0.02	0.02	0.0718	0.02
Aliphatics >C12-C16	0.1	2.26	1.27	1.69	0.1	1.05	1.06	58.4	0.999	0.1	0.1	1.58	0.472	0.1	56.1	14.9
Aliphatics >C16-C21	0.1	5.78	2.28	5.14	3.09	5.11	3.52	23	7.6	0.1	0.1	5.54	3.22	0.1	258	175
Aliphatics >C21-C35	0.1	33	6.31	33.9	26	35.1	16.7	297	54.7	0.1	0.1	28.5	23.8	4.46	316	357
Aliphatics >C35-C44	0.1	11.7	1.04	10.5	7.67	8.58	2.23	261	13.7	0.1	0.1	8.4	8.19	0.1	91.7	130
Aromatics >EC5-EC7	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.268	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.888	0.02	0.02	0.01	0.02	0.02	0.02	0.0479	0.02
Aromatics >EC12-EC16	0.1	2.64	0.581	2.3	0.1	0.1	2.92	21.2	0.765	0.1	0.1	1.59	2.42	0.713	635	105
Aromatics >EC16-EC21	0.1	14.1	1.97	10.8	2.81	5.95	32.5	41.3	4.78	0.1	0.1	6.68	11.2	1.12	3540	1210
Aromatics >EC21-EC35	1.97	48.4	5.09	38.6	34.2	50.2	116	737	30	0.1	4.17	21.4	38.6	5.13	4460	2350
Aromatics >EC35-EC44	0.128	14.9	0.4	12.3	8.71	4.9	30.9	559	18.1	0.1	0.982	6.27	16.6	0.396	926	538
Aromatics >EC40-EC44	0.1	4.75	0.1	4.15	3.04	0.1	7.04	250	7.92	0.1	0.1	2.08	8.5	2.78	220	162
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	202	13.7	85	51.6	37.9	83.5	0.24	44.9	12	12	182	296	12	24400	21600
Acenaphthene	8	39.9	8	21	8	8	8	3600	8	8	8	38.8	67.7	8	1360	1470
Anthracene	16	537	37.4	209	87.7	76.3	373	927	74.9	16	16	375	621	16	101000	103000
Benz(a)anthracene	14	1310	117	642	272	295	2640	360	204	14	33.4	680	1340	43.6	117000	154000
Benzo(a)pyrene	15	988	82.2	459	259	208	2360	300	168	15	15	545	1210	35.7	93600	117000
Benzo(b)fluoranthene	15	1620	143	649	445	411	5750	391	266	15	37.8	766	1900	63.8	132000	170000
Benzo(k)fluoranthene	14	700	71.4	279	159	132	2000	280	94.6	14	14	286	807	20.2	45000	66300
Benzo(g,h,i)perylene	24	743	57.4	321	195	163	2180	0.48	115	24	24	414	694	24	63600	89200
Chrysene	10	1270	118	541	273	320	2830	390	260	10	29.5	608	1360	73.5	113000	165000
Dibenzo(a,h)anthracene	0.023	201	0.023	58.3	50.5	36.7	729	0.46	29	0.023	0.023	122	179	0.023	16800	16300
Indeno(1,2,3-cd)pyrene	0.018	865	71	317	242	160	2850	0.36	129	0.018	0.018	529	904	25.3	79300	85400
Fluoranthene	24.4	2790	226	1400	513	555	7450	2410	494	0.017	87.4	1760	2950	92.7	294000	391000
Fluorene	10	191	13.7	91.1	34.1	33.7	10	1650	13.7	10	10	191	293	10	30900	21200
Naphthalene	9	494	43.1	275	105	66.9	1090	10000	205	9	9	643	787	48.8	17300	16800
Phenanthrene	15	1500	163	855	279	316	4960	6370	377	15	57.8	1580	2230	167	195000	215000
Pyrene	0.015	2.06	0.177	1.02	0.414	0.423	4.48	1.55	0.393	0.015	0.0569	1.25	2.2	0.063	216	278
PAH, Total Detected USEPA 16	0.118	15.5	1.33	7.22	3.38	3.23	39.8	27.7	2.87	0.118	0.303	9.97	17.8	0.634	1540	1910
Naphthalene-d8 % recovery**	94.9	89.2	84.3	82.2	91.9	87	90.7	97.9	79.8	80.9	75.6	79.6	83.1	81.5	78.9	93
Acenaphthene-d10 % recovery**	98.4	89.7	76.3	84.9	95.1	92	93.3	92	83.2	84.4	79.1	91.6	86.4	87.9	86.6	182
Phenanthrene-d10 % recovery**	0	88.1	87.8	84.9	99.2	93.5	97.2	85	86.5	87.6	77.8	94.2	89.8	91.4	84.5	111
Chrysene-d12 % recovery**	107	83.2	91.1	78.4	105	96.2	101	80.1	83.1	96.7	69.1	73.9	96.4	75.8	75.7	267
Perylene-d12 % recovery**	102	82.8	85.5	72.2	101	84.7	95.2	82.9	73.4	97.1	70.6	70.2	91.7	70.8	77.3	183
Total Aliphatics >C12-C44	0.1	52.8	10.9	51.2	36.7	49.9	23.5	639	77	0.1	0.1	44.1	35.6	4.46	722	677
Total Aromatics >EC12-EC44	2.09	80.1	8.04	64.1	45.7	61.1	183	1360	53.6	0.1	5.16	36	68.8	7.37	9560	4200
Total Aliphatics & Aromatics >C5-C44	2.09	133	18.9	115	82.4	111	206	2000	131	0.1	5.16	80	104	11.8	10300	4870
Metals - (Solid)																
Iron	36600	61100	40000	50100	24200	25100	73700	98400	176000	22100	33000	50800	45300	17900	65100	61400
Manganese	416	4990	1210	1720	1260	952	1870	20000	36900	586	577	2440	6530	913	1520	2020
Metals - (Liquid)																
Calcium	-	195000	-	121000	64900	-	39600	182000	205000	-	-	-	126000	-	-	36800
Magnesium	-	55700	-	48300	12700	-	6030	34200	41100	-	-	-	37100	-	-	6000
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0126	0.0126
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0109	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0756
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0882
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.108	-	0.117	0.481	-	0.291	0.0697	0.0099	-	-	-	0.0552	-	-	0.103
pH	7.72	9.9	8.64	9.02	8.38	8.11	7.97	12.7	12.4	8.27	7.43	9.7	10.2	8.65	7.97	12.8
Sulphate, Total																
Sulphur, Total	-	0.0927	-	0.134	0.179	-	0.324	0.461	0.0738	-	-	-	0.112	-	-	0.541
Sulphate, Total potential	-	0.278	-	0.402	0.537	-	0.972	1.38	0.221	-	-	-	0.336	-	-	1.62
Sulphate, acid soluble (total)	-	0.194	-	0.154	0.191	-	0.107	0.491	0.19	-	-	-	0.211	-	-	0.116
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	259	272
Exchangeable Ammonia as N	104	12	12	12	12	12	12	12	12	12	53.7	12	12	12	12	12
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	0.001
Date of Analysis	-	05/11/2018	-	05/11/2018	05/11/2018	-	05/11/2018	05/11/2018	05/11/2018	-	-	-	05/11/2018	-	-	05/11/2018
Analysed By	-	Marcin Magdziarek	-	James Richards	Lucy Caroe	-	James Richards	Marcin Magdziarek	Christian Hallam	-	-	-	Lucy Caroe	-	-	Andrzej Ferfecki
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	0.001
Additional Asbestos Components (Using TM048)	-	-	-	-	None	-	None	-	-	-	-	-	-	-	-	None
Analysts Comments	-	-	-	-	N/C	-	N/A	-	-	-	-	-	-	-	-	N/A
Asbestos Quantification - Total - %	-	-	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	0.001
Chrysotile (White) Asbestos	-	Not Detected	-	Not Detected	Detected	-	Detected	Not Detected	Not Detected	-	-	-	Not Detected	-	-	Not Detected
Amosite (Brown) Asbestos	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	-	-	Detected
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	-	-	Not Detected
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	-	-	Not Detected
Fibrous Tremolite	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	-	-	Not Detected
Fibrous Actinolite	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	-	-	Not Detected
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	Not Detected	-	Detected	Not Detected	Not Detected	-	-	-	Not Detected	-	-	Not Detected
Comments	-	-	-	-	Loose fibres in soil	-	Fibre bundles in soil	0	0	-	-	-	-	-	-	Loose fibres in soil
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	110	107	117	108	109	110	111	107	101	111	109	113	118	126	113	104
Toluene-d8**	98.8	96.9	96.7	99.6	98.1	92.2	93.9	98.2	96.1	102	101	97.3	95.5	94.9	90.5	88.1
4-Bromofluorobenzene**	96.1	87.7	86.2	90.5	83.5	79.8	72.2	84	91.6	102	90.3	85.9	81.6	82.7	74.2	71.4
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.152	2.25	0.13	0.13	0.13	0.194	0.154	0.13	1.3	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.8
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.06
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.6
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.5
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.87
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.5
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.2

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	3CJ3	3CJ3	3CJ3	3CJ1V	3CJ2V	3CJ3V	3CK1	3CK1	3CK1	3CK2	3CK2	3CK4	3CK4	3CK5	3CK5
Depth	0.5	1.5	2	1.8	1.3	3.4	0.5	1	1.5	0.5	1	0.5	1	0.5	1.5
Sampled Date	18/10/2018	18/10/2018	18/10/2018	22/10/2018	19/10/2018	18/10/2018	22/10/2018	22/10/2018	22/10/2018	19/10/2018	19/10/2018	24/10/2018	24/10/2018	24/10/2018	24/10/2018
Carbon															
Soil Organic Matter (SOM)	28.3	2.57	10.1	0.672	7.41	2.93	2.02	1.55	5.83	40	47.6	8.41	0.35	2.16	4.12
Metals (Solids)															
Arsenic	8.18	6	2.12	9.7	11.9	12.9	5.44	8.83	14.2	4.51	12.4	6	6	6	6
Cadmium	0.02	0.765	0.02	0.02	0.0489	0.343	0.15	0.2	1.1	0.02	0.02	1.66	1.02	1.35	1.33
Chromium	57	416	76.3	19.7	63.7	38.7	9.44	97.2	17.4	494	755	561	423	463	991
Copper	13.5	14	2.22	9	30.4	20.5	23.8	21.3	21.3	19.4	66.3	19.2	14	32.5	14
Lead	48.3	19.3	5.54	13.1	30.1	45.1	12.8	33.4	39.3	6.95	33.3	114	30.7	90.5	71
Mercury	0.14	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	1.4	1.4	1.4	1.4
Nickel	13.8	12	1.96	28.7	39	34.3	24.5	19.1	28.2	70.9	307	15.7	10.5	21.4	8.89
Selenium	1.99	10	6.09	1	1	1	1	10	10	4.08	1	10	10	10	10.1
Vanadium	185	284	94.6	36.2	70.2	71	15	127	48.2	173	48.4	416	523	804	582
Zinc	203	62.9	28.5	73.8	131	146	60	75.3	118	41	99.4	396	137	438	278
TPH Criteria Working Group (TPH CWG)															
Benzene															
Toluene															
Ethylbenzene															
sum of detected mpo xylene by GC															
Aliphatics >C5-C6	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.0667	0.0367	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.062	0.0291	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.0421	0.027	0.02	0.02	0.02
Aliphatics >C12-C16	6.41	9.48	3.43	0.36	0.1	0.1	0.1	0.1	1.27	8.18	7.02	2.65	1.19	0.1	1.22
Aliphatics >C16-C21	11.1	33.6	17	0.1	0.1	0.1	0.764	0.1	10.8	41.2	27.3	13	4.04	2.39	8.17
Aliphatics >C21-C35	37.7	168	107	0.325	0.1	3.04	3.22	9.54	22.8	70.5	38.8	45	47.9	25.7	46.9
Aliphatics >C35-C44	4.93	81.4	46.5	0.188	0.1	0.1	0.1	0.1	0.1	16.3	4.24	6.4	2.94	8.03	9.21
Aromatics >EC5-EC7	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.041	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.0281	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	9.8	6.32	3.71	0.1	0.1	0.1	0.1	0.837	0.1	18.5	16.3	4.66	2.5	0.1	2.19
Aromatics >EC16-EC21	26.9	32.2	20.7	0.1	0.1	0.1	2.27	2.81	3.1	175	163	22	6.03	4.04	15
Aromatics >EC21-EC35	70.6	236	116	0.1	12.1	1.6	7.11	10.9	43.9	489	545	71.7	25.3	29.4	69.9
Aromatics >EC35-EC44	18.8	144	66.5	0.1	2.14	0.1	1.2	3.04	7.34	107	126	21.2	7.13	11.1	21.9
Aromatics >EC40-EC44	8.9	61.7	27.3	1.56	0.1	3	0.1	1.13	2.18	28.4	38.1	7.82	2.65	4.19	8.11
Polyaromatic Hydrocarbons (PAHs)															
Acenaphthylene	616	423	279	12	12	12	12.6	51.6	12	1620	4600	155	37.4	38	238
Acenaphthene	92.5	61.2	73.5	8	8	8	8	10.8	8	8	264	8	8	22.3	86.4
Anthracene	659	690	564	16	16	16	23.4	73.1	16	5930	8240	221	80.1	70	866
Benz(a)anthracene	1350	1610	1390	14	14	33	80.9	243	64	18900	30000	644	199	290	1660
Benzo(a)pyrene	890	1160	1150	15	15	29.8	63.1	212	71.7	14100	21800	491	144	285	1430
Benzo(b)fluoranthene	1800	1500	1830	15	15	44.9	116	330	132	14200	37700	961	270	446	2300
Benzo(k)fluoranthene	612	609	651	14	14	14	41.9	126	43.3	7790	15500	334	103	160	783
Benzo(g,h,i)perylene	628	820	766	24	24	24	50	149	52.1	9190	15400	408	124	235	927
Chrysene	1460	1360	1500	10	10	37.5	112	276	86	15700	23600	729	246	350	1830
Dibenzo(a,h)anthracene	149	197	144	0.023	0.023	0.023	0.023	37.2	0.023	3190	4990	109	30.1	46.5	284
Indeno(1,2,3-cd)pyrene	712	706	695	0.018	0.018	0.018	52.8	128	60.1	10000	19200	423	119	222	1030
Fluoranthene	2960	3670	3350	0.017	35.5	70.2	141	450	146	34300	60600	1460	509	503	2930
Fluorene	436	269	315	10	10	10	12.5	33.4	10	1900	1880	81.4	10	29.2	186
Naphthalene	2990	1670	1030	9	347	9	61.4	96.7	14.1	1250	1430	868	170	94.8	321
Phenanthrene	2990	2730	2590	15	15	57.2	211	289	70.9	18600	20100	1140	501	273	1370
Pyrene	2.11	2.67	2.51	0.015	0.0295	0.0543	0.109	0.335	0.115	26.1	41.5	1.01	0.34	0.448	2.38
PAH, Total Detected USEPA 16	20.4	20.1	18.8	0.118	0.412	0.327	1.09	2.84	0.854	183	307	9.03	2.87	3.51	18.6
Naphthalene-d8 % recovery**	91.6	96.7	90.5	92.7	79.6	94.9	91.5	81.4	84.3	89.1	91.3	86.1	83.7	87.5	80.8
Acenaphthene-d10 % recovery**	96.5	96.1	97.2	91.6	85.5	95.1	93.4	80.9	87.2	93.4	90	87.9	85.2	88	88.9
Phenanthrene-d10 % recovery**	96.4	94.1	96.8	92.5	88.1	94.7	95.3	79.4	92.9	99.6	88.6	91	87.6	90.3	92.7
Chrysene-d12 % recovery**	93	92.5	94.8	88.2	77.7	92.2	99.3	77.3	98.8	98.2	83.8	83.4	81.3	86.1	74.2
Perylene-d12 % recovery**	78.5	85.6	86.9	87.4	78.9	90.1	92.5	71.5	94.1	84.8	82.8	78.6	75.3	86.1	70.4
Total Aliphatics >C12-C44	60.2	293	173	0.873	0.1	3.04	3.99	9.54	34.9	136	77.4	67	56.1	36.1	65.5
Total Aromatics >EC12-EC44	126	419	207	0.1	14.2	1.6	10.6	17.5	54.4	790	850	120	40.9	44.6	109
Total Aliphatics & Aromatics >C5-C44	186	711	380	0.873	14.2	4.64	14.6	27.1	89.2	926	927	187	97	80.6	175
Metals - (Solid)															
Iron	79400	97800	33200	27300	38000	31400	13200	115000	63100	73600	36600	133000	141000	113000	162000
Manganese	4630	25900	13600	1140	423	998	341	11900	8420	10400	1310	26800	29400	26600	36800
Metals - (Liquid)															
Calcium	-	219000	211000	-	-	-	2440	-	43000	115000	-	190000	233000	226000	219000
Magnesium	-	32100	27200	-	-	-	2210	-	14600	11900	-	6910	31700	20900	4350
Phenols															
Phenol	0.01	0.01	0.0213	0.01	0.01	0.01	0.01	0.01	0.01	0.0104	0.01	0.01	0.01	0.01	0.01
Cresols	0.0244	0.0112	0.01	0.01	0.01	0.01	0.01	0.01	0.0142	0.01	0.01	0.0108	0.0106	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics															
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.15	0.144	-	-	-	0.0402	-	0.225	0.0302	-	0.0743	0.004	0.0872	0.0322
pH	8.62	11.6	10.8	8.28	6.91	8.49	8.24	8.63	6.53	8.15	8.17	11.6	12.4	11.3	9.45
Sulphate, Total															
Sulphur, Total	-	0.4	1.05	-	-	-	0.0351	-	0.13	0.449	-	0.255	0.161	0.213	0.16
Sulphate, Total potential	-	1.2	3.15	-	-	-	0.105	-	0.39	1.35	-	0.765	0.483	0.639	0.48
Sulphate, acid soluble (total)	-	0.912	0.795	-	-	-	0.023	-	0.228	0.0343	-	0.305	0.296	0.364	0.224
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1.22	1	1	1
Exchangeable Ammonia as N	12	12	12	36.3	181	185	12	12	41.5	12	12	12	12	12	12
Asbestos															
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	05/11/2018	05/11/2018	-	-	-	05/11/2018	-	05/11/2018	05/11/2018	-	07/11/2018	30/10/2018	30/10/2018	07/11/2018
Analysed By	-	Lucy Caroe	Christian Hallam	-	-	-	Marcin Magdziarek	-	Marcin Magdziarek	Lucy Caroe	-	Paul Poynton	Lucy Caroe	Lucy Caroe	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	Not Detected	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Amosite (Brown) Asbestos	-	Not Detected	Not Detected	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	-	Not Detected	Not Detected	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	-	Not Detected	Not Detected	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	-	Not Detected	Not Detected	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	-	Not Detected	Not Detected	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	-	Not Detected	Not Detected	-	-	-	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Comments	-	0	0	-	-	-	-	-	-	0	-	0	0	0	0
Volatile Organic Compounds (VOCs)															
Dibromofluoromethane**	99.4	105	107	112	113	104	123	122	134	97.2	92.2	99.5	94	103	106
Toluene-d8**	96.5	98.1	92	102	101	98	101	104	96.7	92.8	91.3	88.9	89.1	96	96.9
4-Bromofluorobenzene**	111	70	90.2	102	100	87.8	77.7	79.8	80.3	77.2	86.9	74.9	91.8	106	92.5
Methyl Tertiary Butyl Ether	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2
Benzene	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.18	0.09	0.09	0.09	0.18
Toluene	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.14	0.07	0.07	0.07	0.14
Ethylbenzene	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.08	0.04	0.04	0.04	0.08
p/m-Xylene	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2
o-Xylene	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2
Naphthalene	2.6	0.506	0.265	0.13	0.13	0.13	0.13	0.13	0.13	0.26	0.26	0.194	0.13	0.13	0.26
Sum of BTEX	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.8	0.4	0.4	0.4	0.8
Subcontracted: Inorganics															
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	19.8	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	16.9	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	19.6	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	16.3	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	1.16	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	13.9	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	14.9	-	-	-	-

Sample ID	3CK6	3CK6	3CK7	3CK7	3CK8	3CK8	3CK1V	3CK2V	3CK4V	3CK5V	3CK6V	3CK7V	3CK8V	3CL2	3CL2	3CL4	3CL4	3CL4
Depth	0.5	1	0.5	1	0.7	1.8	1.7	1.2	4	3.5	2.5	2.2	2.8	0.5	1	1	2.5	3
Sampled Date	23/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018	22/10/2018	19/10/2018	24/10/2018	24/10/2018	23/10/2018	23/10/2018	23/10/2018	19/10/2018	19/10/2018	24/10/2018	24/10/2018	24/10/2018
Carbon																		
Soil Organic Matter (SOM)	27.8	20.3	17.6	20.2	19.3	15.2	1.36	5.4	3.02	4.86	1.41	0.895	2.12	2.84	86.4	5.24	17.9	20.9
Metals (Solids)																		
Arsenic	11.2	11.5	8.46	9.17	6	6	13.4	11.4	11.3	11.8	13.3	16.4	13.3	12.9	9.29	9.74	4.12	6.04
Cadmium	2.79	0.9	0.922	0.02	0.704	0.2	0.02	0.02	0.212	0.302	22.5	0.02	0.02	0.254	0.02	0.639	0.02	1.66
Chromium	299	277	159	84.4	539	366	31.6	39.3	34.2	37.9	37	38.6	36.5	114	8.5	32.8	372	490
Copper	37.9	26.6	27.1	506	15.3	19.8	16.4	17.7	17.1	18.4	81.4	18.6	22.7	14.3	33.5	15.5	9.82	36.4
Lead	329	58.9	62.8	43.7	36	37.4	21.1	31.5	27.9	35.7	172	24	20.8	49.3	38.9	67.2	17.9	136
Mercury	1.4	1.4	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4
Nickel	25.8	19.5	27.9	15.4	10.7	11.9	35.5	25.9	33.7	32.7	40.4	41.5	32.8	22.5	17.6	32.1	8.5	31.7
Selenium	10	10	10	3.07	10	11.7	1	1	1	1	1	1	1	1.97	1	1	7.23	10
Vanadium	229	224	282	99.4	404	787	52.5	62.7	55.7	62.1	52.7	58.8	57.8	109	28.4	50.8	262	557
Zinc	1110	145	234	118	58.6	87.5	105	113	109	123	1240	124	127	190	158	313	44.1	164
TPH Criteria Working Group (TPH CWG)																		
Benzene																		
Toluene																		
Ethylbenzene																		
sum of detected mpo xylene by GC																		
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.0507	0.02
Aliphatics >C6-C8	0.02	0.02	0.0234	0.02	0.0902	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.247	0.02
Aliphatics >C8-C10	0.02	0.02	0.0234	0.02	0.0704	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.204	0.02
Aliphatics >C10-C12	0.02	0.02	0.0445	0.02	0.0726	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0201	0.02	0.236	0.02
Aliphatics >C12-C16	1.81	0.767	6.3	3.11	12.2	3.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	8.74	0.1	19.4	19.7
Aliphatics >C16-C21	5.63	4.92	40.1	18.4	27.4	10.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	69.2	0.1	132	433
Aliphatics >C21-C35	18.8	28.1	83.5	39.1	68.3	43.1	0.1	2.61	0.1	2.26	0.1	0.1	0.1	7.18	124	7.99	93.2	151
Aliphatics >C35-C44	2.81	5.38	20.6	9.18	11.1	8.04	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	30.5	0.94	13.3	30.2
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.0224	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.0696	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.0473	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.137	0.02
Aromatics >EC10-EC12	0.02	0.02	0.0293	0.02	0.0484	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.157	0.02
Aromatics >EC12-EC16	2.41	1.26	28.8	10.6	15.1	4.51	0.1	0.1	0.1	0.1	0.1	0.359	0.1	0.1	58.6	0.1	26.7	7.58
Aromatics >EC16-EC21	8.14	7.67	296	127	42.2	18.2	0.1	0.1	0.1	0.1	0.1	3.61	0.1	0.1	966	0.817	158	124
Aromatics >EC21-EC35	24.8	27.8	718	428	93	70.5	2.61	18.6	3.74	9.45	3.19	11.3	6.36	15.9	1880	16.2	638	199
Aromatics >EC35-EC44	6.65	8.08	177	101	20.9	16.7	0.1	1.85	0.547	1.99	0.607	1.22	0.1	1.59	379	8.05	181	43.5
Aromatics >EC40-EC44	2.33	2.73	43.4	25.2	5.84	4.75	2.35	0.1	0.1	0.1	0.1	0.1	0.1	0.1	97.3	3.62	56.8	16.2
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	98.5	35	8130	3440	267	104	12	12	12	12	12	25.4	12	12	13100	13.8	226	96.5
Acenaphthene	20.9	8	472	206	56.5	46.2	8	8	8	8	8	8	8	8	721	8	132	273
Anthracene	150	82.7	118000	5720	430	238	16	16	16	16	16	38.6	16	16	58000	20.2	758	599
Benz(a)anthracene	457	215	38700	21800	952	910	14	80.2	22.2	21.9	14	73.8	23.4	28	96500	88.7	3050	2800
Benzo(a)pyrene	411	129	32800	19400	723	894	15	57.9	15	15	15	62.3	15	32.7	86000	84.4	2750	2580
Benzo(b)fluoranthene	340	277	50600	32000	787	1120	15	96.3	15	27.6	21.2	58.9	29.8	58.2	117000	152	3800	3450
Benzo(k)fluoranthene	239	88.9	18000	8890	360	487	14	30.7	14	14	14	31.2	14	19	39100	50.6	1480	1410
Benzo(g,h,i)perylene	320	104	20700	16000	555	789	24	47.8	24	24	24	47.7	24	24	75700	67.5	1730	1850
Chrysene	437	287	37300	19000	944	950	10	90.1	18.4	24.3	16.3	63.9	17.4	26.5	80700	105	2620	2800
Dibenzo(a,h)anthracene	72.8	28.5	5890	3710	138	148	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	13800	0.023	690	564
Indeno(1,2,3-cd)pyrene	283	161	31500	17200	561	744	0.018	34.5	0.018	0.018	0.018	50.2	0.018	31.4	74900	70.8	1550	2560
Fluoranthene	1150	840	91000	42200	2440	2010	0.017	176	55	42	29.1	206	40.2	49	287000	181	3240	5090
Fluorene	78.9	25.8	12900	1450	180	83.4	10	10	10	10	10	17.7	10	10	16000	10	294	195
Naphthalene	318	131	7040	2390	1720	494	9	9	9	16.6	9	82.8	9	9	5660	30	1960	336
Phenanthrene	738	756	45200	11700	2160	1050	15	51.7	29.6	30	15	105	15	21.8	156000	96.9	2560	3230
Pyrene	0.856	0.534	61.2	32	1.81	1.75	0.015	0.138	0.0375	0.037	0.0206	0.153	0.0288	0.044	226	0.143	2.67	4.01
PAH, Total Detected USEPA 16	5.97	3.7	580	237	14.1	11.8	0.118	0.802	0.163	0.199	0.118	1.02	0.14	0.311	1350	1.1	29.5	31.8
Naphthalene-d8 % recovery**	94.6	82.2	74.8	86.8	88.7	86.4	92.2	87.4	85.7	86.9	79.1	85.1	79.9	92	80.9	80.9	99.4	80.8
Acenaphthene-d10 % recovery**	89.7	84	77.9	83.4	87.9	84.9	85.8	90.1	95.1	89	84.2	83.6	81.8	94.2	88.8	88.6	91	86.8
Phenanthrene-d10 % recovery**	88	87	81.1	84.9	84.9	82.2	89.8	93.2	100	92.8	88.4	79.5	86.8	96.7	89.6	93.3	92.4	103
Chrysene-d12 % recovery**	83.8	82	76.4	77.3	78.2	77.5	84	88	86.9	88.5	75.7	73.1	74.7	103	88.6	79.7	88	96.4
Perylene-d12 % recovery**	76.5	70.4	74.2	77.2	70.6	75.3	86.6	80.3	83.9	86.5	70.7	71.4	70.8	100	90.3	74.5	86.5	87.6
Total Aliphatics >C12-C44	29.1	39.2	150	69.8	119	65.1	0.1	2.61	0.1	2.26	0.1	0.1	0.1	7.18	233	8.93	258	633
Total Aromatics >EC12-EC44	42	44.8	1220	667	171	110	2.61	20.5	4.28	11.4	3.8	16.5	6.36	17.5	3280	25.1	1000	374
Total Aliphatics & Aromatics >C5-C44	71.1	84	1370	737	291	175	2.61	23.1	4.28	13.7	3.8	16.5	6.36	24.7	3520	34	1260	1010
Metals - (Solid)																		
Iron	88300	65900	61100	66200	89000	129000	26700	38500	27000	28400	36200	36700	32400	43900	36900	31500	99200	141000
Manganese	14100	17300	15100	5690	23500	21500	453	445	393	496	267	445	378	3640	1250	947	18700	27300
Metals - (Liquid)																		
Calcium	98100	-	105000	-	163000	-	-	-	-	-	-	-	-	-	62800	26400	176000	-
Magnesium	12700	-	9610	-	17400	-	-	-	-	-	-	-	-	-	4540	9160	12800	-
Phenols																		
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0118	0.01	0.0118	0.0102
Cresols	0.01	0.0113	0.0117	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0115	0.0354	0.01
Xylenols	0.015	0.0226	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0472	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0944	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	0.151	-	0.345	-	0.114	-	-	-	-	-	-	-	-	-	0.0853	0.0834	0.168	-
pH	8.62	12	8.8	8.82	10.6	12	7.56	7.64	8.33	7.78	8.11	8.33	7.48	8.45	7.84	8.04	12.2	12.5
Sulphate, Total																		
Sulphur, Total	0.271	-	0.288	-	0.345	-	-	-	-	-	-	-	-	-	0.298	0.055	0.457	-
Sulphate, Total potential	0.813	-	0.864	-	1.04	-	-	-	-	-	-	-	-	-	0.894	0.165	1.37	-
Sulphate, acid soluble (total)	0.276	-	0.447	-	0.552	-	-	-	-	-	-	-	-	-	0.0722	0.0583	0.513	-
Cyanide, Total	1	1	1	1.4	1	1	1	1	1	1	1	1.25	1	1	19.3	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	26.7	108	263	119	64	22	191	12	12	12	12	12
Asbestos																		
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	06/11/2018	-	06/11/2018	-	06/11/2018	-	-	-	-	-	-	-	-	-	05/11/2018	31/10/2018	07/11/2018	-
Analysed By	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	-	-	-	-	-	-	-	-	Andrzej Ferfecki	Christian Hallam	James Richards	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-
Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	94.4	97.3	104	88.4	85.2	99.5	113	106	105	113	111	105	112	125	99.5	101	92.3	105
Toluene-d8**	93	92.8	98.1	89.1	87.8	94.6	101	105	95.6	98.8	101	97.1	98.8	104	97.3	92.5	88	87.6
4-Bromofluorobenzene**	71.5	79.2	81.6	79.7	73.3	73.3	101	110	105	88.8	93.7	97.7	106	86.8	71.8	96.7	70.5	95.7
Methyl Tertiary Butyl Ether	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
Benzene	0.09	0.18	0.09	0.18	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09
Toluene	0.07	0.14	0.07	0.14	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.175	0.07
Ethylbenzene	0.04	0.08	0.04	0.08	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04
p/m-Xylene	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
o-Xylene	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
Naphthalene	0.13	0.26	0.638	0.26	0.34	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1.78	0.13	1.07	0.13
Sum of BTEX	0.4	0.8	0.4	0.8	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CL5	3CL5	3CL5	3CL6	3CL6	3CL7	3CL7	3CL2V	3CL4V	3CL5V	3CL6V	3CL7V	3CM2	3CM2	3CM3	3CM4	3CM4	3CM4	3CM5
Depth	0.5	2	3	0.5	1	0.5	1	1.5	5.205.20	5.405.40	3	2.5	0.5	1	0.5	0.7	1.8	2.5	0.5
Sampled Date	23/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018	22/10/2018	22/10/2018	19/10/2018	24/10/2018	23/10/2018	23/10/2018	22/10/2018	19/10/2018	19/10/2018	24/10/2018	24/10/2018	24/10/2018	24/10/2018	23/10/2018
Carbon																			
Soil Organic Matter (SOM)	2.9	2.26	1.19	24	18.4	9.88	12.3	1.6	1.39	88.8	3.26	8.31	6.86	25.9	1.09	6.05	21.9	0.76	2.48
Metals (Solids)																			
Arsenic	7.65	6	6	397	7.02	6.54	6.54	12	11.2	5.72	13.8	13.1	13.4	11.7	6	6	7.37	2.77	18.1
Cadmium	1.34	0.492	0.886	0.856	0.455	0.02	0.02	0.02	0.02	0.136	0.02	0.0685	2.15	0.2	1.94	1.11	0.427	0.02	8.99
Chromium	30.8	359	910	193	174	461	358	28	36.3	3.07	34.2	37.3	82.8	9	560	1040	629	756	153
Copper	15.6	15.2	14	144	16.3	11.3	10.5	11.9	15.4	36.6	20.2	21.1	22.7	38.7	22.3	16.4	14	6.02	51.9
Lead	91.7	197	16.2	80.6	34.6	23.2	15.7	20.2	24.9	24.9	22.4	31.8	69.9	27.7	121	52.8	22.2	4.99	1390
Mercury	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.15	0.14	0.14	1.4	1.4	1.4	1.4	1.4	0.14	1.4
Nickel	38.6	14.5	6.16	313	14.5	10	6.11	30.4	40.8	13	30	24.5	25.2	45.2	22.9	18	17.1	3.46	39.6
Selenium	10	12.2	16.7	51.7	2.5	7.05	11.7	1	1	2.22	1	1	10	10	10	10	12.6	11.2	10
Vanadium	77.5	324	600	278	123	344	394	48.1	65.5	10.9	61.4	52.7	124	125	647	498	344	672	356
Zinc	389	827	52.8	205	129	143	72.4	95.7	124	23.5	112	117	288	142	401	203	59.9	33	6160
TPH Criteria Working Group (TPH CWG)																			
Benzene																			
Toluene																			
Ethylbenzene																			
sum of detected mpo xylene by GC																			
Aliphatics >C5-C6	0.02	0.02	0.0245	0.02	0.02	0.0278	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.0222	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.0705	0.088	0.0966	0.071	0.0353	0.01	0.02	0.02	0.02	0.02	0.02	0.0855	0.02	0.02	0.0746	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.0531	0.109	0.0644	0.0722	0.0217	0.01	0.02	0.02	0.02	0.02	0.02	0.0588	0.02	0.02	0.0576	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.0378	0.229	0.104	0.354	0.0365	0.01	0.02	0.02	0.02	0.02	0.02	0.04	0.02	0.02	0.0565	0.02	0.02
Aliphatics >C12-C16	0.411	0.932	1.79	8.58	7.81	9.69	6.6	0.1	0.415	6.04	0.1	2.88	2.89	2.93	1.4	0.972	19.2	0.96	0.444
Aliphatics >C16-C21	5.16	11	8.11	29.2	55.8	33	68.8	0.1	1.63	12.1	0.1	0.982	14.3	25.6	8.37	3.24	18.7	8.37	11.1
Aliphatics >C21-C35	30.2	50.5	38.2	54.6	72.7	75.4	77.8	0.1	3.89	35.7	0.1	10.6	54.6	33.2	42.7	16.4	29.7	41.8	50.6
Aliphatics >C35-C44	5.63	11.1	8.22	14	28.8	17.8	18.8	0.1	0.1	8.73	0.1	0.1	15.8	8.15	11.6	5.1	5.98	13.9	7.11
Aromatics >EC5-EC7	0.02	0.02	0.0204	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.0429	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.0233	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.0358	0.0726	0.0437	0.0477	0.0148	0.01	0.02	0.02	0.02	0.02	0.02	0.0389	0.02	0.02	0.0384	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.0256	0.153	0.069	0.236	0.0239	0.01	0.02	0.02	0.02	0.02	0.02	0.0266	0.02	0.02	0.0373	0.02	0.02
Aromatics >EC12-EC16	0.1	1.94	3.33	118	14.4	45.4	9.26	0.1	0.1	7.69	0.1	0.666	8.34	9.29	2.41	1.08	31.3	0.1	0.81
Aromatics >EC16-EC21	2.36	8.81	10.8	512	72.6	395	58.3	0.1	0.633	14.8	0.1	2.89	113	140	18.2	4.68	38.9	10.3	7.26
Aromatics >EC21-EC35	26.6	40.6	35.7	632	142	695	103	0.1	5.67	55.2	5.28	48.8	345	377	74.7	26.3	78	52.5	35.3
Aromatics >EC35-EC44	7.62	11.3	7.21	114	46.1	150	28.7	0.1	0.537	9.21	0.1	6.51	97.5	109	27.4	9	22.7	14.6	8.24
Aromatics >EC40-EC44	2.35	3.56	1.82	26.8	15.1	35.9	9.11	0.1	0.1	2.76	0.1	1.6	33	35.4	10.7	3.3	8.1	5.45	2.15
Polyaromatic Hydrocarbons (PAHs)																			
Acenaphthylene	16.8	15	238	3590	1340	4530	787	12	12	12	12	12	2230	7120	198	20.2	18.2	12	107
Acenaphthene	9.23	10.2	59.1	416	263	416	145	8	8	15	8	8	78.1	660	27.1	15.5	15.1	40	8
Anthracene	36.7	42.4	269	5250	2000	12700	2000	16	16	16	16	16	5600	39100	350	41.2	52.7	56.5	74.2
Benz(a)anthracene	131	129	739	10500	4150	18500	3250	14	22.6	34.7	14	21.8	17400	44800	1130	192	150	288	260
Benzo(a)pyrene	143	113	525	9230	3540	13200	2610	15	15	26.5	15	15	14800	26900	1060	206	127	252	362
Benzo(b)fluoranthene	167	176	584	11100	3510	21300	3900	15	38.7	70.2	15	42.6	20200	50900	1490	241	148	291	390
Benzo(k)fluoranthene	82.4	67.6	270	4730	1480	7670	1420	14	14	14	14	14	9000	19200	559	112	63.9	134	157
Benzo(g,h,i)perylene	138	121	411	6770	2780	8770	1580	24	24	30	24	24	12000	27800	738	153	93.3	193	428
Chrysene	139	174	697	8760	3550	19100	3210	10	25.8	172	10	36.3	17700	42700	1060	214	171	404	265
Dibenzo(a,h)anthracene	0.023	0.023	106	1350	669	2760	339	0.023	0.023	0.023	0.023	0.023	2820	8840	165	35.9	0.023	44.9	66.3
Indeno(1,2,3-cd)pyrene	130	113	409	6520	2860	10300	1790	0.018	0.018	0.018	0.018	0.018	11800	26200	1070	143	83.6	169	409
Fluoranthene	237	235	1990	29300	10200	54500	7590	0.017	27.8	95.2	27.7	54.9	39700	105000	2080	331	329	494	396
Fluorene	12.6	15.7	243	2800	1210	5180	1060	10	10	114	10	10	904	7170	114	22.1	34.9	23.3	18.6
Naphthalene	47	69.3	980	11900	6870	7630	3690	9	9	290	9	9	983	2840	427	94.4	254	277	135
Phenanthrene	107	207	1910	15000	6520	28400	5390	15	15	597	15	36.6	9720	75000	944	208	466	411	206
Pyrene	0.191	0.214	1.35	21.3	7.55	39.5	5.68	0.015	0.0241	0.0888	0.015	0.0424	32	82.1	1.61	0.282	0.269	0.493	0.349
PAH, Total Detected USEPA 16	1.59	1.7	10.8	149	58.5	254	44.4	0.118	0.139	1.53	0.118	0.235	197	567	13	2.31	2.28	3.57	3.62
Naphthalene-d8 % recovery**	88.3	88.7	90.8	94	82.8	78.6	79.3	92.9	90.7	88.6	83.4	85	83.5	79.8	79.2	75.2	91.7	80.3	89.9
Acenaphthene-d10 % recovery**	85.7	93.4	89.5	88.3	82.8	85.1	87.8	87.7	85.9	92.6	82.1	90.9	89	88.5	80.4	76.4	90.8	81	93.3
Phenanthrene-d10 % recovery**	85.7	100	88.6	87.5	84.9	95.8	91	91.3	86.2	94.2	82.9	89.6	96.8	94.2	87.1	78.7	87.9	83.7	97.2
Chrysene-d12 % recovery**	80.4	93.9	85	75.4	77.9	97.8	83.7	85.8	77.7	82.6	82.4	82.1	110	84.8	86.8	72.3	85.3	79	86.3
Perylene-d12 % recovery**	74.1	80.2	82.4	71.7	72.7	89.3	72.7	87.4	83.1	52	75.5	79.4	96.7	86.5	75.9	70.3	82.3	77.1	72.4
Total Aliphatics >C12-C44	41.4	73.6	56.4	106	165	136	172	0.1	5.94	62.6	0.1	14.5	87.6	69.9	64	25.8	73.6	65.1	69.3
Total Aromatics >EC12-EC44	36.6	62.6	57	1370	275	1290	199	0.1	6.84	86.9	5.28	58.9	564	635	123	41.1	171	77.4	51.6
Total Aliphatics & Aromatics >C5-C44	78	136	114	1480	440	1420	371	0.1	12.8	150	5.28	73.4	651	706	187	66.8	245	142	121
Metals - (Solid)																			
Iron	82200	121000	165000	83600	48600	78100	126000	43800	34400	4500	42300	22400	115000	268000	112000	127000	103000	156000	233000
Manganese	2840	22400	64800	188000	12100	25400	36100	1260	912	162	577	506	11500	4570	23500	21700	21300	48500	17300
Metals - (Liquid)																			
Calcium	60600	-	248000	-	164000	-	180000	-	-	-	-	-	89800	-	161000	167000	-	288000	141000
Magnesium	10500	-	800	-	11400	-	8120	-	-	-	-	-	9740	-	11300	10700	-	14600	3490
Phenols																			
Phenol	0.01	0.01	0.0409	0.011	0.115	0.0555	0.125	0.01	0.01	0.012	0.01	0.0143	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.0115	0.01	0.0511	0.022	0.023	0.0222	0.0228	0.01	0.01	0.012	0.01	0.0286	0.01	0.01	0.0101	0.01	0.0113	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.0333	0.015	0.015	0.015	0.036	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.092	0.035	0.138	0.111	0.148	0.035	0.035	0.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																			
Soluble Sulphate 2:1 extract as SO4 BRE	0.0777	-	0.0202	-	0.205	-	0.145	-	-	-	-	-	0.146	-	0.0757	0.0391	-	0.0769	0.0782
pH	8.46	11	13	10.6	10.9	10.4	11.3	7.84	7.98	7.31	7.59	6.88	8.48	8.62	9.47	8.4	12.2	11.9	8.68
Sulphate, Total																			
Sulphur, Total	0.185	-	0.286	-	0.371	-	0.365	-	-	-	-	-	0.229	-	0.137	0.124	-	0.219	0.182
Sulphate, Total potential	0.555	-	0.858	-	1.11	-	1.1	-	-	-	-	-	0.687	-	0.411	0.372	-	0.657	0.546
Sulphate, acid soluble (total)	0.209	-	0.328	-	0.545	-	0.438	-	-	-	-	-	0.214	-	0.307	0.12	-	0.329	0.218
Cyanide, Total	1	6.46	1	1	1	1.66	1	1	1	1	1	1	3.12	2.05	1	1	1	1	9.2
Exchangeable Ammonia as N	12	12	12	19	12	12	12	28.9	35.3	46.3	172	297	12	12	79.8	12	12	12	12
Asbestos																			
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	06/11/2018	-	06/11/2018	-	06/11/2018	-	05/11/2018	-	-	-	-	-	05/11/2018	-	29/10/2018	07/11/2018	-	07/11/2018	06/11/2018
Analysed By	James Richards	-	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	-	-	-	-	-	Andrzej Ferfecki	-	Lucy Caroe	Christian Hallam	-	Paul Poynton	Barbara Urbanek-Walsh
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	N/C	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
Non-Asbestos Fibre	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
Comments	-	-	-	-	-	-	Loose fibres in soil.	-	-	-	-	-	0	-	0	0	-	0	-
Volatile Organic Compounds (VOCs)																			
Dibromofluoromethane**	115	117	102	95.7	81.5	106	93.9	125	104	100	113	108	107	104	103	111	110	79.5	107
Toluene-d8**	99.3	98.3	91.6	95.6	94.1	99.6	96.6	103	95.4	93.5	101	101	99.9	97.1	94.9	98.7	98.7	86.1	100
4-Bromofluorobenzene**	90	89.3	73.7	76.4	70.2	91.3	85.3	87.5	108	83.1	94.4	99.7	71	70.6	98.7	95.5	101	78	90.4
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09	0.09	0.18	1.8	0.09	0.09
Toluene	0.07	0.07	0.139	0.07	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	0.07	0.07	0.07	0.14	1.4	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.08	0.8	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1
Naphthalene	0.13	0.13	0.13	1.74	18.4	8.37	1.37	0.13	0.13	2.6	0.13	0.13	0.154	0.257	0.13	0.26	2.6	0.245	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	0.4	0.4	0.4	0.8	8	0.4	0.4
Subcontracted: Inorganics																			
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	3CM5	3CM5	3CM5	3CM6	3CM6	3CM7	3CM7	3CM7	3CM8	3CM8	3CM8	3CML1	3CML1	3CML1V
Depth	2	3	4	0.7	1.5	0.5	1	2	0.5	1	2	0.6	1	1.6
Sampled Date	23/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018
Carbon														
Soil Organic Matter (SOM)	6.09	5.48	10.4	2.41	5.28	12	14.9	28.8	9.95	7.76	16.7	0.35	2.52	1.1
Metals (Solids)														
Arsenic	6	6	8.13	10.6	6	8.16	7.57	8.7	18	10.8	6.3	6.66	14.7	13.8
Cadmium	0.2	0.972	0.867	0.289	0.2	0.363	0.02	0.02	0.02	0.02	0.02	0.02	0.265	0.02
Chromium	629	901	290	40.5	641	87.4	93.9	241	128	63	573	9.6	13	25.1
Copper	17.2	17.2	20.4	22.8	16.8	24.2	19.4	16.9	21.4	19.1	11.4	15.9	12.6	13.7
Lead	305	43.2	58.5	28.7	43.8	53.3	22.5	66.1	50.6	30.7	81.4	15.7	28.4	20
Mercury	1.4	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	10.3	18	20.6	46.2	16.9	12.8	13.8	11.7	22.9	20.1	8.24	17.1	28.4	32.5
Selenium	17.6	10.3	10	1	16	1.53	4.31	5.02	4.27	1	9.54	1	1	1
Vanadium	459	503	282	62.1	683	78.3	227	318	168	93.2	535	19.7	21.8	45.9
Zinc	1020	165	230	121	150	192	92.2	139	218	146	445	79.8	199	94.6
TPH Criteria Working Group (TPH CWG)														
Benzene														
Toluene														
Ethylbenzene														
sum of detected mpo xylene by GC														
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.0278	0.0244	0.02	0.02	0.0217	0.02	0.01	0.01
Aliphatics >C6-C8	0.02	0.0757	0.0278	0.02	0.0509	0.02	0.132	0.0998	0.0259	0.02	0.0935	0.02	0.01	0.01
Aliphatics >C8-C10	0.02	0.0746	0.02	0.02	0.0328	0.02	0.0999	0.0789	0.0218	0.02	0.0958	0.02	0.01	0.01
Aliphatics >C10-C12	0.02	0.08	0.02	0.02	0.0452	0.02	0.21	0.132	0.0539	0.02	0.368	0.02	0.01	0.01
Aliphatics >C12-C16	2.56	1.4	7.23	0.1	3.98	3.72	15.8	6.38	2.49	3.16	6.02	0.817	1.51	0.1
Aliphatics >C16-C21	11	7.04	15.1	0.1	17	20	257	25.2	14.1	14.8	21.1	1.91	1.51	0.1
Aliphatics >C21-C35	57.5	48.2	52.2	0.1	36.3	50.7	210	57.5	39.5	39.3	71.4	12.4	5.97	0.1
Aliphatics >C35-C44	9.41	12.6	12.5	0.1	11.1	13.4	33.7	17.9	11.6	10.5	21.8	2.96	0.959	0.1
Aromatics >EC5-EC7	0.02	0.02	0.0206	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aromatics >EC7-EC8	0.02	0.0235	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Aromatics >EC8-EC10	0.02	0.0501	0.02	0.02	0.0215	0.02	0.0666	0.0534	0.02	0.02	0.0638	0.02	0.01	0.01
Aromatics >EC10-EC12	0.02	0.0533	0.02	0.02	0.0305	0.02	0.14	0.0882	0.0363	0.02	0.245	0.02	0.01	0.01
Aromatics >EC12-EC16	4.32	1.67	5.41	0.1	5.58	17.9	21.2	14.5	12.5	7.81	9.43	1.8	1.07	0.1
Aromatics >EC16-EC21	12.4	8.64	13.1	0.1	27.7	145	144	63.3	104	74.8	57	7.49	3.68	0.1
Aromatics >EC21-EC35	47.8	42.4	52.4	6.37	76	351	186	161	289	232	165	23.3	9.48	1.37
Aromatics >EC35-EC44	10.7	12.2	12	0.431	20.7	89	43.6	53.4	78.5	64.3	49.6	7.42	1.99	0.1
Aromatics >EC40-EC44	3.06	3.77	3.34	0.1	5.73	28.9	16.7	19.3	21.6	17.8	14.3	2.47	0.438	0.1
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	31.8	26.8	42.6	12	379	406	1980	471	2600	3170	1270	92.9	29.3	12
Acenaphthene	194	24.1	17.7	8	98.7	49	236	82	196	454	167	17.9	8	8
Anthracene	404	74.4	65.9	16	568	809	1930	953	6830	8700	1760	261	51.8	16
Benz(a)anthracene	1360	470	262	14	2090	2050	3100	1900	12700	19100	4620	415	181	14
Benzo(a)pyrene	1500	557	303	15	1980	1810	2400	1400	10200	17100	4410	360	121	15
Benzo(b)fluoranthene	1290	564	325	25.8	3130	2840	3990	2420	16000	25800	6570	494	227	15
Benzo(k)fluoranthene	632	267	155	14	1060	942	1350	842	6020	9660	2410	178	69.8	14
Benzo(g,h,i)perylene	963	463	215	24	1260	1190	1460	1010	6470	11500	3570	297	86.3	24
Chrysene	1290	537	324	14.7	1810	1990	3150	1930	11900	16600	4730	451	200	10
Dibenzo(a,h)anthracene	161	93.5	47.2	0.023	305	297	331	200	1680	2630	890	50.7	0.023	0.023
Indeno(1,2,3-cd)pyrene	993	452	229	0.018	1870	1360	1680	1050	5910	14300	4130	264	79.1	0.018
Fluoranthene	2430	763	454	33.3	4470	4640	7450	4580	28400	51400	10700	1110	400	0.017
Fluorene	151	28.5	71	10	337	358	1660	472	1320	3260	924	108	31.4	10
Naphthalene	418	102	197	9	2000	514	6020	1180	4620	2840	4000	236	94.9	9
Phenanthrene	1720	564	545	21.7	2080	2330	6460	3710	25300	31600	4850	821	294	15
Pyrene	2.21	0.677	0.39	0.0245	3.63	3.33	5.33	3.27	21.2	37.8	8.09	0.774	0.293	0.015
PAH, Total Detected USEPA 16	15.8	5.66	3.64	0.12	27	24.9	48.5	25.5	161	256	63	5.93	2.16	0.118
Naphthalene-d8 % recovery**	87.6	90.3	91.4	86.9	78.3	76.2	81.5	88.4	77	93.7	92.5	82.6	91.2	92.7
Acenaphthene-d10 % recovery**	87.6	87.8	96	88.8	82	79.4	87.9	93.9	79.8	93.9	92.7	88.6	96.6	89.3
Phenanthrene-d10 % recovery**	87.2	86.7	102	89.6	86.1	79.6	90.1	94.9	83.4	97.1	92.4	88.1	95.4	92.5
Chrysene-d12 % recovery**	84.2	86.5	99.6	75.6	78	74.1	85.7	89.8	78.6	105	87.7	80.3	90.6	83.5
Perylene-d12 % recovery**	77.4	83	88.3	72.3	70.8	72.2	73.8	81.5	74.9	103	90.2	75.7	79.6	85.2
Total Aliphatics >C12-C44	80.4	69.2	87	0.1	68.2	87.8	517	107	67.8	67.7	120	18.1	9.95	0.1
Total Aromatics >EC12-EC44	75.3	64.9	82.9	6.8	130	602	395	292	484	378	281	40	16.2	1.37
Total Aliphatics & Aromatics >C5-C44	156	134	170	6.8	198	690	912	399	551	446	402	58	26.2	1.37
Metals - (Solid)														
Iron	184000	133000	61800	29800	126000	31200	56200	95200	68300	65900	80200	22800	28600	40000
Manganese	34700	29900	21000	509	28300	3300	9310	16800	12900	3980	32400	724	1130	1220
Metals - (Liquid)														
Calcium	-	225000	-	6180	-	109000	-	145000	-	96200	-	72000	-	-
Magnesium	-	12500	-	11400	-	44400	-	18400	-	17300	-	34900	-	-
Phenols														
Phenol	0.01	0.01	0.0121	0.01	0.0113	0.0113	0.366	0.209	0.01	0.0228	0.228	0.01	0.01	0.01
Cresols	0.01	0.0107	0.0484	0.01	0.0113	0.01	0.0555	0.0464	0.0104	0.0114	0.0798	0.01	0.01	0.01
Xylenols	0.015	0.015	0.0847	0.015	0.015	0.015	0.0333	0.015	0.015	0.015	0.0228	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.145	0.035	0.035	0.035	0.455	0.255	0.035	0.035	0.331	0.035	0.035	0.035
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.0158	-	0.0553	-	0.115	-	0.175	-	0.197	-	0.0588	-	-
pH	10.9	12.7	10.1	7.98	10.8	8.87	11.1	11.3	9.92	9.55	10.9	10	8.26	7.99
Sulphate, Total														
Sulphur, Total	-	0.269	-	0.0331	-	0.115	-	0.238	-	0.204	-	0.0301	-	-
Sulphate, Total potential	-	0.807	-	0.0993	-	0.345	-	0.714	-	0.612	-	0.0903	-	-
Sulphate, acid soluble (total)	-	0.491	-	0.0336	-	0.199	-	0.319	-	0.475	-	0.0998	-	-
Cyanide, Total	5.73	1	1	1	1	1.14	1	1	1	2.36	3.37	1	1	1
Exchangeable Ammonia as N	12	12	34.7	152	12	12	12	12	12	12	16.1	12	12	65.5
Asbestos														
Asbestos Quantification - Gravimetric - %	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	06/11/2018	-	06/11/2018	-	05/11/2018	-	05/11/2018	-	05/11/2018	-	05/11/2018	-	-
Analysed By	-	Andrzej Ferfecki	-	Renata Bozhkov	-	Marcin Magdziarek	-	James Richards	-	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	-
Asbestos Quantification - PCOM Evaluation - %	-	0.0409	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	None	-	-	-	-	-	-	-	-	-	-		
Analysts Comments	-	N/A	-	-	-	-	-	-	-	-	-	-		
Asbestos Quantification - Total - %	-	0.0411	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Amosite (Brown) Asbestos	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Tremolite	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Actinolite	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Comments	-	loose fibres in soil	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	103	109	105	120	96.7	103	94.9	91.9	108	107	96.3	117	117	125
Toluene-d8**	98.8	95.4	98	100	96.8	99.8	94	93.1	100	97.2	92.4	102	102	103
4-Bromofluorobenzene**	103	79.8	101	91.1	87.9	91.6	76.8	75.5	80.9	77.6	80.1	75	79.9	92
Methyl Tertiary Butyl Ether	2	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	1.8	0.09	1.8	0.09	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	1.4	0.07	1.4	0.07	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.8	0.04	0.8	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	2	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	2	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	2.6	0.13	2.6	0.13	4.32	0.567	1.7	0.87	1.01	0.583	7.55	0.13	0.13	0.13
Sum of BTEX	8	0.4	8	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CM2V	3CM3V	3CM4V	3CM5V	3CM6V	3CM7V	3CM8V	4CA7	4CA8	4CA8	4CA9	4CA9	4CA9	4CA7V
Depth	1.4	1.7	4.204.20	4.704.70	3.2	3.3	3.5	0.5	0.5	1	0.5	1	1.5	2.6
Sampled Date	19/10/2018	24/10/2018	24/10/2018	23/10/2018	23/10/2018	22/10/2018	22/10/2018	03/10/2018	04/10/2018	04/10/2018	04/10/2018	04/10/2018	04/10/2018	03/10/2018
Carbon														
Soil Organic Matter (SOM)	5.72	1.35	1.03	6.29	32.9	1.6	1.29	2	0.46	0.464	4.79	1.84	9.71	1.42
Metals (Solids)														
Arsenic	16	12.4	6.78	18.3	16.8	11.1	12.2	9.43	19	9.62	11	27.6	28.1	12
Cadmium	0.02	0.02	0.18	0.356	3.46	0.02	0.02	0.0281	1.42	2.17	0.02	0.02	0.02	0.02
Chromium	38.3	29.1	28.1	34	38.8	38.3	30.9	0.9	9	0.9	32.1	0.9	8.97	34.4
Copper	19.7	10.2	7.84	22.4	26.7	18	11	9.62	14	1.4	17.2	28.1	24.1	10.8
Lead	39.1	21.8	16.4	37.8	762	24	22.3	9.84	18.5	10.6	58	15.8	14.6	31.3
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14
Nickel	29.5	40.5	29.8	28.3	20.7	40.8	35	13.6	12.2	2.11	16.4	30.6	22.9	43.3
Selenium	1	1	1	1	1.52	1	1	3.39	10	1	1.52	1	2.6	1
Vanadium	65.5	58	42.4	63.3	73.9	59	52.7	79.2	17.5	17	87.8	37.2	33.9	62.1
Zinc	125	112	78.6	120	2780	114	111	56.8	54	28.7	211	85	33	145
TPH Criteria Working Group (TPH CWG)														
Benzene														
Toluene														
Ethylbenzene														
sum of detected mpo xylene by GC														
Aliphatics >C5-C6	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0115	0.01	0.0142	0.01
Aliphatics >C6-C8	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0645	0.01	0.0297	0.01
Aliphatics >C8-C10	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0416	0.01	0.0245	0.01
Aliphatics >C10-C12	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.0142	0.01	0.0583	0.01	0.0219	0.01
Aliphatics >C12-C16	0.1	0.1	0.1	0.1	9.19	0.1	0.1	4.91	10.2	4.82	2.58	0.918	1.11	0.1
Aliphatics >C16-C21	0.1	0.1	0.1	0.1	72.6	0.1	0.1	13.9	5.78	15.5	8.55	1.69	1.85	0.1
Aliphatics >C21-C35	4.1	0.1	0.1	4.87	99	0.754	0.1	59.6	70.7	20.4	41.2	15.4	17.6	0.1
Aliphatics >C35-C44	0.1	0.1	0.1	0.1	15.2	0.1	0.1	43.3	32.8	7.05	14.4	5.29	5.68	0.1
Aromatics >EC5-EC7	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.0581	0.01
Aromatics >EC7-EC8	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.0297	0.01
Aromatics >EC8-EC10	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0281	0.01	0.0155	0.01
Aromatics >EC10-EC12	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0385	0.01	0.0142	0.01
Aromatics >EC12-EC16	0.1	0.1	0.1	3.38	19	0.1	0.1	1.37	4.53	1.1	2.44	0.1	0.1	0.1
Aromatics >EC16-EC21	1.17	0.992	1	5.78	174	0.1	0.1	5.49	8.06	4.31	14	1.31	0.1	0.1
Aromatics >EC21-EC35	10.5	4.69	6.69	29	553	2.9	5.53	67.3	64.3	12.2	47.8	7.77	5.27	0.1
Aromatics >EC35-EC44	1.55	3.16	0.1	3.17	139	0.731	0.705	53.9	51.7	6.84	19.4	2.44	0.1	0.1
Aromatics >EC40-EC44	0.292	1.32	0.1	0.1	33.4	0.1	0.1	22.2	20.1	2.53	7.34	0.829	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	12	12	12	12	2810	12	16.3	120	120	12	323	12	12	12
Acenaphthene	8	8	8	8	487	8	8	80	80	8	121	8	8	8
Anthracene	16	16	16	16	2850	16	16	160	160	16	556	16	16	16
Benz(a)anthracene	33	14	14	39	11800	14	64.3	140	140	14	1380	38.5	14	14
Benzo(a)pyrene	32.4	15	15	37.5	13600	15	59.2	150	150	15	1110	33.5	15	15
Benzo(b)fluoranthene	49.1	15	15	49.6	11300	15	98.7	150	150	15	1840	68.7	15	15
Benzo(k)fluoranthene	14	14	14	20.5	6320	14	30.3	140	140	14	555	22.2	14	14
Benzo(g,h,i)perylene	24	24	24	42.8	12700	24	37.7	0.24	0.24	24	732	29.9	24	24
Chrysene	34.1	10	10	41.2	10700	10	51.5	0.1	117	10	1260	42.6	10	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	2820	0.023	0.023	0.23	0.23	0.023	209	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	29.4	0.018	0.018	33.4	12800	0.018	51.2	180	180	0.018	1030	40.2	0.018	0.018
Fluoranthene	73.2	0.017	0.017	88.7	20800	0.017	106	200	292	0.017	3100	89.8	0.017	0.017
Fluorene	10	10	10	10	903	10	10	0.1	0.1	10	264	10	10	10
Naphthalene	9	9	9	13.2	4240	9	42.6	90	90	9	577	21.8	13	9
Phenanthrene	30.9	15	15	50.6	6540	15	51.4	150	150	15	1680	56	24.1	15
Pyrene	0.0549	0.015	0.015	0.0667	16.3	0.015	0.0864	0.191	0.37	0.0209	2.34	0.07	0.015	0.015
PAH, Total Detected USEPA 16	0.337	0.118	0.118	0.483	137	0.118	0.695	1.18	1.18	0.118	17.1	0.513	0.118	0.118
Naphthalene-d8 % recovery**	91.3	83.2	89.5	83.8	86.9	80	93.2	92.3	79.8	86.7	91.9	88.2	54.5	97.8
Acenaphthene-d10 % recovery**	94.2	82.1	86.6	84.4	81.4	80.9	96.1	88.6	87.7	84.6	101	91.7	57.7	93.7
Phenanthrene-d10 % recovery**	97.7	83.7	87	81	84.8	80.3	97.7	98.7	93.6	83.2	106	97.2	33.6	102
Chrysene-d12 % recovery**	107	74.1	76.5	76.7	78.7	75	103	92.1	79.5	73.3	98	87.2	8.09	100
Perylene-d12 % recovery**	104	78.4	83.2	72.6	79.4	76.9	99.6	99.4	81.5	77.1	86	81.1	3.46	103
Total Aliphatics >C12-C44	4.1	0.1	0.1	4.87	196	0.754	0.1	122	119	47.8	66.7	23.3	26.2	0.1
Total Aromatics >EC12-EC44	13.3	8.85	7.69	41.4	886	3.63	6.23	128	129	24.5	83.6	11.5	5.27	0.1
Total Aliphatics & Aromatics >C5-C44	17.4	8.85	7.69	46.2	1080	4.38	6.23	250	248	72.3	151	34.8	31.7	0.1
Metals - (Solid)														
Iron	31700	34300	23500	29200	99100	27100	34800	215000	276000	454000	77300	144000	19600	43900
Manganese	342	724	746	283	5290	355	1220	3540	15300	2930	3470	4840	367	399
Metals - (Liquid)														
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-	76100
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	35500
Phenols														
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0224
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.185	0.015	0.015	0.015	0.0448
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.185	0.035	0.035	0.035	0.0784
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-							
pH	7.55	7.83	8.39	7.92	8.64	8.1	8							
Sulphate, Total														
Sulphur, Total	-	-	-	-	-	-	-							
Sulphate, Total potential	-	-	-	-	-	-	-							
Sulphate, acid soluble (total)	-	-	-	-	-	-	-							
Cyanide, Total	1.33	1	1	1	1	1	1							
Exchangeable Ammonia as N	12	77	31.5	228	12	158	111							
Asbestos														
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	17/08/2018
Analysed By	-	-	-	-	-	-	-	-	-	-	-	-	-	James Richards
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)														
Analysts Comments														
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-	Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected
Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	Fibre bundles in soil
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	133	107	103	116	107	112	109	104	101	109	113	109	108	106
Toluene-d8**	104	95.8	96.5	99.5	97	100	102	100	99.6	98.6	99.2	99	95.3	93.3
4-Bromofluorobenzene**	87.1	107	109	93.9	78.8	99.4	100	101	98.5	98	97.4	95.1	83.5	75.7
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.166	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.84
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4CA8V	4CA9V	4CB6	4CB6	4CB6	4CB7	4CB7	4CB8	4CB8	4CB9	4CB9	4CB6V	4CB7V	4CB8V
Depth	2.3	2.3	0.5	1	1.5	0.6	1.2	0.5	1	0.5	1	2.3	3.4	2.1
Sampled Date	04/10/2018	04/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	04/10/2018	04/10/2018	04/10/2018	04/10/2018	03/10/2018	03/10/2018	04/10/2018
Carbon														
Soil Organic Matter (SOM)	0.498	0.962	4.71	3.29	4.53	3.88	3.95	0.85	0.559	6.4	1.15	2.53	0.962	2.29
Metals (Solids)														
Arsenic	12.1	9.34	10.5	10.9	15.2	14.8	15.5	20.5	27.8	14.4	12.6	11.7	11	17.9
Cadmium	0.02	0.02	0.254	0.02	1.58	0.39	0.2	1.81	2.69	0.02	0.02	0.02	0.02	0.02
Chromium	40.6	34.3	58	81.9	53.7	41.4	193	0.9	9	22.6	9.67	37.7	29.9	36.7
Copper	13.1	11.6	22.4	20.5	28.9	42.9	31.5	4.36	256	26	28.1	14.9	10.3	12.6
Lead	28.3	22.6	49.8	27.3	54.7	48.3	57.9	28.5	219	40.2	21	28.4	25.4	27.5
Mercury	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14
Nickel	45.1	37.3	19.1	18.4	33.5	20.7	18.4	8.7	33.8	23.9	30.6	35.3	36.3	41
Selenium	1	1	5.95	4	10	5.75	10	1.32	10	5.41	2.52	1.02	1	1
Vanadium	64.8	59.3	149	132	186	151	402	66	87.4	47.5	23.6	61.2	53	64.7
Zinc	117	118	243	122	184	150	175	74.5	321	173	111	125	118	111
TPH Criteria Working Group (TPH CWG)														
Benzene														
Toluene														
Ethylbenzene														
sum of detected mpo xylene by GC														
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0134	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	0.1	0.1	0.1	0.1	0.1	5.4	6.73	0.1	1.6	0.625	0.1	0.1	0.1	0.37
Aliphatics >C16-C21	0.1	1.46	2.74	0.1	1.88	15.9	19.2	2.88	3.58	6.53	0.1	0.1	0.1	0.376
Aliphatics >C21-C35	0.1	1.7	26	5.65	15.4	56.7	61.1	35.6	12.4	25	3.53	0.1	0.1	4.09
Aliphatics >C35-C44	0.1	0.1	6.15	1.22	5.46	11.2	20.8	5.55	2.14	8.66	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	0.1	0.1	0.95	0.404	0.435	5.73	4.98	0.306	0.589	2.05	0.1	0.1	0.192	0.1
Aromatics >EC16-EC21	0.1	0.1	6.25	2.35	4.07	38.8	20.2	1.44	1.76	13.2	0.1	0.538	0.436	0.1
Aromatics >EC21-EC35	1.44	1.5	33.2	12.4	22.4	81.5	62.5	13.2	14	47.7	0.12	3.71	0.48	3.86
Aromatics >EC35-EC44	2.85	0.1	15.8	4.98	12.1	27.9	24.9	12.2	8.67	20	0.1	0.1	0.1	1.81
Aromatics >EC40-EC44	1.84	0.1	6.67	1.98	5.33	10.8	8.73	6.32	3.93	8.04	0.1	0.1	0.1	0.729
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	12	12	206	97	166	311	401	27.5	12	422	12	12	12	12
Acenaphthene	8	8	46.9	40	26.8	59.8	71.8	8	8	28.2	8	8	8	8
Anthracene	16	16	349	128	251	469	556	86.6	16	485	16	16	16	16
Benz(a)anthracene	14	14	1060	371	554	1080	1580	115	90.3	1530	14	14	14	14
Benzo(a)pyrene	15	15	887	332	500	894	1340	93	104	1240	15	15	15	15
Benzo(b)fluoranthene	15	15	917	514	858	1490	1200	124	131	2090	15	15	15	15
Benzo(k)fluoranthene	14	14	395	191	328	451	723	56.6	50.3	715	14	14	14	14
Benzo(g,h,i)perylene	24	24	644	244	353	641	902	66.7	82.7	812	24	24	24	24
Chrysene	10	10	893	350	570	1050	1190	123	100	1230	10	10	10	10
Dibenzo(a,h)anthracene	0.023	0.023	131	0.115	84.7	145	159	0.023	0.023	220	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	807	254	409	723	922	63.7	73.3	1220	0.018	0.018	0.018	0.018
Fluoranthene	0.017	0.017	2470	744	1360	2710	3900	239	147	3200	0.017	0.017	0.017	0.017
Fluorene	10	10	168	62.5	110	243	351	20.2	10	143	10	10	10	10
Naphthalene	9	9	333	211	329	896	1210	106	13.6	262	9	9	9	9
Phenanthrene	15	15	1410	437	675	1680	2190	122	40.9	1460	15	15	15	15
Pyrene	0.015	0.015	1.73	0.529	0.958	1.94	2.76	0.188	0.154	2.54	0.0163	0.015	0.015	0.015
PAH, Total Detected USEPA 16	0.118	0.118	12.5	4.46	7.53	14.8	19.5	1.43	0.987	17.6	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	78.4	93.1	97.6	89.4	91.2	90.5	97	86.8	85.4	91.7	91	94.2	90	82.2
Acenaphthene-d10 % recovery**	81.3	87.8	94.8	85.9	86.6	88.4	91.5	86.3	82.8	101	100	85.1	85.6	83.9
Phenanthrene-d10 % recovery**	83	97.4	105	83.2	83.3	85.6	106	86.8	82.3	106	97.7	86.1	85.5	85.2
Chrysene-d12 % recovery**	73.6	93.8	107	76.3	71.1	81.7	112	77.8	72.4	87.1	90	79.5	83.7	77.2
Perylene-d12 % recovery**	70.7	88.7	107	73.8	72.2	78.8	108	73.3	70.5	88.6	84.9	78.7	82.9	70.5
Total Aliphatics >C12-C44	0.1	3.15	34.9	6.86	22.7	89.3	108	44.1	19.7	40.8	3.53	0.1	0.1	4.83
Total Aromatics >EC12-EC44	4.29	1.5	56.2	20.1	38.9	154	113	27.1	25	82.9	0.12	4.24	1.11	5.77
Total Aliphatics & Aromatics >C5-C44	4.29	4.66	91.2	27	61.6	243	220	71.2	44.7	124	3.65	4.24	1.11	10.6
Metals - (Solid)														
Iron	36300	38000	166000	131000	124000	245000	120000	432000	456000	59400	45500	32900	30500	42800
Manganese	321	561	8780	5570	4580	8050	9350	10700	3460	12500	4300	372	821	389
Metals - (Liquid)														
Calcium	-	87800	-	-	-	-	-	-	38900	-	139000	-	-	137000
Magnesium	-	15700	-	-	-	-	-	-	6090	-	13800	-	-	19900
Phenols														
Phenol	0.01	0.01	0.01	0.01	0.01	0.0246	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.0123	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE														
pH														
Sulphate, Total														
Sulphur, Total														
Sulphate, Total potential														
Sulphate, acid soluble (total)														
Cyanide, Total														
Exchangeable Ammonia as N														
Asbestos														
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	03/08/2018	-	-	-	-	-	-	17/08/2018	-	03/08/2018	-	-	01/08/2018
Analysed By	-	Andrzej Ferfecki	-	-	-	-	-	-	Andrzej Ferfecki	-	Lucy Caroe	-	-	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)														
Analysts Comments														
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Amosite (Brown) Asbestos	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Crocidolite (Blue) Asbestos	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Fibrous Anthophyllite	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Fibrous Tremolite	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Fibrous Actinolite	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Non-Asbestos Fibre	-	Not Detected	-	-	-	-	-	-	Trace	-	Detected	-	-	Not Detected
Comments	-	0	-	-	-	-	-	-	0	-	0	-	-	0
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	111	102	112	116	105	106	109	106	105	103	99	101	105	101
Toluene-d8**	99.4	97.5	98.7	98.4	100	99.4	99.1	96.5	97.3	97.3	96.6	97.2	99.7	96
4-Bromofluorobenzene**	92.4	89.9	94	97.7	103	94.1	94.8	93.5	84.9	89.8	89.3	88.7	94.5	86.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.149	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	4.82	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	4.41	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	4.68	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	4.09	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	8.51	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	8.51	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4CB9V	4CC5	4CC5	4CC6	4CC6	4CC7	4CC7	4CC8	4CC8	4CC5V	4CC6V	4CC7V	4CC8V	4CD4
Depth	2.3	0.6	1.2	0.6	1.2	0.5	1	0.5	1.3	2	2.3	3	2.2	0.4
Sampled Date	04/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	04/10/2018	04/10/2018	03/10/2018	03/10/2018	03/10/2018	04/10/2018	03/10/2018
Carbon														
Soil Organic Matter (SOM)	0.898	1.19	0.764	0.984	0.384	1.66	0.662	2.93	1.27	10.1	7.95	6.62	1.12	1.17
Metals (Solids)														
Arsenic	14.8	9.3	4.21	9.79	8.96	17.9	20	14.4	11.7	17.3	17.3	32.3	16.2	15.9
Cadmium	0.02	0.02	0.02	0.02	0.2	1.79	0.2	1.49	2.23	0.207	0.02	0.168	0.02	0.2
Chromium	30	0.9	193	0.9	9	15.3	9	18.1	0.9	37.2	37.5	32.6	31.9	9
Copper	12.1	60.4	165	130	29.8	348	65.5	25.3	37	19.7	17.8	19.6	10.3	49.2
Lead	23.3	22.3	11.6	21.7	7.57	22.8	32.4	41.8	27.9	54.5	36.6	50.8	26.2	20.7
Mercury	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	1.4
Nickel	36.5	22.5	9.69	47.1	24.3	45	36.8	28.4	6.97	30	29.7	28.7	37.7	49.9
Selenium	1	1.92	26.2	1	10	5.78	10	10	1	1	1	1	1	10
Vanadium	51.7	246	812	207	108	128	128	91.5	38.3	59.6	59.9	59.8	56	232
Zinc	100	108	26.2	113	43.3	135	145	127	55.8	155	125	175	108	63.1
TPH Criteria Working Group (TPH CWG)														
Benzene														
Toluene														
Ethylbenzene														
sum of detected mpo xylene by GC														
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0243	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0194	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	0.1	0.1	0.237	0.1	0.1	0.614	2.06	2.09	1.91	0.1	0.702	0.1	0.1	5.12
Aliphatics >C16-C21	1.54	2.62	1.99	0.1	2.27	4.39	6.59	9.52	7.01	0.1	0.1	0.1	0.1	18.7
Aliphatics >C21-C35	2.23	28.3	6.71	14.1	14	26	23.4	58	49.2	4.25	0.1	0.1	0.1	96.1
Aliphatics >C35-C44	1.07	2.59	0.1	5.38	5.39	9.22	8.55	19.3	4.57	0.1	0.1	0.1	0.1	10.8
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.013	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	0.188	0.324	0.1	0.1	0.1	0.763	0.94	2.01	0.1	0.248	0.1	0.1	0.1	0.795
Aromatics >EC16-EC21	0.1	1.55	0.555	1.99	0.255	5.44	3.43	7.98	2.64	1.17	0.1	0.1	0.1	4.68
Aromatics >EC21-EC35	0.669	11.7	3.06	15.1	6.64	29.3	15	51.7	14.7	51.9	11.6	11.2	0.1	26.7
Aromatics >EC35-EC44	0.248	4.44	0.1	9.39	3.56	15.7	6.32	35.7	3.19	7.11	0.934	0.649	0.1	5.17
Aromatics >EC40-EC44	0.121	1.97	0.1	3.91	1.32	6.61	2.35	14.5	0.983	1.58	0.1	0.1	0.1	1.53
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	12	12	12	42	12	92.5	40.5	101	12	12	12	12	12	19.5
Acenaphthene	8	8	8	8	8	17.1	8	17.5	18	8	8	8	8	8
Anthracene	16	16	16	58.8	16	113	53	77	85.1	16	16	16	16	30.3
Benz(a)anthracene	14	43	40.8	234	54.1	498	168	580	770	32.7	36.3	14	14	91.2
Benzo(a)pyrene	15	42	40.9	200	49.6	475	156	639	740	33.4	35.8	15	15	89.5
Benzo(b)fluoranthene	15	67.8	64.1	271	63.3	618	272	827	1000	48.2	80.5	36	15	188
Benzo(k)fluoranthene	14	25.4	27.9	130	28	217	97	308	434	14	23.6	14	14	65
Benzo(g,h,i)perylene	24	45.1	52.5	155	38.5	385	119	460	525	24	24	24	24	84.8
Chrysene	10	53.3	51.7	224	47.2	426	171	563	692	41.2	49.6	25.2	10	114
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	69	28.8	76.6	130	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	40.5	41.1	165	38.2	406	115	553	475	0.018	30	0.018	0.018	77.2
Fluoranthene	0.017	68.5	106	451	98.6	1080	346	828	1070	92.7	90	46.9	0.017	178
Fluorene	10	10	10	24.5	10	48.3	27.7	19	10	10	10	10	10	10
Naphthalene	9	20.9	9	118	25	157	80.9	88.4	14.1	9	9	9	9	43.1
Phenanthrene	15	54.6	68.9	199	46.9	470	204	256	386	50	45.3	25.6	15	89.6
Pyrene	0.015	0.0581	0.0886	0.478	0.0969	0.818	0.255	0.949	1.01	0.0708	0.0665	0.0348	0.015	0.172
PAH, Total Detected USEPA 16	0.118	0.519	0.583	2.75	0.586	5.89	2.13	6.34	7.35	0.369	0.457	0.169	0.118	1.24
Naphthalene-d8 % recovery**	85.7	90.1	98.8	98.8	98	98.8	95.1	98.8	88.1	97.6	90.8	87.3	84.8	89.1
Acenaphthene-d10 % recovery**	95.1	90.7	94.9	93.4	92.9	96	90.8	89.2	86.1	89.7	89.8	89.9	82.4	85.8
Phenanthrene-d10 % recovery**	98.5	98.4	105	103	104	105	92	96.5	85.2	93.9	91.2	90.6	81.3	83.6
Chrysene-d12 % recovery**	87	101	109	107	101	110	85.4	98.6	90.7	85.2	85.7	76.1	82.1	72.9
Perylene-d12 % recovery**	76.5	93.8	102	102	101	108	83.7	97.7	92	85.7	85.9	70.6	81.3	72.4
Total Aliphatics >C12-C44	4.84	33.6	8.94	19.5	21.7	40.3	40.6	88.9	62.7	4.25	0.702	0.1	0.1	131
Total Aromatics >EC12-EC44	1.1	18	3.61	26.4	10.5	51.2	25.7	97.4	20.5	60.4	12.6	11.8	0.1	37.3
Total Aliphatics & Aromatics >C5-C44	5.95	51.6	12.5	45.9	32.2	91.5	66.3	186	83.3	64.7	13.3	11.8	0.1	168
Metals - (Solid)														
Iron	36700	284000	196000	436000	487000	570000	386000	228000	591000	27500	28800	29600	32500	440000
Manganese	1040	6880	59800	2910	2180	6150	4300	8700	6140	224	208	362	644	14000
Metals - (Liquid)														
Calcium	-	-	-	-	-	-	-	6080	-	145000	101000	-	184000	-
Magnesium	-	-	-	-	-	-	-	796	-	17100	16400	-	11900	-
Phenols														
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0888	0.0523	0.129	0.0805	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0234	0.0115	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0888	0.0523	0.152	0.092	0.035
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE														
pH														
Sulphate, Total														
Sulphur, Total														
Sulphate, Total potential														
Sulphate, acid soluble (total)														
Cyanide, Total														
Exchangeable Ammonia as N														
Asbestos														
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	17/08/2018	-	03/08/2018	01/08/2018	-	01/08/2018	-
Analysed By	-	-	-	-	-	-	-	Lucy Caroe	-	Andrzej Ferfecki	James Richards	-	Marcin Magdziarek	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)														
Analysts Comments														
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Fibrous Tremolite	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Fibrous Actinolite	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Comments	-	-	-	-	-	-	-	0	-	0	0	-	0	-
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	99.1	116	106	104	110	105	113	109	103	99.1	109	104	102	111
Toluene-d8**	96.6	97.6	99.3	99.9	99.7	97.7	97	96.1	97.3	94.9	97.1	97.7	98.3	100
4-Bromofluorobenzene**	80.2	99.5	96	95.8	97.4	93.1	88.6	78.7	89.2	86.9	95.3	86.1	83.6	97.1
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.548	0.34	0.13	0.13	0.13	0.13	0.13	0.13	0.151	0.13	0.13	0.275	0.221	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	28.1	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	21	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	27.9	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	20.3	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	25.3	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	25.3	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	4CD5	4CD5	4CD6	4CD6	4CD7	4CD4V	4CD5V	4CD6V	4CE4	4CE4	4CF2	4CF4	4CF4	4CF4	4CF4	4CF5	4CF5	4CF5
Depth	0.5	1	0.5	1	0.5	2.2	2.2	2.8	0.5	0.9	0.5	0.5	1	1.5	2	0.5	1	1.5
Sampled Date	04/10/2018	04/10/2018	04/10/2018	04/10/2018	04/10/2018	03/10/2018	04/10/2018	04/10/2018	03/10/2018	03/10/2018	11/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	02/10/2018	02/10/2018	02/10/2018
Carbon																		
Soil Organic Matter (SOM)	4.02	0.812	5.55	1.22	5.28	4.81	3.47	1.74	5	2.52	1.55	12.6	2.76	3.03	1.81	3.57	3.69	1.76
Metals (Solids)																		
Arsenic	11.3	10.9	14.5	6.46	14.9	14.5	13.8	18.8	11.9	9.43	12	19	20	25.6	15.7	21	8.09	7.04
Cadmium	1.89	1.16	0.02	1.26	1.49	0.02	0.02	0.02	0.2	0.02	0.2	0.2	0.02	0.2	3.38	0.2	0.353	0.708
Chromium	104	0.9	30.3	9	18.5	43.4	40.3	38.4	560	448	356	212	0.9	70.4	9	120	101	78.3
Copper	23.6	10.5	18.4	22.2	35.2	18.9	14.4	15.4	14	19.1	42.1	19.9	31.5	19.9	14	29.8	18.9	18
Lead	125	26.8	97.2	26.8	176	36.9	32	31.3	25.1	30.4	7	42.1	30.4	38.1	35.6	45.7	20.7	31
Mercury	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4	0.14	1.4	1.4	1.4	0.14	0.14
Nickel	29.3	11.2	15	29	96.2	38.7	35.3	42.6	16.8	16.1	16.2	32.6	13.2	32.2	22.8	23.9	14.4	11
Selenium	10	1	2.46	10	25.2	1	1	1	11	8.99	19.2	10	1.85	10	10	16.3	12.7	8.96
Vanadium	336	56.1	137	126	88.8	71.4	63.5	64.6	666	612	1150	222	143	401	84.5	562	454	298
Zinc	455	101	444	89.2	693	142	121	124	119	153	20.6	120	78.3	114	57.2	168	86.9	127
TPH Criteria Working Group (TPH CWG)																		
Benzene																		
Toluene																		
Ethylbenzene																		
sum of detected mpo xylene by GC																		
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.012
Aliphatics >C6-C8	0.0132	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0208	0.0234	0.04
Aliphatics >C8-C10	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0219	0.0468	0.036
Aliphatics >C10-C12	0.0121	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0658	0.166	0.091
Aliphatics >C12-C16	2.12	3.02	1.25	0.603	0.644	0.1	0.1	0.1	2.76	2.42	0.904	5.37	3.92	10.9	0.645	7.79	17.4	2.83
Aliphatics >C16-C21	9.27	16.9	11.1	7.44	4.13	0.1	0.388	0.827	20.4	18	4.05	23.2	13.4	33.2	6.93	17.2	31.2	7.7
Aliphatics >C21-C35	73.1	128	59.7	49.1	36.4	0.1	0.877	0.1	131	100	19.2	127	109	320	57.1	78.8	86.1	50.8
Aliphatics >C35-C44	29.8	35.3	25.6	17	12.3	0.1	0.1	0.1	44.4	32.6	7.56	54.9	20.7	71.9	7.13	13.7	27.5	8.2
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0142	0.0316	0.024
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0438	0.111	0.061
Aromatics >EC12-EC16	4.47	1.51	1.51	0.888	0.662	0.1	0.1	0.131	5.76	5.93	0.1	6.46	0.951	3.21	0.1	4.13	3.47	2.32
Aromatics >EC16-EC21	11.5	5.82	9.18	5.81	4.72	0.1	0.1	1.38	70	77.2	3.06	19.8	4.94	14.4	0.1	15.6	13.7	8.98
Aromatics >EC21-EC35	74.5	58.2	44.7	32.5	30.9	3.8	7.94	5.15	204	212	25.4	99.7	37.8	103	8.01	91.5	93.6	59.1
Aromatics >EC35-EC44	39.3	37.8	27.7	27.9	16	0.1	0.602	9.46	65.3	61.4	10.1	91.5	14.1	46.8	1.53	43.7	46.3	29.4
Aromatics >EC40-EC44	16	15.4	12.2	12.1	6.16	0.1	0.1	4.87	23.2	21	3.9	41.2	5.07	18.5	0.1	16.2	17.7	11.1
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	80.5	20.1	60	96.3	101	12	12	12	1240	2010	12	120	12	94.3	12	52.6	125	25.9
Acenaphthene	139	10	40	12.1	16	8	8	8	205	127	9.93	80	8	22.9	8	40.2	35.5	22.6
Anthracene	265	30.5	80	155	116	16	16	16	3250	5500	22.5	160	23.6	180	16	128	357	62.5
Benz(a)anthracene	1480	119	288	414	343	14	14	14	7740	11900	311	461	87.4	459	42.4	809	1080	412
Benzo(a)pyrene	1990	121	255	356	344	15	15	15	6400	10400	459	398	96.9	429	41.5	907	1150	461
Benzo(b)fluoranthene	2600	154	312	486	567	15	15	15	8080	12300	917	539	159	695	47.5	1140	1260	591
Benzo(k)fluoranthene	942	65.8	113	195	214	14	14	14	3240	5040	275	215	52.8	244	21.5	502	460	233
Benzo(g,h,i)perylene	1360	101	176	231	274	24	24	24	4650	7230	499	348	77.9	323	34.8	777	991	413
Chrysene	1660	116	254	370	318	10	10	10	6980	10800	395	402	95	431	42	848	1060	456
Dibenzo(a,h)anthracene	301	0.023	0.115	41.7	63.8	0.023	0.023	0.023	875	1710	78.7	0.23	0.023	76.3	0.023	115	157	62.7
Indeno(1,2,3-cd)pyrene	1820	99.2	188	234	370	0.018	0.018	0.018	5510	6400	367	312	86	320	40.3	829	859	333
Fluoranthene	2430	214	589	665	808	0.017	0.017	0.017	19500	28600	550	1070	147	957	65.3	1440	2270	729
Fluorene	88	13.8	50	34.1	51.4	10	10	10	612	983	10	0.1	11.6	86.1	10	37.5	150	22.4
Naphthalene	193	51.8	45	101	190	9	9	9	946	1540	13.1	542	52.4	212	20.5	104	71.1	63.2
Phenanthrene	1100	122	262	256	482	15	15	15	7980	8910	170	836	103	680	38.7	593	1370	306
Pyrene	2.18	0.18	0.52	0.648	0.6	0.015	0.015	0.015	14.5	20.1	0.515	0.869	0.126	0.714	0.0627	1.3	1.85	0.669
PAH, Total Detected USEPA 16	18.6	1.42	2.96	4.3	4.86	0.118	0.118	0.118	91.7	134	4.58	5.99	1.12	5.92	0.457	9.62	13.2	4.86
Naphthalene-d8 % recovery**	86.6	89.5	88.8	87	87.3	82.3	93.9	71.3	91.8	87.9	94.2	91.4	82.3	93.8	90.2	81	95.5	80.4
Acenaphthene-d10 % recovery**	94.1	82.2	79.5	85.6	92.1	81.9	88.4	74.4	82.4	80.7	91.6	83.6	92.2	91	87.1	85.8	93.7	78.4
Phenanthrene-d10 % recovery**	101	84.2	81.7	86.3	91.4	83.2	99	78.8	84.2	84.5	92.1	86.9	94.8	94	95.3	91.1	91.8	78.3
Chrysene-d12 % recovery**	90.1	72.9	74.4	85.1	78.1	79.2	93.2	71.1	94.4	85.4	96	90.6	81.2	87.3	98.2	84	89.9	76.6
Perylene-d12 % recovery**	85.1	75	71.4	83.7	77.4	75.3	87.9	70.3	89.3	84.8	109	77.6	84.1	85.2	91.9	81.6	91.3	74.6
Total Aliphatics >C12-C44	114	183	97.6	74.1	53.5	0.1	1.26	0.827	199	154	31.8	211	147	436	71.8	117	162	69.6
Total Aromatics >EC12-EC44	130	103	83.1	67.1	52.3	3.8	8.54	16.1	345	357	38.5	218	57.8	167	9.54	155	157	99.9
Total Aliphatics & Aromatics >C5-C44	244	287	181	141	106	3.8	9.81	16.9	544	510	70.3	428	205	603	81.3	273	320	170
Metals - (Solid)																		
Iron	231000	315000	130000	255000	169000	33700	33900	39400	285000	215000	423000	165000	418000	380000	639000	302000	240000	273000
Manganese	14600	4400	7640	6880	91300	262	400	355	26400	25200	32600	9350	8190	13000	11400	28500	24900	16600
Metals - (Liquid)																		
Calcium	-	-	8780	-	141000	-	97000	-	-	159000	-	-	-	-	-	-	-	-
Magnesium	-	-	1700	-	17400	-	11700	-	-	13000	-	-	-	-	-	-	-	-
Phenols																		
Phenol	0.01	0.01	0.0118	0.01	0.0228	0.01	0.0565	0.106	0.01	0.196	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.0114	0.01	0.0113	0.0118	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0294	0.01
Xylenols	0.015	0.015	0.015	0.015	0.0228	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	1.16	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.057	0.035	0.0678	0.118	0.035	0.196	0.035	0.035	0.035	0.035	0.035	0.035	1.19	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE																		
pH																		
Sulphate, Total																		
Sulphur, Total																		
Sulphate, Total potential																		
Sulphate, acid soluble (total)																		
Cyanide, Total																		
Exchangeable Ammonia as N																		
Asbestos																		
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	17/08/2018	-	08/08/2018	-	01/08/2018	-	-	02/08/2018	-	-	-	-	-	-	-	-
Analysed By	-	-	Andrzej Ferfecki	-	Lucy Caroe	-	Lucy Caroe	-	-	Lucy Caroe	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																		
Analysts Comments																		
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	Not Detected	-	Trace	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	-	-	Not Detected	-	Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
Fibrous Tremolite	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
Fibrous Actinolite	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	-	-	Trace	-	Not Detected	-	Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
Comments	-	-	0	-	Loose fibres in soil	-	0	-	-	0	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	105	108	106	102	100	95.3	105	105	107	94.7	106	114	111	101	104	107	108	97.3
Toluene-d8**	98.8	97.4	98	98.3	97.7	95.8	98	98.5	99	95.9	98.3	95.6	100	99.3	99.7	99.7	92.5	95.8
4-Bromofluorobenzene**	95.6	82.6	97.1	91.7	88.4	78.3	92.6	90.4	99.2	72.5	94.9	88.5	97	94.3	100	94.3	81.8	74.5
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Benzene	0.09	0.176	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18
Toluene	0.07	0.146	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.574	0.08
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.39	0.2
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.651	0.2
Naphthalene	0.13	0.13	0.13	0.199	0.185	0.474	0.13	0.13	0.13	0.459	0.13	0.13	0.13	0.13	0.13	0.13	689	1.59
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.61	0.8
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	25.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	20.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	24.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	20.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	0.71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	16.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4CF6	4CF6	4CF7	4CF7	4CF4V	4CF6V	4CG4	4CG4	4CG4	4CG5	4CG5	4CG5	4CG6	4CG6	4CG6	4CG4V	4CG5V	4CG6V
Depth	0.6	1.2	0.6	1.2	2.3	2.3	0.5	1.2	1.8	0.5	1	1.5	0.3	1	1.5	2.4	2.8	2.9
Sampled Date	02/10/2018	02/10/2018	02/10/2018	02/10/2018	03/10/2018	02/10/2018	11/10/2018	11/10/2018	11/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	11/10/2018	02/10/2018	02/10/2018
Carbon																		
Soil Organic Matter (SOM)	5.33	2.74	4.71	4.62	1.43	5.17	5.05	6.62	0.436	5.45	7.9	2.21	2.83	0.974	1.44	2.69	1.72	43.6
Metals (Solids)																		
Arsenic	9.91	6.6	10.1	9.87	8.27	12.3	7.22	8.6	6.66	8.55	12.1	10.4	6.4	9.75	13.4	16.7	13.3	27.4
Cadmium	0.2	0.0287	0.2	2.58	0.02	0.02	0.944	0.02	1.18	0.261	0.2	0.711	0.154	0.966	0.02	0.432	0.02	0.02
Chromium	109	46.7	89.8	320	0.9	37.2	232	348	467	127	342	7.82	19.1	8.19	38.7	49.5	35.8	12.1
Copper	21.2	10.8	19.5	22.7	33.7	16	18.3	27.7	29.7	14.6	23.1	20.8	10.3	24.7	14.9	11.9	17.1	20.7
Lead	65.1	19.7	91.3	143	13.5	33.9	17.9	15.1	15.6	57.4	31.2	25	14.9	20.5	4.47	26.1	29.6	20.2
Mercury	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	25.8	14.4	24.1	37.7	11.6	25.8	14.8	15.6	12.8	13.7	57.8	15.1	41.5	14.3	4.71	33	42.8	27.3
Selenium	10	7.11	10	10	1.07	1	7.09	7.8	12.3	7.04	12.8	5.22	4.66	7.14	5.1	1	1.45	1.81
Vanadium	642	124	357	258	18	53.6	911	941	1890	363	894	169	250	143	121	84.6	57	37.6
Zinc	235	92.6	329	1380	50.8	126	73.6	50.6	61.4	275	131	99.4	344	126	53.7	102	135	130
TPH Criteria Working Group (TPH CWG)																		
Benzene																		
Toluene																		
Ethylbenzene																		
sum of detected mpo xylene by GC																		
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.0224	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.0112	0.0133	0.01	0.01	0.01	0.0714	0.01	0.01	0.01	0.0132	0.01	0.0239	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.0162	0.0102	0.01	0.01	0.01	0.581	0.01	0.01	0.01	0.01	0.01	0.0239	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.0122	0.0265	0.01	0.01	0.01	1.66	0.01	0.01	0.01	0.0121	0.01	0.0559	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	0.1	4.37	2.53	3.85	0.96	0.659	1.29	0.1	0.1	21	29.2	43.3	1.99	2.24	1.34	0.1	0.1	0.459
Aliphatics >C16-C21	8.44	11	10.2	14.2	4.15	0.1	6.63	0.767	2.02	46.4	67.6	73.5	10.2	11.9	6.8	0.1	1.13	2.49
Aliphatics >C21-C35	76.7	61.9	123	118	48.8	2.29	73.7	20.6	33.6	165	199	141	82.6	87.6	46.4	0.1	3.84	111
Aliphatics >C35-C44	21.6	9.28	64.5	65.6	7.31	0.132	55.5	11.1	18.2	42.5	49.3	30.2	30.7	15.5	4.23	0.1	0.405	2.3
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.0101	0.01	0.01	0.01	0.01	0.388	0.01	0.01	0.01	0.01	0.01	0.016	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.0173	0.01	0.01	0.01	1.11	0.01	0.01	0.01	0.01	0.01	0.0365	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	2.19	3.7	4.5	2.67	0.1	3.66	1.98	0.449	0.1	7.9	9.11	7.91	2.98	0.967	1.88	0.1	0.746	6.3
Aromatics >EC16-EC21	12	14.8	12.6	11.7	0.785	1.4	9.97	2.7	4.35	23.9	27.7	22.2	10.5	5.39	6.94	0.1	1.38	13.1
Aromatics >EC21-EC35	65.5	99.3	92.8	91.7	19.9	23.8	113	19.7	41.1	112	143	75.2	63.5	42.8	31.5	0.186	13.9	546
Aromatics >EC35-EC44	38.6	38	92.4	79.8	3.09	2.63	109	9.57	21.5	60.9	65.5	30.6	48.9	22.6	15.2	0.1	4.3	367
Aromatics >EC40-EC44	14.9	13.1	41.8	35	0.555	0.1	46.7	3.58	8.09	23.7	24.6	11.6	20.8	9.07	5.96	0.1	1.49	50
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	79.3	59.6	81	102	12	12	120	34	12	55.2	60	12	12	12	17.1	12	12	12
Acenaphthene	15.5	18.8	40	21.6	8	8	80	19	50.7	18.7	46.3	15	12.7	8	8	8	8	8
Anthracene	120	87.2	104	148	16	16	160	59	64.1	92.7	80	26.9	46.5	22.3	40.2	16	16	16
Benz(a)anthracene	324	365	360	523	14	14	140	507	1090	490	1070	152	222	114	196	14	14	48.4
Benzo(a)pyrene	310	413	347	505	15	15	150	550	1670	654	1590	178	274	122	139	15	15	15
Benzo(b)fluoranthene	358	638	720	645	15	15	150	723	2160	566	1700	206	300	148	306	15	15	82.2
Benzo(k)fluoranthene	146	237	293	236	14	14	140	301	734	277	633	93.7	123	53.1	111	14	14	14
Benzo(g,h,i)perylene	246	328	282	377	24	24	0.24	412	1170	539	1160	155	206	115	111	24	24	24
Chrysene	291	395	379	552	10	10	0.1	500	1280	502	1120	159	250	129	228	10	10	59.4
Dibenzo(a,h)anthracene	44.2	71.9	0.115	63.9	0.023	0.023	0.23	80.6	190	89	193	0.023	40.4	0.023	28.8	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	227	332	368	325	0.018	0.018	180	329	1220	509	1110	176	210	100	115	0.018	0.018	0.018
Fluoranthene	720	647	756	1050	0.017	0.017	0.17	581	1280	746	1160	248	274	181	269	0.017	0.017	155
Fluorene	50.7	32.9	50.9	54.5	10	10	0.1	22.8	16.5	56.9	50	17.3	18.1	10	10	10	10	10
Naphthalene	185	133	166	245	9	21.1	90	159	21.1	215	117	49.5	25.5	37	23.8	9	9	9
Phenanthrene	459	331	438	563	15	15	150	278	290	457	384	140	151	94	127	15	15	49.2
Pyrene	0.537	0.54	0.612	0.89	0.015	0.015	0.15	0.526	1.35	0.737	1.31	0.252	0.251	0.215	0.256	0.015	0.015	0.0943
PAH, Total Detected USEPA 16	4.11	4.63	4.96	6.3	0.118	0.118	1.18	5.08	12.6	6	11.6	1.87	2.4	1.33	1.97	0.118	0.118	0.488
Naphthalene-d8 % recovery**	80.9	82	81.7	95	92	94	90.8	95.3	87.1	86.9	83.3	79.7	17	83.4	79.2	85.4	75.8	83.6
Acenaphthene-d10 % recovery**	78	79.3	89.7	88.7	89.7	93.4	78	88.9	88.1	78.5	82.8	85.9	16.2	77.8	77.2	89.2	82.9	89.8
Phenanthrene-d10 % recovery**	77	80	88.5	89.5	91.1	93.4	82.4	89	95.3	79.9	78.6	83.2	16	78.9	75.5	92.5	87.9	94.7
Chrysene-d12 % recovery**	72.2	74.5	83.6	83.3	88.4	88.9	88.8	98.3	88.5	76.2	77.3	81.8	15.7	73.4	72.4	82.1	91.6	82.8
Perylene-d12 % recovery**	70.9	74.3	79	79.3	89.9	89.4	90.8	101	89.2	72.7	71.9	80.6	15.1	76.7	71.2	95.8	90.6	76.7
Total Aliphatics >C12-C44	107	86.6	200	201	61.3	3.08	137	32.5	53.8	275	345	288	125	117	58.8	0.1	5.37	117
Total Aromatics >EC12-EC44	118	156	202	186	23.8	31.5	234	32.4	66.9	205	245	136	126	71.8	55.5	0.186	20.3	933
Total Aliphatics & Aromatics >C5-C44	225	242	402	387	85	38.4	371	64.9	121	480	590	424	251	189	114	0.186	25.6	1050
Metals - (Solid)																		
Iron	158000	189000	226000	206000	58500	24300	133000	121000	154000	157000	155000	299000	249000	352000	96500	32400	32300	23500
Manganese	10700	11600	10400	10900	1610	175	21100	26500	46100	13100	22000	6530	6670	10000	10400	915	967	708
Metals - (Liquid)																		
Calcium	38700	158000	-	69600	102000	-	-	-	-	-	-	98300	130000	-	157000	146000	-	13600
Magnesium	6400	9980	-	6500	14200	-	-	-	-	-	-	11500	19500	-	44000	24200	-	7080
Phenols																		
Phenol	0.01	0.0222	0.0113	0.0605	0.0666	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.0784	0.01	0.0112	0.01	0.01	0.01
Cresols	0.01	0.01	0.0113	0.0363	0.01	0.01	0.0147	0.01	0.01	0.01	0.01	0.01	0.0112	0.01	0.0112	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.0968	0.0666	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0896	0.035	0.035	0.035	0.035	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE																		
pH																		
Sulphate, Total																		
Sulphur, Total																		
Sulphate, Total potential																		
Sulphate, acid soluble (total)																		
Cyanide, Total																		
Exchangeable Ammonia as N																		
Asbestos																		
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	17/08/2018	06/08/2018	-	07/08/2018	02/08/2018	-	-	-	-	-	-	17/08/2018	07/08/2018	-	07/08/2018	01/08/2018	-	29/10/2018
Analysed By	James Richards	Andrzej Ferfecki	-	Renata Bozhkov	Andrzej Ferfecki	-	-	-	-	-	-	Lucy Caroe	Renata Bozhkov	-	Renata Bozhkov	James Richards	-	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																		
Analysts Comments																		
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	Detected	Not Detected	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	Not Detected	Trace	-	Not Detected	Not Detected	-	-	-	-	-	-	Detected	Not Detected	-	Detected	Not Detected	-	Not Detected
Comments	0	0	-	Loose fibres in soil	0	-	-	-	-	-	-	0	0	-	0	0	-	0
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	107	104	102	95.1	103	101	116	102	113	102	114	104	104	105	97.9	106	106	104
Toluene-d8**	96.7	95.7	98.2	94.2	98.6	98.1	100	99.8	99.2	98.9	98.7	95.4	99.8	96.8	97.1	98.9	98.8	98.3
4-Bromofluorobenzene**	75.8	85.7	91.7	79.9	98.1	96.8	102	96.1	102	102	92	80.4	101	86.7	90.8	91.6	92	94.9
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.165	0.994	0.13	2.65	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.156	0.13	0.232	0.37	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	15.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	13.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	12.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	12.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4CH1	4CH1	4CH2	4CH2	4CH4	4CH4	4CH4	4CH5	4CH5	4CH5	4CH6	4CH6	4CH6	4CH7	4CH7	4CH7	4CH8	4CH8	4CH8
Depth	0.5	1	0.5	1	0.5	1	1.6	0.5	1	1.8	0.5	1	1.5	0.5	1	1.7	0.5	1	1.5
Sampled Date	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
Carbon																			
Soil Organic Matter (SOM)	9.78	7.02	26	10.9	5.71	4.29	4.31	4.59	6.15	4.21	4.9	29.8	8.22	5.95	7.17	4.43	3.88	6.05	5
Metals (Solids)																			
Arsenic	10.1	12.2	11.2	15.7	13.9	14.8	10	16.8	13.8	12.4	16.1	10.7	11.1	75.5	30.8	89.2	5.32	9.16	8.37
Cadmium	0.2	0.02	0.998	0.2	0.2	0.2	0.02	0.2	0.2	0.2	0.558	0.2	0.174	1.03	0.513	0.2	0.02	2.38	0.534
Chromium	103	106	0.9	9	23.8	9.03	30.5	115	101	34.4	99.3	369	49.5	37.5	25.9	165	0.9	135	434
Copper	16.1	32.5	19.5	23.9	20.6	19.1	12.5	38.8	25.9	28.6	43.4	42.6	17.7	38.4	26	32.5	5.56	74.6	25.7
Lead	45.3	45.8	35.8	47.2	64.3	51.3	26	55.9	66.2	36.1	67.6	26.7	41.6	76.3	97.4	56.1	37.4	112	65.8
Mercury	1.4	0.14	1.4	1.4	1.4	1.4	0.14	1.4	1.4	1.4	0.14	1.4	0.14	0.14	0.14	1.4	0.14	1.4	0.14
Nickel	23.7	22.1	27.1	33.7	49.7	28	13.3	47.3	27.5	27.2	27	238	18	38.9	64	36	13.9	29.8	15.1
Selenium	10	1.71	1	10	10	10	1.25	10	10	10	6.15	10	3.89	20.9	7.99	25	1.7	10	9.23
Vanadium	148	143	56.4	49.4	142	132	87.5	205	176	104	309	281	92.1	137	75.8	166	54.9	143	322
Zinc	133	184	221	185	179	174	103	195	251	114	301	138	180	384	433	240	193	366	223
TPH Criteria Working Group (TPH CWG)																			
Benzene																			
Toluene																			
Ethylbenzene																			
sum of detected mpo xylene by GC																			
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0231	0.01	0.0117	0.0119	0.0107	0.0104	0.022	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0147	0.01	0.01	0.01	0.01	0.01	0.012	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0274	0.01	0.01	0.01	0.01	0.01	0.011	0.01
Aliphatics >C12-C16	3.2	3.06	1.2	1.98	2.1	2.21	1.96	0.453	1.39	0.1	4.72	37.2	2.05	0.1	1.5	1.24	0.1	0.1	0.1
Aliphatics >C16-C21	14.6	22.8	5	2.79	12.8	10.7	19.3	4.12	6.57	0.1	18.9	114	11.9	5.8	7.05	5.53	4.61	2.81	5.01
Aliphatics >C21-C35	88.6	49.5	52.1	34.7	129	126	339	53.4	57.3	11.8	83.8	92.5	60.5	64.2	49.4	34.9	64.5	33.8	40.7
Aliphatics >C35-C44	32.9	11.9	25.5	26.1	69	82.2	203	23.2	33.6	4.98	56.4	5.85	10.9	12.2	20.7	11.6	20	9.01	2.32
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0179	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	3.61	2.37	1.51	1.07	0.765	1.22	1.36	2.51	1.63	0.691	3.51	5.95	4.3	5.52	2.78	1.97	2.68	1.57	0.682
Aromatics >EC16-EC21	15.1	12.9	6.38	5.42	7.79	7.41	18.7	16.9	9.08	3.86	14.8	26	16.7	27.6	10.4	7.78	15.5	8.02	4.24
Aromatics >EC21-EC35	91.6	62.6	58.5	52.9	145	146	460	54.7	51.8	21.6	104	66.6	71.6	79.1	46.2	33.7	74.4	38.3	25.8
Aromatics >EC35-EC44	59.6	23.8	51.1	58.9	130	150	443	30.5	42.3	10.3	107	35.2	46.4	35.9	29.2	17.8	46.2	20.5	10.5
Aromatics >EC40-EC44	24.3	8.52	22.2	26.8	55.3	66.1	190	12.5	18.8	3.97	44.9	15.3	19.2	13.6	12.7	7.18	18.5	7.83	3.77
Polyaromatic Hydrocarbons (PAHs)																			
Acenaphthylene	112	102	0.24	120	60	182	120	458	271	74.5	120	115	179	287	172	45.9	196	158	42
Acenaphthene	22.8	75.1	160	80	40	40	80	160	40	16.3	80	24	26.1	81.9	26.6	11.2	37.6	40	11.7
Anthracene	171	254	<0.32	160	150	428	160	596	368	123	160	165	229	553	206	90.5	376	214	67.6
Benz(a)anthracene	561	1210	280	399	260	682	320	1550	969	288	320	498	708	1430	666	256	1030	703	206
Benzo(a)pyrene	582	1510	300	477	350	746	302	1750	1060	330	297	494	654	1220	615	237	923	651	190
Benzo(b)fluoranthene	1080	2020	300	720	322	740	410	1550	1020	346	323	662	1040	1500	1060	364	983	1040	325
Benzo(k)fluoranthene	358	645	280	298	129	365	162	825	547	163	154	277	324	588	340	135	468	335	114
Benzo(g,h,i)perylene	477	1000	0.48	364	290	582	0.24	1270	825	201	273	428	537	939	460	206	719	481	140
Chrysene	583	1140	0.2	472	308	684	353	1720	909	276	330	435	677	1220	665	248	1020	622	200
Dibenzo(a,h)anthracene	114	210	0.46	0.23	0.115	0.115	0.23	0.46	151	37.7	0.23	77	102	176	120	34.6	130	0.115	33.2
Indeno(1,2,3-cd)pyrene	461	1070	0.36	355	305	556	232	1260	956	220	232	510	465	1130	625	221	696	450	140
Fluoranthene	1100	1840	0.34	513	591	2360	662	4090	2470	696	630	1100	1330	3710	1510	648	2350	1500	419
Fluorene	73.2	95.1	0.2	0.1	50	198	0.1	270	162	54.2	0.1	77.7	83.8	480	129	36.5	168	82.6	31.1
Naphthalene	414	274	180	114	101	140	249	608	459	147	209	268	366	417	236	164	345	324	118
Phenanthrene	754	1010	300	335	279	1780	451	2120	1330	454	406	638	817	2890	1030	430	1340	751	256
Pyrene	0.768	1.55	0.3	0.456	0.484	1.68	0.476	2.82	1.62	0.49	0.491	0.814	0.999	2.52	1.1	0.505	1.88	1.18	0.346
PAH, Total Detected USEPA 16	7.63	14	2.36	4.5	3.57	11.1	3.62	20.9	13.1	3.92	3.67	6.58	8.53	19.1	8.95	3.63	12.7	8.49	2.64
Naphthalene-d8 % recovery**	91.3	85.2	92.8	86.6	91.3	90.8	88.6	91.6	93	87.2	90.3	77.5	96.4	80.7	80.2	107	84.4	88.6	93.9
Acenaphthene-d10 % recovery**	83.6	89.6	90.5	88.9	93.4	89.7	90.7	92.8	92.5	94.3	81.6	88.5	94.4	87.2	84.8	88.8	83.1	83.2	88.5
Phenanthrene-d10 % recovery**	91.4	94.2	92.8	88.9	101	97.8	91.7	98	93.5	102	78.8	84.7	93.4	87.2	86.7	91	80.9	82.4	90.9
Chrysene-d12 % recovery**	93.9	82.4	78	76.9	95.4	89.8	81.5	96.6	78.2	84.2	70.9	79	89.2	78.9	76.7	83.4	76.1	82.1	91.2
Perylene-d12 % recovery**	101	81.5	68.6	75.7	107	96	82.2	105	86.1	89.1	70.1	82.4	84.6	77.2	79.1	84.7	71.6	78.8	86.8
Total Aliphatics >C12-C44	139	87.3	83.8	65.6	213	221	564	81.2	98.8	16.8	164	250	85.3	82.2	78.6	53.2	89.1	45.6	48.1
Total Aromatics >EC12-EC44	170	102	118	118	283	305	923	105	105	36.4	229	134	139	148	88.7	61.2	139	68.4	41.2
Total Aliphatics & Aromatics >C5-C44	309	189	201	184	496	526	1490	186	204	53.2	393	384	224	230	167	114	228	114	89.3
Metals - (Solid)																			
Iron	189000	150000	136000	73800	187000	196000	127000	206000	164000	83300	226000	132000	166000	238000	135000	167000	79700	224000	194000
Manganese	9020	10600	3490	1690	10400	7880	5960	11800	9890	3000	10500	15500	6130	43000	15000	39900	2460	8710	18800
Metals - (Liquid)																			
Calcium	86300	-	138000	-	114000	-	151000	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	11800	-	29800	-	41600	-	12100	-	-	-	-	-	-	-	-	-	-	-	-
Phenols																			
Phenol	0.01	0.0319	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0129	0.0875	0.01	0.01	0.01	0.01	0.0973	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0278	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0875	0.035	0.035	0.035	0.035	0.125	0.035	0.035	0.035	0.035	0.035
Inorganics																			
Soluble Sulphate 2:1 extract as SO4 BRE																			
pH																			
Sulphate, Total																			
Sulphur, Total																			
Sulphate, Total potential																			
Sulphate, acid soluble (total)																			
Cyanide, Total																			
Exchangeable Ammonia as N																			
Asbestos																			
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	09/10/2018	-	09/10/2018	-	09/10/2018	-	08/10/2018	-	-	-	-	-	-	-	-	-	-	-	-
Analysed By	Andrzej Ferfecki	-	Andrzej Ferfecki	-	Marcin Magdziarek	-	Andrzej Ferfecki	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																			
Analysts Comments																			
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Comments	0	-	0	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																			
Dibromofluoromethane**	90.5	100	100	98.5	98	98.2	96.4	107	99.6	108	112	119	118	106	103	107	130	123	104
Toluene-d8**	91.7	93.8	97	96.2	95.9	95.2	96.6	100	97.9	95.1	97	88.1	91.2	96.2	99.2	96.3	98.8	98.7	101
4-Bromofluorobenzene**	81.2	82.1	87.8	86.5	86.6	83.6	81.6	99.8	95.7	88.5	83.4	70.4	85.4	88.4	91.3	90.6	104	96	103
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.009	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.007	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.004	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.137	1.57	0.26	0.013	0.013	0.013	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.04	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																			
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	4CH1V	4CH2V	4CH4V	4CH5V	4CH6V	4CH7V	4CH8V	4CI1	4CI1	4CI2	4CI2	4CI2	4CI3	4CI3	4CI4	4CI4	4CI5
Depth	1.6	1.8	2	2.5	3.3	3.3	3	0.5	1.1	0.5	1	1.5	0.5	0.8	0.5	1	0.5
Sampled Date	11/10/2018	11/10/2018	11/10/2018	11/10/2018	02/10/2018	02/10/2018	02/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	17/10/2018
Carbon																	
Soil Organic Matter (SOM)	1.07	1.33	5.5	7.98	3.81	1.95	5.1	47.8	7.83	26.4	27.1	10.1	4.19	4.22	4.38	3.78	0.94
Metals (Solids)																	
Arsenic	17.8	18.4	14.2	16.1	12.3	9.62	12.8	8.45	6	21.3	10.1	8.37	11.6	16.1	9.11	21.6	4.13
Cadmium	0.02	0.541	0.475	0.219	0.02	0.02	0.02	1.19	0.2	0.2	1.56	0.774	1.46	1.86	0.2	3.48	0.02
Chromium	27.8	32.7	35	39.8	36.3	34.6	37.8	36.4	109	214	12.5	171	91.8	116	52.1	54.4	19.6
Copper	10.5	11.2	14.6	17.6	16	14	17.9	21.7	17	27.8	36	22.6	17.8	17.4	25.7	32.7	4.45
Lead	25.4	28.7	33.7	45	52.2	28.8	34.5	76.9	25	113	127	25.5	53.1	34.4	49.9	96.7	3.53
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	1.4	1.4	1.4	1.4
Nickel	34.3	43	27.1	29.7	37.2	37.2	25.8	25.1	11.5	28.6	22.6	15.1	18.7	19.3	19.6	37.9	2.96
Selenium	1	1	1	1	1	1	1.16	1.02	10	10	1.37	4.02	1.76	10	10	10	4.58
Vanadium	48.4	62.1	56.1	60.6	57.3	57.2	61.3	50.8	134	375	72.3	124	143	129	116	162	64.3
Zinc	115	128	111	153	143	133	136	261	68.3	394	593	117	223	137	163	315	32.8
TPH Criteria Working Group (TPH CWG)																	
Benzene																	
Toluene																	
Ethylbenzene																	
sum of detected mpo xylene by GC																	
Aliphatics >C5-C6	0.01	0.01	0.0274	0.0116	0.01	0.01	0.01	0.0167	0.011	0.01	0.01	0.01	0.01	0.01	0.012	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.0638	0.0231	0.01	0.01	0.01	0.0622	0.0594	0.01	0.01	0.01	0.0344	0.0343	0.0469	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.0851	0.0182	0.01	0.01	0.01	0.0544	0.0583	0.01	0.01	0.01	0.025	0.231	0.0992	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.0623	0.0198	0.01	0.01	0.01	0.0866	0.0759	0.01	0.01	0.01	0.0594	1.48	0.306	0.01	0.01
Aliphatics >C12-C16	0.1	0.1	0.1	0.1	0.1	0.983	0.49	46.4	22.4	6.49	5.67	2.64	3.95	23.3	9.62	2.77	0.1
Aliphatics >C16-C21	0.1	0.1	0.1	0.1	0.1	0.77	0.31	194	83.7	18.7	13.9	11.2	13.9	15.4	11.8	11.2	2.1
Aliphatics >C21-C35	0.1	0.1	0.1	4.21	1.99	1.53	6.53	154	543	394	215	89.1	135	78.8	93.1	83.7	30.9
Aliphatics >C35-C44	0.1	0.1	0.1	0.1	0.1	0.1	0.1	58.5	330	417	205	43.8	54.9	44.1	60.6	28.8	33.9
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0154	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.0562	0.0116	0.01	0.01	0.01	0.0355	0.0385	0.01	0.01	0.01	0.0167	0.154	0.0665	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.041	0.0132	0.01	0.01	0.01	0.0577	0.0506	0.01	0.01	0.01	0.0396	0.984	0.204	0.01	0.01
Aromatics >EC12-EC16	0.1	0.1	0.1	0.1	0.1	0.1	0.1	13.3	6.54	7.45	6.21	2.04	4.27	10.2	6.33	1.46	0.1
Aromatics >EC16-EC21	0.1	0.1	0.248	0.1	0.1	0.1	2.34	109	34.8	34.3	20.8	12.5	18.4	10.9	15.3	6.65	2.16
Aromatics >EC21-EC35	0.1	0.1	21.8	22.5	12.6	4.87	50.5	159	488	527	247	90.7	65.7	40.8	84.8	42.4	29.9
Aromatics >EC35-EC44	0.1	0.1	4.28	3.36	1.19	1.11	11.8	62.6	346	597	272	54.3	35.6	40.4	75.9	26.3	42.5
Aromatics >EC40-EC44	0.1	0.1	1.46	0.1	0.1	0.1	4.23	24.5	136	258	119	22.2	14.3	21.5	33.4	11	20.2
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	12	12	12	12	12	12	12	535	120	600	453	60	153	108	120	89.3	12
Acenaphthene	8	8	8	8	8	8	8	80	107	160	160	40	114	210	80	40	8
Anthracene	16	16	16	16	16	16	16	492	160	751	535	80	376	189	160	117	16
Benz(a)anthracene	14	14	14	39.1	14	14	14	2320	549	2460	1560	266	900	392	140	398	49.8
Benzo(a)pyrene	15	15	15	39.8	15	15	15	2440	799	1990	1700	408	658	331	150	532	49.5
Benzo(b)fluoranthene	15	15	23.2	55.7	15	15	15	3890	646	3190	1960	614	913	474	150	474	78.2
Benzo(k)fluoranthene	14	14	14	14	14	14	14	1380	325	966	865	201	381	158	140	254	27.5
Benzo(g,h,i)perylene	24	24	24	24	24	24	24	1850	517	1360	1140	474	505	267	0.24	475	51.8
Chrysene	10	10	10	44.4	10	10	10	1990	682	2060	1600	294	815	365	0.1	436	50.4
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	0.023	430	0.23	0.46	0.46	0.115	112	55.5	0.23	0.115	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	31.7	0.018	0.018	0.018	2030	427	1440	1170	512	388	263	180	396	33.3
Fluoranthene	0.017	0.017	0.017	83.1	0.017	0.017	29.9	4260	1490	5640	3900	539	1940	1030	0.17	898	82.7
Fluorene	10	10	10	10	10	10	10	0.1	111	253	0.2	50	198	170	0.1	50	10
Naphthalene	9	9	9	9	9	9	9	460	239	180	781	86.9	1210	456	90	170	17.3
Phenanthrene	15	15	15	43.3	15	15	15	1800	957	2790	1980	239	1810	870	150	485	43.9
Pyrene	0.015	0.015	0.015	0.064	0.015	0.015	0.0231	3.35	1.23	4.05	2.81	0.387	1.35	0.72	0.15	0.709	0.0697
PAH, Total Detected USEPA 16	0.118	0.118	0.118	0.401	0.118	0.118	0.118	27.2	8.08	27.6	20.4	4.02	11.8	6.06	1.18	5.43	0.554
Naphthalene-d8 % recovery**	89.2	77.6	90.9	98.1	80.7	77.6	77.5	84.3	93.8	84.6	87.4	91.4	95.6	86.8	85.3	91	95.1
Acenaphthene-d10 % recovery**	79.1	81.9	90.8	94.5	77.9	85.1	78	74.3	91.7	79.8	94.2	91	94.7	91.6	82.1	94.4	95.5
Phenanthrene-d10 % recovery**	95.5	87.3	94.2	92.7	78.1	87.5	80.3	87.7	94.4	84.4	93.8	92.6	94.5	96.2	76	101	99.2
Chrysene-d12 % recovery**	85.6	80.1	91.6	99.2	75.5	78.1	78.7	78	75.8	72.7	85.4	87.6	104	81.3	77.4	96.5	98
Perylene-d12 % recovery**	86.3	78.8	113	110	76.5	74.8	76.8	76.9	90.6	66	85.4	96.3	101	80.9	79.7	105	92.5
Total Aliphatics >C12-C44	0.1	0.1	0.1	4.21	1.99	3.28	7.33	452	979	837	439	147	208	162	175	126	66.9
Total Aromatics >EC12-EC44	0.1	0.1	26.3	25.8	13.8	5.98	64.7	344	875	1170	547	160	124	102	182	76.8	74.5
Total Aliphatics & Aromatics >C5-C44	0.1	0.1	26.7	30.1	15.8	9.26	72	797	1850	2000	986	306	332	267	358	203	141
Metals - (Solid)																	
Iron	34100	38000	28200	24100	28300	30500	26900	108000	83100	134000	134000	63500	169000	90900	95900	281000	22800
Manganese	719	782	271	422	289	353	583	3360	18200	11800	5070	7050	7680	9750	8740	8840	6680
Metals - (Liquid)																	
Calcium	131000	-	91600	-	100000	-	8820	-	179000	-	182000	-	-	-	-	-	-
Magnesium	17500	-	18300	-	12400	-	6040	-	18300	-	34000	-	-	-	-	-	-
Phenols																	
Phenol	0.01	0.01	0.0115	0.0117	0.01	0.0116	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.0102	0.0117	0.0115	0.0117	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0115	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE																	
pH																	
Sulphate, Total																	
Sulphur, Total																	
Sulphate, Total potential																	
Sulphate, acid soluble (total)																	
Cyanide, Total																	
Exchangeable Ammonia as N																	
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	03/08/2018	-	07/08/2018	-	01/08/2018	-	29/10/2018	-	29/10/2018	-	24/10/2018	-	-	-	-	-	-
Analysed By	Lucy Caroe	-	Renata Bozhkov	-	Lucy Caroe	-	Christian Hallam	-	Paul Poynton	-	Paul Poynton	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																	
Analysts Comments																	
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Detected	-	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Comments	Soil containing ACM debris	-	0	-	Fibre bundle in soil	-	0	-	0	-	0	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	105	109	95.2	103	107	108	108	105	109	103	107	111	105	99.9	116	121	107
Toluene-d8**	98.1	98.4	95.2	96.4	98.3	98.1	97.7	97.4	97.7	93.1	92.7	97.3	99.4	93	96.8	97.9	92.4
4-Bromofluorobenzene**	90.8	86.7	80.4	85.3	89.7	87.9	95.8	96	90.4	97.1	99.8	90	100	82.8	84.9	89.7	95.4
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.009	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.007	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.004	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.1
Naphthalene	0.13	0.13	0.213	0.195	0.13	0.323	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.013	0.013	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-	0.4	0.4	0.4	0.04	0.04	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4CI5	4CI6	4CI6	4CI7	4CI7	4CI8	4CI8	4CI2V	4CI4V	4CI6V	4CI7V	4CI8V	4CJ1	4CJ1	4CJ1	4CJ2	4CJ2
Depth	1	0.5	1	0.5	1	0.5	1	1.7	2.5	2.2	1.8	1.9	0.5	1	2	0.5	1
Sampled Date	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	11/10/2018	11/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Carbon																	
Soil Organic Matter (SOM)	1.68	1.66	3.26	6.47	5.14	3.26	19.5	1.26	1.02	3.88	1.61	1.91	15.4	11.7	19.3	32.1	10.2
Metals (Solids)																	
Arsenic	6.28	9.64	7.28	7.39	5.68	5.03	6.83	12.6	14.3	13.6	14.9	12.4	8.54	5.87	11.4	9.25	8.72
Cadmium	0.02	0.02	0.2	0.149	0.02	0.02	0.2	0.397	0.02	0.02	0.02	0.02	0.155	0.0664	0.2	0.184	0.02
Chromium	22.3	21.7	462	41.5	207	32.4	30	28.5	30.1	33.1	31.6	35.8	39.8	14.9	9	40.1	81.7
Copper	22.2	12.1	18.8	11.1	10.4	3.88	17.6	9.96	11.6	15.4	12.6	17.9	17.3	11.2	21.2	17.9	14.5
Lead	8.16	29.1	24.4	45.8	23.2	10.7	48.2	23.5	24.1	30.4	25.5	26.3	60.4	12.5	28.5	67.1	62.1
Mercury	0.14	0.14	1.4	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14
Nickel	18.6	16	13.1	8.84	6.72	5.19	20.8	37.3	39.5	31.6	30.9	30.4	19.1	6.66	15.7	15	13.3
Selenium	2.93	1	13.7	2.56	4.94	3.8	10	1	1	1	1	1	2.66	3.1	10	1.87	3.76
Vanadium	59.3	79	330	72.4	223	109	114	54.2	57.6	53.3	57	55.7	49.6	42	129	72.9	124
Zinc	49.4	154	60	203	138	57.7	118	117	118	113	107	136	187	50	81.8	258	248
TPH Criteria Working Group (TPH CWG)																	
Benzene																	
Toluene																	
Ethylbenzene																	
sum of detected mpo xylene by GC																	
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.0129	0.0138	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.0247	0.0357	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.0418	0.0575	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.0236	0.01	0.19	0.208	0.01	0.01	0.0138	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	0.1	2.54	11.5	41	12	4.4	38.2	0.1	0.1	0.1	0.1	0.1	3.35	4.65	4.31	4.25	2.46
Aliphatics >C16-C21	4.18	11.4	27	116	59	9.62	157	0.1	0.1	0.1	0.1	0.1	19.5	32.6	86.9	10.7	9.21
Aliphatics >C21-C35	28.9	110	85.1	821	388	109	915	0.1	0.1	5.78	3.64	2.95	91.8	134	80.6	45.4	30.7
Aliphatics >C35-C44	8.43	38.2	26.2	226	98.3	129	258	0.1	0.1	0.1	0.1	0.1	25.4	23.5	3.84	12.6	12
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.0253	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.0173	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.0279	0.038	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.015	0.01	0.126	0.139	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	0.198	2.76	3.35	15.8	6.8	11.1	15.9	0.1	0.1	0.1	0.1	0.1	4.88	2.42	6.68	0.583	2.3
Aromatics >EC16-EC21	1.92	8.29	15.7	53.7	31.9	15.1	72.5	0.1	0.1	1.97	0.1	0.332	21.2	13.1	57.4	7	10.2
Aromatics >EC21-EC35	19	60.1	77.6	252	165	146	356	0.1	0.1	38.5	9.17	16	90.9	85.1	80.4	30.3	53.5
Aromatics >EC35-EC44	9.94	39.1	37.4	103	78	210	137	0.1	0.1	7.74	3.64	3.99	35.4	39	18.7	2.97	28.6
Aromatics >EC40-EC44	3.55	16.7	14.9	40.3	31.4	93.7	50.7	0.1	0.1	2.6	1.28	0.802	13.4	16	7.33	0.1	12.7
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	60	23.8	20.1	145	75.5	120	134	12	12	12	12	12	205	26.5	142	291	101
Acenaphthene	40	17.4	42.7	43	28.2	94.3	403	8	8	8	8	8	39.5	15.3	485	58.7	33.5
Anthracene	80	65.6	93.2	225	123	178	358	16	16	16	16	16	352	77.7	158	469	150
Benz(a)anthracene	87.9	269	571	766	488	140	2470	14	14	22.5	14	14	1550	418	370	1870	851
Benzo(a)pyrene	98.9	333	747	604	520	150	2600	15	15	22.2	23	15	1320	426	330	1660	904
Benzo(b)fluoranthene	93.5	446	779	864	682	150	2750	15	15	32.1	21.1	15	2020	560	446	1990	1220
Benzo(k)fluoranthene	70	141	335	300	230	140	844	14	14	14	14	14	728	188	128	651	389
Benzo(g,h,i)perylene	120	260	550	526	404	0.24	1780	24	24	24	24	24	960	366	255	1150	641
Chrysene	126	286	582	729	459	0.1	2110	10	10	22.1	19	10	1390	398	323	1500	793
Dibenzo(a,h)anthracene	0.115	59.1	123	125	74	0.23	423	0.023	0.023	0.023	0.023	0.023	236	82.5	74.8	306	135
Indeno(1,2,3-cd)pyrene	90	173	388	443	566	180	1460	0.018	0.018	0.018	0.018	0.018	846	446	211	1060	967
Fluoranthene	146	502	1000	1260	784	339	2850	0.017	0.017	38.9	0.017	0.017	2870	618	685	3270	1500
Fluorene	50	19.4	29.5	166	58	0.1	328	10	10	10	10	10	123	31.5	358	240	62.5
Naphthalene	45	106	114	459	167	305	907	9	9	14.5	9	9	463	91.8	348	446	297
Phenanthrene	75	385	560	1010	545	439	1730	15	15	26.4	15	15	1310	366	870	1800	534
Pyrene	0.148	0.423	0.908	1.42	0.833	0.292	2.55	0.015	0.015	0.0314	0.015	0.015	2.21	0.495	0.478	2.61	1.35
PAH, Total Detected USEPA 16	0.7	3.51	6.84	9.09	6.04	1.65	23.7	0.118	0.118	0.21	0.118	0.118	16.6	4.6	5.66	19.4	9.92
Naphthalene-d8 % recovery**	94.5	94.9	91	92.4	83.2	89.4	92.2	75.4	91.3	91.2	90.3	84.1	96.2	83.3	93	93.9	80.7
Acenaphthene-d10 % recovery**	96.6	94.5	92.2	96.7	85.6	86.4	92.2	77.9	85.3	90.5	91.1	82.1	95.5	84.9	92.9	93.4	82.3
Phenanthrene-d10 % recovery**	97.8	99.3	95	99.8	93.4	91	95.1	82.8	87.4	94.1	91.1	85.5	94.6	90.6	95.2	95.4	88.5
Chrysene-d12 % recovery**	95.3	95.3	91.3	97.8	91.9	84.9	97.2	86.9	88.2	96	90.5	82.8	96.7	83.1	98.7	97.6	83.7
Perylene-d12 % recovery**	91.4	88.1	86	89	88.9	80.4	89.2	100	92.9	96.5	91.1	82.3	91.4	81.1	94.6	94.1	76.9
Total Aliphatics >C12-C44	41.5	162	150	1210	557	252	1370	0.1	0.1	5.78	3.64	2.95	140	194	176	72.9	54.4
Total Aromatics >EC12-EC44	31.1	110	134	424	282	382	581	0.1	0.1	48.2	12.8	20.3	152	140	163	40.9	94.6
Total Aliphatics & Aromatics >C5-C44	72.5	273	284	1630	839	634	1950	0.1	0.1	54	16.4	23.3	292	334	339	114	149
Metals - (Solid)																	
Iron	43000	93400	98000	57000	108000	28200	174000	36700	39300	29600	29900	33500	40300	19500	217000	90300	73800
Manganese	4520	4630	29500	5450	19100	6960	8060	638	1380	575	547	644	3950	4360	14300	4730	10500
Metals - (Liquid)																	
Calcium	-	-	-	-	-	-	56300	-	230000	-	81100	-	-	126000	-	-	-
Magnesium	-	-	-	-	-	-	8790	-	13500	-	10100	-	-	16900	-	-	-
Phenols																	
Phenol	0.01	0.01	0.0268	0.0116	0.01	0.01	0.791	0.0696	0.0103	0.0113	0.0113	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.0134	0.0116	0.01	0.01	0.484	0.209	0.01	0.0113	0.0226	0.0116	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.0354	0.441	0.015	0.015	0.0678	0.0348	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	1.31	0.719	0.035	0.035	0.102	0.0464	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE																	
pH																	
Sulphate, Total																	
Sulphur, Total																	
Sulphate, Total potential																	
Sulphate, acid soluble (total)																	
Cyanide, Total																	
Exchangeable Ammonia as N																	
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	17/08/2018	-	17/08/2018	-	17/08/2018	-	-	24/10/2018	-	-	-
Analysed By	-	-	-	-	-	-	James Richards	-	Lucy Caroe	-	James Richards	-	-	Paul Poynton	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																	
Analysts Comments																	
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-
Fibrous Anthophyllite	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-
Fibrous Tremolite	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-
Fibrous Actinolite	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-
Non-Asbestos Fibre	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-
Comments	-	-	-	-	-	-	0	-	0	-	0	-	-	0	-	-	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	115	105	101	102	104	113	101	84.5	103	101	65.3	102	102	101	104	107	108
Toluene-d8**	99.9	97.9	96.9	99	99.8	99.6	101	85.6	96.2	96.4	70.3	98.9	92.5	91.3	99.6	94.3	99.6
4-Bromofluorobenzene**	104	95.8	92	93	97.8	95.9	90.9	72.1	94.8	78.5	36.2	104	84.3	88.3	99.9	95	98.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	2	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.698	0.09	0.18	0.109	1.8	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.334	0.07	0.14	0.07	1.4	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.08	0.04	0.8	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.51	0.1	0.2	0.1	2	0.1	0.1	0.1	0.194	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	2	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	2.6	0.206	2.53	0.13	2.6	0.13	0.13	0.13	0.56	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.54	0.4	0.8	0.4	8	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	22.4	-	-	21.6	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	19	-	-	18.5	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	21.9	-	-	21	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	18.1	-	-	17.7	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	0.5	-	-	0.5	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	15.6	-	-	14.4	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	15.6	-	-	14.4	-	-	-	-	-	-

Sample ID	4CJ2	4CJ3	4CJ3	4CJ3	4CJ4	4CJ4	4CJ4	4CJ5	4CJ5	4CJ1V	4CJ3V	4CJ4V	4CJ5V	4CE2	4CE2	4CE5	4CE5	4CE6
Depth	2	0.5	1	1.5	0.5	1	1.4	0.5	1	2.7	1.9	2	1.7	0.5	0.7	0.5	1	0.5
Sampled Date	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018
Carbon																		
Soil Organic Matter (SOM)	12.3	9.79	59.1	14.9	2.24	1.65	7.31	8.28	8.03	0.712	1.95	1.26	5.24	3.55	1.3	4.86	3.09	4.29
Metals (Solids)																		
Arsenic	10.5	9.31	9.53	8.6	7.08	6	6	17.2	13.5	14.8	15.6	20.4	12.1	9.91	6	8.8	8.51	6
Cadmium	0.2	0.02	3.14	0.02	0.168	0.2	0.2	0.2	0.2	0.02	0.02	0.02	0.02	0.2	1.3	0.2	1.68	1.62
Chromium	47.2	18.2	9.74	121	32.8	810	449	238	115	27.5	36.4	33.8	49.5	55.2	359	26	9	84.6
Copper	25.7	43.6	28.8	15.9	10.2	18	30.4	32.7	61.3	24.6	10.5	11.4	17.4	31.3	14	14.9	17.4	14
Lead	56.4	84.5	56.5	41.5	25.6	7	24.3	47.8	70.9	24.3	27.7	29.9	35.7	165	9.38	42.9	80.1	51.2
Mercury	1.4	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4
Nickel	35.2	14.3	19.5	13.6	9.27	8.79	12.9	22.2	25.1	44.9	38.8	42.6	29.5	46.3	9.19	22	32.8	33.4
Selenium	10	1.25	1	3.55	3.2	16.5	18.5	14.4	10	1	1	1	1	10	10	10	10	10
Vanadium	86.2	65.9	60.5	126	58.9	354	394	268	171	51.2	64.3	62.5	68.4	231	1020	109	111	221
Zinc	448	302	239	188	113	23.3	63.3	110	318	108	111	115	132	574	19	132	202	159
TPH Criteria Working Group (TPH CWG)																		
Benzene																		
Toluene																		
Ethylbenzene																		
sum of detected mpo xylene by GC																		
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0333	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.142	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.662	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.0263	0.01	0.01	0.01	0.01	1.8	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	2.22	0.685	1.45	1.16	9.48	2.27	0.1	1.75	0.1	9.35	0.1	0.1	0.1	2.01	0.1	0.1	3.12	1.77
Aliphatics >C16-C21	15.5	4.74	5.54	8.23	21.6	8.96	7.83	9.72	5.82	167	0.1	0.1	0.1	11.3	2.03	8.31	13.6	12.2
Aliphatics >C21-C35	39.2	27.1	24.8	22.8	55.1	26.7	41.1	77.1	43.8	90.9	0.1	0.1	5.29	98	9.43	78.7	75.4	54.5
Aliphatics >C35-C44	13.7	12.1	5.51	2.27	29.2	6.27	9.38	42.1	14.7	0.1	0.1	0.1	0.1	49.4	0.812	25.1	22.5	22.3
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.442	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.0175	0.01	0.01	0.01	0.01	1.2	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	0.1	0.1	3.95	2.27	2.16	1.46	1.15	1.62	2.52	14.2	0.1	0.1	0.1	1.62	0.1	2	1.1	1.32
Aromatics >EC16-EC21	5.42	4.23	47.2	13.3	7.15	13.6	9.86	9.71	11.7	126	0.1	0.1	0.1	8.37	4.51	11.7	5.39	12.1
Aromatics >EC21-EC35	15.4	10.7	114	43	37.6	68.8	46.7	70.7	63.4	78.2	0.454	1.57	19.8	64.5	43.6	71.4	41	50.1
Aromatics >EC35-EC44	1.61	1.21	31.3	13.5	35.4	20.5	17.2	53.4	46.5	1.93	0.858	0.1	7.45	38.9	13.2	41.9	23.8	25.3
Aromatics >EC40-EC44	0.1	0.1	11.4	5.38	16.3	7.31	6.88	22.7	20.1	1.13	0.496	0.1	2.42	15.1	4.56	16	9.43	10.2
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	137	132	138	273	60	20.3	12	87.7	25.8	132	12	12	12	21.5	12	131	71.6	162
Acenaphthene	27.6	15.7	21.4	16.1	40	16.8	14.5	40	8	698	8	8	8	37.1	21.5	34.6	14	28.3
Anthracene	219	196	195	409	118	193	128	102	42.7	135	16	16	16	139	37	220	106	191
Benz(a)anthracene	792	672	719	1370	329	1820	830	492	472	26.9	14	14	14	354	359	776	357	675
Benzo(a)pyrene	690	559	702	1180	271	1790	752	530	486	15	15	15	15	280	474	670	262	626
Benzo(b)fluoranthene	783	755	1060	1480	313	2610	989	619	523	20.5	15	15	15	472	478	857	517	882
Benzo(k)fluoranthene	332	283	349	530	122	798	366	278	218	14	14	14	14	194	188	291	170	291
Benzo(g,h,i)perylene	469	436	552	832	197	1370	602	457	405	24	24	24	24	206	426	493	246	473
Chrysene	750	581	695	1260	313	1690	855	556	439	23.6	10	10	10	395	369	645	420	632
Dibenzo(a,h)anthracene	107	104	126	159	0.115	325	157	0.115	89.6	0.023	0.023	0.023	0.023	38	50	110	42.5	99.6
Indeno(1,2,3-cd)pyrene	645	378	487	1080	224	1800	517	314	278	0.018	0.018	0.018	0.018	188	356	749	245	387
Fluoranthene	1750	1310	1550	3820	692	2520	1270	906	410	213	0.017	0.017	0.017	641	645	1330	803	1140
Fluorene	111	61.6	77.6	175	50	27.9	23.9	50	10	405	10	10	10	47.3	10	77.1	36	83.6
Naphthalene	198	291	221	116	52.2	122	123	139	74.8	145	9	9	9	106	10.3	262	150	193
Phenanthrene	999	724	906	2360	282	930	544	465	221	948	15	15	15	389	206	768	445	644
Pyrene	1.28	1	1.17	2.83	0.589	1.86	0.908	0.807	0.637	0.139	0.015	0.015	0.015	0.659	0.604	1.07	0.626	1.01
PAH, Total Detected USEPA 16	9.29	7.5	8.97	17.9	3.5	17.9	8.08	5.75	4.32	2.89	0.118	0.118	0.118	4.17	4.22	8.49	4.51	7.52
Naphthalene-d8 % recovery**	83.4	95.4	94	81	82	80.6	94.9	90	94.3	83.2	94.9	95.4	87.7	87.7	81	84.9	82	96.9
Acenaphthene-d10 % recovery**	85.7	94	91.2	83.6	84.2	84.2	93.7	87.2	94.6	86.9	94	95.3	88.2	91.3	85.4	87.6	89.7	96.7
Phenanthrene-d10 % recovery**	89.8	94.4	90.4	87.2	85.1	90.2	93.4	94.1	96.9	94.6	95.3	94.9	94.1	92.3	86.7	95.7	92.7	99.5
Chrysene-d12 % recovery**	82.5	95.1	86.9	85.1	79	85.4	98.1	89.7	96.6	92.6	102	100	92.1	85.4	79	93.1	83.7	99
Perylene-d12 % recovery**	85.5	87.9	79.3	73	79.3	79.6	96	82.6	94.9	86.9	102	99.8	88.8	75.1	80.6	90.7	71.9	97.8
Total Aliphatics >C12-C44	70.7	44.5	37.3	34.5	115	44.2	58.3	131	64.3	267	0.1	0.1	5.29	161	12.3	112	115	90.7
Total Aromatics >EC12-EC44	22.4	16.1	197	72.2	82.3	104	74.9	135	124	220	1.31	1.57	27.3	113	61.3	127	71.3	88.8
Total Aliphatics & Aromatics >C5-C44	93.1	60.7	234	107	198	149	133	266	188	491	1.31	1.57	32.5	274	73.6	239	186	180
Metals - (Solid)																		
Iron	93600	78600	70500	81500	50600	167000	148000	108000	109000	41600	27800	38800	28700	174000	225000	159000	184000	193000
Manganese	4800	4880	3010	9220	4990	34400	43700	31700	14700	1630	519	995	1180	8680	40600	13300	11600	12300
Metals - (Liquid)																		
Calcium	-	-	-	-	-	-	17700	151000	-	121000	150000	-	71100	-	316000	-	64800	116000
Magnesium	-	-	-	-	-	-	11600	24200	-	43300	10000	-	9530	-	11800	-	8770	16100
Phenols																		
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.448	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.0127	0.01	0.01	0.01	0.01	0.01	0.01	0.0137	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.448	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE														-	0.046	-	0.317	0.141
pH														11.1	12.1	8.57	9.96	10.1
Sulphate, Total																		
Sulphur, Total														-	0.189	-	0.185	0.125
Sulphate, Total potential														-	0.567	-	0.555	0.375
Sulphate, acid soluble (total)														-	0.407	-	0.368	0.412
Cyanide, Total														1	1	1	1	1
Exchangeable Ammonia as N														12	12	12	12	12
Asbestos																		
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	19/06/2018	19/06/2018	-	21/06/2018	21/06/2018	-	21/06/2018	-	05/11/2018	-	05/11/2018	05/11/2018
Analysed By	-	-	-	-	-	-	Christian Hallam	Christian Hallam	-	Barbara Urbanek-Walsh	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	-	James Richards	James Richards
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)														-	-	-	-	-
Analysts Comments														-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	Not Detected	Not Detected	-	Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Comments	-	-	-	-	-	-	0	0	-	Loose fibres in soil.	0	-	0	-	0	-	0	0
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	116	109	107	126	110	100	116	105	109	102	109	102	107	105	108	110	109	108
Toluene-d8**	101	96.8	100	100	96.4	98.8	95.9	96.1	94	101	95.7	98.8	97.8	97.5	98.7	97.9	98.7	97.4
4-Bromofluorobenzene**	103	98.8	101	105	90.5	96.6	88.1	94.9	89.6	90.7	97.2	99	91.8	81.9	95.7	84.1	97.2	93.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

												Sample ID	4CE6	4CE7	4CE7	4CE7	3CE1V	3CE3V	3CE4V	3CE5V	4CE5V	4CE6V	4CG8	4CG8	4CG8V	4CK1	4CK1	4CK2	4CK2	W12601	W12602	W12603	W12604	W12605	W12606	W12607	W12608	W12609	W13101	W13102	W13103	W13104	W13301	W13302	W13303	W13304	SPJC01	SPJC02	4AB1	4AB1	4AB2	4AB4	4AB4	4AB4	4AB5	4AB5	4AB5	4AB6	4AB6
												Depth	1	0.5	1	1.4	1.8	2.7	3	3.4	2	2	0.5	1	2.6	0.5	1	0.5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1.3	0.5	0.5	1	2	0.5	1.4	2.5	0.5	1
												Sampled Date	18/10/2018	18/10/2018	18/10/2018	18/10/2018	23/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	24/10/2018	24/10/2018	18/10/2018	18/10/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	01/08/2018	01/08/2018	02/04/2019	02/04/2019	03/04/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	13/03/2019	13/03/2019
Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances																																																	
Carbon																																																											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00	0.771	3.28	1.63	1.24	3.26	5.95	4.29	1.26	1.08	1.1	3.62	4.76	2	9.15	2.33	4.97	3.33	2.98	3.24	4.47	6.55	2.59	2.31	2.74	2.36	2.88	3.12	13.6	17.9	11.9	11	10.8	15.3	10.2	2.19	2.47	16.7	93.8	25.2	8.79	13.6	6.93	6.14	97.2	10.6	8.91	18.8
Metals (Solids)																																																											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93	6.99	13.7	25.7	20.8	8.95	13.9	13.9	12.8	14.4	12.2	7.92	12.1	13.1	9.61	6	9.24	5.93	5.94	9.8	9.2	21.8	7.41	7.89	7.58	6.48	8.63	10.7	10.3	8.36	11.1	6.54	11.4	8.85	7.8	4.71	7.31	8.63	3.16	7.15	40.8	37.1	16.5	10.7	6.24	7.98	6	8.33
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47	0.2	1.01	1.25	0.2	0.02	0.137	0.02	0.02	0.02	0.02	0.02	1.74	0.332	0.2	0.962	0.0834	0.144	0.149	0.869	0.633	0.311	0.309	0.404	0.429	0.351	0.228	0.372	0.44	0.405	1.12	1.6	2.38	1.97	1.04	0.02	0.02	1	0.154	0.186	9.32	11.6	5.25	1.79	0.168	2.22	1.11	1.32
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09	9	9	9	9	26.1	37.7	34.7	30.9	34.6	30.8	38.3	46.4	30.9	103	476	51.8	8.4	0.9	10.2	9	29.2	0.9	17.1	0.9	8.69	1.83	25.3	32.5	51.3	81.2	80.9	204	222	155	174	113	19.4	8.05	8.93	230	77.1	52.5	192	20.9	599	539	387
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00	14	23.3	103	75.7	13.7	21	18	10.6	10.4	10	9.56	40.3	13.6	34.3	14	27.8	8.04	15.1	32	17.1	15	19	12.4	28.5	19.6	17.8	11.3	15.8	21.5	24	20.7	21.8	22.7	103	9.18	11.5	34.5	15.1	16	105	87.3	42.6	29.3	30.6	25.6	18.3	17.3
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66	7	42	98.4	50.7	18.7	41	35.1	20.9	29	23.4	14.7	91.1	50	84.1	19.3	71.3	55.5	15.8	48.9	42.9	37.6	25.8	33.5	23.4	39.1	30.3	35	55.8	78.5	87.6	264	199	293	201	21.1	36.1	48	16.3	13.1	1340	1940	703	252	54.4	232	22.3	62.9
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.299	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	1.4	1.4	1.4	0.14	0.14	1.4	1.4	1.4
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87	13.5	26.6	31.7	24.5	29.4	27.3	25.8	35.5	40.6	33.7	11.2	28.4	40.6	34.2	54.7	20.2	9.13	9.68	18.8	9.22	13.1	9.35	14.5	12.5	13.7	13.6	13	18.4	23.8	27.7	21.1	22	22.7	28.6	8.02	11.8	20.4	8.05	8.61	161	74.1	56.4	23.9	10.7	19.8	8.71	20.9
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93	10	10	10	10	1	1	1	1	1	1	2.08	10	1	10	10	1	1	1.29	10	10	3.12	2.11	1.82	1.58	1	1.85	2.81	3.62	10	10	10	12	10	10	4.03	2.29	10	1.51	2.47	10.4	10	10	6.7	2.7	16.9	16.4	10
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57	51.1	90.4	143	171	43.1	64.9	53.6	58.2	61.4	53.3	169	120	59.8	196	290	64.7	21.3	19.3	52.5	26.1	194	13.2	43.7	24.4	21.7	19.4	63.6	87.6	143	140	148	425	200	181	273	159	53.3	16.7	20	115	120	105	438	25.5	452	401	297
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57	56.1	190	261	190	106	131	112	91.7	123	102	60.7	151	187	287	121	244	90	69.6	183	156	149	64.3	222	116	142	104	128	222	263	284	865	683	1070	555	93.5	152	147	63.1	62.7	5560	7140	2470	1240	52.3	865	63.4	201
TPH Criteria Working Group (TPH CWG)																																																											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00																		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04													
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00																		0.002	0.002	0.002	0.00348	0.002	0.002	0.002	0.002	0.002	0.008	0.008	0.008	0.008	0.0216	0.0118	0.0218	0.0189													
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00																		0.003	0.003	0.003	0.00928	0.003	0.003	0.003	0.003	0.003	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012													
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00																		0.009	0.009	0.009	0.0104	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009													
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.02	0.0945	0.02	0.02	0.02	0.02	0.01	0.02	0.0469	0.02	0.02
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0101	0.01	0.0568	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.0432	0.04	0.04	0.04	0.0557	0.059	0.01	0.01	0.02	0.345	0.02	0.02	0.02	0.02	0.01	0.02	0.15	0.02	0.02
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0381	0.01	0.498	0.0146	0.01	0.01	0.01	0.01	0.04	0.0413	0.0597	0.04	0.04	0.04	0.0424	0.0566	0.01	0.01	0.02	0.155	0.02	0.02	0.02	0.02	0.01	0.02	0.0917	0.02	0.02
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0874	0.01	1.57	0.0202	0.01	0.01	0.01	0.01	0.04	0.085	0.0648	0.04	0.0864	0.04	0.0932	0.114	0.01	0.01	0.02	0.173	0.02	0.02	0.02	0.02	0.01	0.02	0.097	0.02	0.02
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00	0.308	2.09	0.982	2.47	0.1	0.1	0.1	0.1	0.1	0.1	4.48	3.53	0.1	1.81	3	1.29	0.1	4.33	5.92	4.16	55	6.8	4.71	4.72	5.61	2.84	0.1	1.07	0.712	0.503	1.56	1.65	1.63	2.92	0.804	1.48	14.1	120	13.5	0.884	1.33	0.1	1.68	32.3	4.48	7.93	1.34
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00	4.24	5.48	4.31	6.53	0.1	0.1	0.1	0.1	0.1	0.1	23.7	22.6	0.1	10.2	16.6	11.3	1.65	17.7	21.1	13	76.9	22.7	19.3	19.4	22.6	11.6	0.1	5.15	3.58	3.4	11.9	27.4	16.2	20.7	6.68	13.8	25.8	182	68.8	28.1	15.8	3.95	6.92	81.8	62	146	11.4
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00	23.6	20.5	27.9	48.3	1.45	6.67	1.62	0.1	0.1	1.84	175	182	0.1	71.1	125	105	37.1	56.3	39.9	31.6	42.9	58.8	47.4	66.3	69.1	39	3.52	17.6	27.6	19.8	23.4	39.6	40.7	47.1	34.2	57.3	110	441	141	96.8	77.9	60.1	75.9	103	108	37.4	21.4
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00	10	5.63	9.4	17.9	0.1	0.1	0.1	0.1	0.1	3.21	42.5	55.3	0.1	25.7	29.2	30.3	10.1	22.8	13.2	10.9	7.1	16.5	16.8	27	34.4	16.6	0.1	5.12	13.1	6.07	5.54	9.47	15.3	12.9	12.8	29.4	22.7	50	18.6	15.3	10.7	18.8	21.3	21.1	24.8	3.87	5.47
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.02	0.0409	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.028	0.01	0.356	0.0101	0.01	0.01	0.01	0.01	0.04	0.0413	0.0521	0.04	0.0576	0.04	0.0641	0.072	0.01	0.01	0.02	0.103	0.02	0.02	0.02	0.02	0.01	0.02	0.0608	0.02	0.02
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0582	0.01	1.05	0.0134	0.01	0.01	0.01	0.01	0.04	0.0563	0.0432	0.04	0.0576	0.04	0.0629	0.0755	0.01	0.01	0.02	0.116	0.02	0.02	0.02	0.02	0.01	0.02	0.065	0.02	0.02
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07	0.1	0.1	0.1	0.762	0.1	0.1	0.1	0.1	0.1	0.1	3.03	2.22	0.1	2.46	2.94	0.1	0.444	1.12	2.15	1.57	27	1.72	1.45	1.52	2.39	1.56	0.1	11.6	454	7.4	4.91	4.74	3.72	6.49	1.07	1.05	23.1	126	35.4	1.35	2.14	0.339	2.08	34.7	3.92	1.33	9.66
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14	0.248	2.05	0.1	3.1	0.1	0.1	0.1	0.1	0.1	0.1	15	11.4	0.1	19.1	12.4	1.82	2.35	7.02	9.37	6.46	31.9	8.72	9.61	8.79	9.39	6.92	1.09	71.2	1020	81.7	25.4	38.1	29.7	9.82	6.39	7.61	66.7	290	161	10.1	10.1	5.69	10.4	91.8	39.8	36.6	97.1
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00	0.371	15.2	4.51	21	0.1	21.9	12.9	1.68	2.55	1.2	92.9	110	3.41	86.2	63.8	22.3	20.4	44	33.2	26.4	37.9	32.1	37.1	51.2	55.8	44	7.98	150	1200	160	56.8	93	90.6	36	38	41.6	161	521	402	49.1	43.3	50.2	77.1	161	157	19.9	191
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00	0.242	3.42	0.614	11.2	0.1	3.29	0.369	0.1	0.426	0.676	53.7	87	0.963	42	29.4	3.1	12.5	31.2	21	17.4	20.5	18	21.7	34.8	52.3	29.4	2.56	39.5	267	46.7	17.2	30.6	35.9	16.7	22.8	35	53.8	136	106	16	12.4	23	40.7	36.7	38.6	3.2	49.1
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00	0.111	0.909	0.1	4.12	0.1	0.1	0.1	0.1	0.1	0.1	22.7	37.8	0.1	17.7	11.6	0.1	7.68	12.5	9.03	7.63	9.35	7.71	9.62	15.6	23.9	12.2	1.14	12.9	81.9	16.2	5.87	11.4	13.6	6.2	9.65	16.2	19.2	46.8	30.2	5.5	4.31	8.16	15.3	12.3	13.3	1.05	15.9
Polyaromatic Hydrocarbons (PAHs)																																																											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01	19.1	12	62.9	12	12	12	12	12	12	12	125	60	12	255	70.6	114	39.2	75.4	40	78.6	86.8	90.5	77.7	228	41	96.3	216	1190	4420	1790	900	1050	1280	1610	89.3	110	1180	3460	2140	157	189	122	55.6	72.5	62.4	34	1210
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40	8	14.4	53.2	31.6	8	8	8	8	8	8	40	40	8	40.7	14.2	21.3	8.76	16.6	36.3	31.8	34.9	44.5	21.3	36	9.77	30.6	21.3	124	328	193	154	217	241	280	27.7	24.6	121	416	457	13.6	8	36.2	68.6	112	145	9.46	164
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33	31.8	22.7	112	35.4	16	16	16	24.9	16	16	231	130	16	571	131	123	53.9	93.5	99.4	203	180	166	141	406	53	162	681	3240	6840	3480	2020	2160	3460	4070	171	214	1920	4610	4950	157	131	88.9	165	333	239	21.6	2260
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27	114	69.3	508	95.6	57.2	14	14	62.6	14	14	889	406	14	1290	385	520	203	508	406	570	577	624	513	774	222	693	1750	4290	10500	6120	4740	5200	7510	8260	684	649	2710	6060	8590	474	287	600	633	230	1480	78.4	8890
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93	94.7	50.3	298	72.6	68.5	15	15	38.4	15	15	703	392	15	1160	315	458	193	450	358	435	538	538	441	554	174	602	1440	3280	7980	4250	4220	4760	6720	7190	700	691	1900	4530	8140	539	337	661	607	109	1280	96.3	7760
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00	172	81.9	542	96.4	107	40.9	15	101	15	15	1240	517	15	1980	15	863	218	764	599	720	948	800	660	937	249	907	2320	4870	11300	6160	6180	6340	9610	9830	1080	788	3320	7550	12700	1080	557	1180	1200	261	1220	112	7240
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00	70.9	28.7	188	40.8	28.1	14	14	38.6	14	14	418	185	14	721	199	289	107	283	222	280	300	297	282	363	101	341	728	1830	4120	2380	2160	2720	3390	3880	392	345	1160	2800	5260	269	251	384	536	70.5	572	48.5	3990
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51	71.5	42.8	204	75	86.2	24	24	44.9	24	24	578	338	24	875	242	434	193	273	218	238	475	378	382	310	151	445	940	1860	4370	2190	2680	3180	3930	4490	576	545	1290	2570	5560	581	406	520	501	73.3	996	108	5580
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26	124	65.3	453	103	64	30.5	10	79.5	10	10	1010	374	10	1410	377	635	194	464	402	522	566	531	454	853	189	581	1630	4160	8790	5440	4430	5270	6370	7010	716	645	2640	5550	8220	536	379	680	824	498	1670	88.9	7120
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63	0.023	0.023	47.5	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.115	0.115	0.023	225	56.3	79.8	31.1	80.7	65.3	76.3	139	104	87.1	99.4	52.6	126	251	636	1490	787	793	925	1280	1260	140	121	273	741	1340	120	70.4	119	99	32.2	233	0.023	1070
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93	85.4	51.1	201	66.2	79.6	0.018	0.018	52.1	0.018	0.018	479	355	0.018	986	297	404	158	258	191	215	394	335	302	284	124	395	897	1830	4320	2260	2350	2850	3700	4030	629	545	1400	2530	4970	421	294	462	399	42.7	728	63.7	3980
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85	189	194	1160	372	135	51.1	0.017	206	0.017	0.017	1720	802	0.017	2870	771	883	423	881	744	1280	981	1010	1010	2190	323	922	5270	10200	25200	15700	9730	11700	14900	16500	1110	1300	7720	17000	17900	748	496	1020	1540	799	2150	117	20900
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80	14.4	11.5	58.2	18.4	10	10	10	10	10	10	88	50	10	161	46.5	46.1	20	35.6	56.6	77.3	70.2	62.9	55.6	496	19.1	59.9	283	1930	6380	4000	1150	1190	1570	2110	45.7	71.4	1010	2880	1420	38.1	30.7	31.5	71.1	360	99.6	23.2	739
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86	26.1	21.1	50.7	23.6	9	9	9	9	9	9	205	111	9	294	306	378	95.7	129	148	155	200	175	183	128	60.9	159	526	5980	14900	6450	6950	7980	11900	11200	204	326	6660	21200	4790	192	220	50.8	72.3	1310	233	172	2240
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64	91.4	117	739	222	58.7	15	15	188	15	15	791	359	15	1360	504	491	206	278	377	641	547	503	538	2330	160	433	2920	7810	22300	15900	6220	7070	9370	11400	477	641	6850	19300	11400	419	319	315	730	1920	1280	135	7010
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09	0.207	0.154	0.8	0.284	0.112	0.0441	0.015	0.146	0.015	0.015	1.54	0.778	0.015	2.16	0.601	0.74	0.336																		0.957	1.03	5.23	12.1	13.7	0.52	0.371	0.813	1.13	0.587	2.13	0.114	15.5
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00	1.31	0.923	5.47	1.54	0.796	0.167	0.118	0.982	0.118	0.118	10	4.75	0.118	16.4	4.32	6.48	2.48	5.3	4.55	6.51	6.86	6.46	5.93	11.4	2.2	6.79	23.4	59.8	149	86.4	61.3	70.9	95.7	105	8	8.05	45.4	113	112	6.26	4.34	7.09	8.63	6.81	14.5	1.22	95.7
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00	84.6	82.8	83.2	81.9	87.2	79.7	92.7	80.1	96.6	79.1	83.7	77.2	88.8	80	83.6	83.9	85.6	104	102	105	104	92.2	90.8	104	86.2	93.6	90.3	91.5	87.4	91.4	93.1	103	122	104	97.6	90.7	93.4	97.4	101	83.5	90.8	93.3	97.8	93.6	106	92.9	79.3
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00	88.5	86.8	89.5	88	86.9	85	86.3	91	95.9	83.1	88	83	92.1	89.1	81.7	88.7	89.9	103	101	104	103	95.7	90.8	102	93.1	96.7	78.2	81.7	79.4	84.3	87.2	101	109	99.2	106	87.4	93	98.7	97.9	86.6	89.3	90.2	96.8	95.4	105	92.5	74.1
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00	93.4	90.7	93	89.9	85.7	89	95.1	96.7	97.4	85.5	90.3	85.8	92.1	93.2	87.5	90.7	89.5	101	100	103	103	96.6	95.3	101	95.8	105	73.5	79.6	79.7	82.9	86.8	103	104	99.1	111	86.5	98	103	103	87.4	92.2	92.8	107	98.3	105	91.9	71.5
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00	98.6	85.6	86.5	84.9	86.1	99.8	100	79.1	101	81.1	88.1	78.2	88.4	74.6	86.4	83.9	82.9	96.8	95	98.1	103	116	99.9	96.2	105	116	75.1	85.8	88	90.6	94.8	105	109	102	105	81	80.7	84.8	84.6	75.6	69.8	92.4	93.1	75.4	109	97.8	96
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00	92.8	81.6	74	87.7	84	96.9	101	74.1	96.9	77.6	76.3	76.7	83.6	73.1	71.8	70.7	83.6	98.5	96.3	99.7	104	123	105	96.9	113	123	75.7	87.3	91.3	93.7	98.5	99.2	110	107	94.6	81	75	79.6	77.9	70.3	54.7	87.2	82.8	53.8	106	94.1	77.3
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00	38.2	33.7	42.6	75.2	1.45	6.67	1.62	0.1	0.1	5.05	245	264	0.1	109	174	148	48.9	101	80.2	59.7	182	105	88.2	117	132	70	3.52	28.9	44.9	29.8	42.4	78.2	74	83.7	54.4	102	173	794	242	141	106	82.8	106	238	199	196	39.7
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00	0.86	20.7	5.13	36.1	0.1	25.2	13.2	1.68	2.97	1.87	165	211	4.37	150	109	27.2	35.7	83.3	65.8	51.9	117	60.5	69.9	96.3	120	81.9	11.6	273	2940	295	104	166	160	69	68.2	85.3	305	1070	705	76.6	67.9	79.2	130	324	240	61.1	347
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00	39.1	54.4	47.7	111	1.45	31.9	14.9	1.68	2.97	6.92	410	474	4.37	259	282	175	84.5																		123	187	478	1870	946	218	174	162	236	563	439	257	387
Metals - (Solid)																																																											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000			387000	212000	315000	395000	22900	27800	22300	33900	43300	32200	87500	218000	26800	161000	114000	63600	27900	28900	63200	53100	111000	34400	47100	38300	21300	33100	28800	49700	47000	58900	85100	108000	95400	93400	70700	75200	67100	4360	23100	214000	305000	149000	99800	6800	158000	131000	94800
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520			3130	10500	6280	11300	392	603	449	892	315	735	8620	9290	498	8370	19200	3270	873	1130	2450	1380	6000	2770	3410	1270	942	2090	4200	3820	3470	5510	8440	14900	13600	11100	10700	7870	3110	462	2090	11400	7670	4770	10600	676	25200	31900	16100
Metals - (Liquid)																																																											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950			51200	49800	54800	-	-	-	-	-	-	-	219000	94400	-	95500	167000	181000	-	130000	-	147000	-	165000	-	129000	-	105000	147000	-	77500	-	105000	-	108000	-	-	156000	133000	49600	163000	-	-	-	-	-	-	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290			8960	7810	5970	-	-	-	-	-	-	-	17600	10900	-	9130	22800	12400	-	36000	-	18500	-	40700	-	19600	-	28500	18400	-	10900	-	16400	-	12700	-	-	25900	19300	2290	25100	-	-	-	-	-	-	-	
Phenols																																																											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00	0.01	0.0113	0.0111	0.0114	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.229	0.01	0.01	0.01	0.0121	0.0118	0.0348	0.01	0.01	0.0141	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.47	0.01	0.01	0.01	0.01	0.01	0.0116	0.0106	0.01	0.01	0.01	-	-	-	-	-	-	-	-
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.584	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	-	-	-	-	-	-	-	-
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	1.28	0.035	0.035	0.035	0.035	0.035	0.0464	0.035	0.035	0.035	0.035	-	-	-	-	-	-	-	-
Inorganics																																																											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42	0.257	0.471	0.205	-	-	-	-	-	-	-	0.237	0.199	-	0.175	0.0234	0.167	-	0.162	-	0.21	-	0.15	-	0.229	-	0.19	0.302	-	0.326	-	0.182	-	0.148	-			0.102	0.109	0.0526	0.0277	-	0.045	0.051	-	0.159	0.116	0.11
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01	9.86	10.1	10.5	10.9	8.52	7.9	8.03	9.1	7.82	8.23	11.8	9.55	7.71	10.9	11.8	11.4	11.2	11.2	11.2	11.3	11.1	11.4	11.7	11.4	11.4	11.2	8.58	9.21	8.73	8.78	10.6	9.34	10	9.33			8.77	8.47	8.48	8.19	8.28	8.08	8.57	8.03	11.5	11.2	10.7
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-													
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32	0.262	0.307	0.196	-	-	-	-	-	-	-	0.218	0.146	-	0.197	0.149	0.14	-	0.145	-	0.217	-	0.193	-	0.156	-	0.132	0.418	-	0.258	-	0.255	-	0.212	-			0.307	0.272	0.262	0.0861	-	0.0867	0.107	-	0.181	0.512	0.196
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32	0.786	0.921	0.588	-	-	-	-	-	-	-	0.654	0.438	-	0.591	0.447	0.42	-	0.435	-	0.651	-	0.579	-	0.468	-	0.396	1.25	-	0.774	-	0.765	-	0.636	-			0.921	0.816	0.786	0.258	-	0.26	0.321	-	0.543	1.54	0.588
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42	0.325	0.413	0.433	-	-	-	-	-	-	-	0.537	0.371	-	0.34	0.214	0.267	-	0.231	-	0.267	-	0.279	-	0.378	-	0.193	0.891	-	0.187	-	0.483	-	0.207	-			0.413	0.0643	0.526	0.0876	-	0.0687	0.0816	-	0.328	0.716	0.279
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.01	1	1.04	1.51	1	1.2			1	1	1	20.9	27.6	4.98	5.29	1	2.22	1	1.28
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61	12	12	12	12	172	164	198	154	166	81.7	12	12	188	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	31.8	12	12			12	12	12	-	-	-	-	-	-	-	-
Asbestos																																																											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0					0.00		05/11/2018	05/11/2018	05/11/2018	-	-	-	-	-	-	-	05/11/2018	05/11/2018	-	29/10/2018	29/10/2018	05/11/2018	-	09/01/2018	-	09/01/2018	-	09/01/2018	-	09/01/2018	-	09/01/2018	03/02/2018	-	03/02/2018	-	03/02/2018	-	01/02/2018	-	-	18/07/2018	16/04/19	16/04/19	16/04/19	18/03/19	-	18/03/2019	18/03/2019	-	18/03/2019	20/03/2019	20/03/19
Analysed By	TM048	No units		1371	0	0					0.00		Marcin Magdziarek	Christian Hallam	Barbara Urbanek-Walsh	-	-	-	-	-	-	-	Christian Hallam	Barbara Urbanek-Walsh	-	Lucy Caroe	Lucy Caroe	Marcin Magdziarek	-	James Richards	-	James Richards	-	James Richards	-	James Richards	-	James Richards	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	-	James Richards	-	Eva Guerra	-	-	James Richards	Christian Hallam	Christian Hallam	Christian Hallam	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-	None	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0					0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/C	-	-	-	-	-	-	-	-	-	-	N/C	-	N/C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Detected	-	Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00		Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Detected
Comments	TM048	No units		1371	0	0			0		0.00		0	0	0	-	-	-	-	-	-	-	0	0	-	0	0	Loose fibres in soil	-	0	-	0	-	0	-	0	-	0	Loose fibres in soil.	-	Loose fibres in soil.	-	0	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																																																											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00		113	110	110	111	109	112	109	111	175	129	109	112	109	110	101	110	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95.5	88.8	99.1	102	89.1	103	103	102	97.7	99.8	101	102	98.8
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00		98.8	99.7	98.9	99	99.3	97.8	97.4	100	100	100	95.5	98.7	100	98.7	89.8	92	98.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91.8	94.8	96.3	96.7	91.5	101	102	101	97.9	95.9	96.8	98.8	96.8
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00		99.8	99	87.9	95.4	88.7	94.9	94.8	90.5	101	90.9	93.4	89.6	93.1	87.2	85.3	84.5	96.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	82.8	87.3	85.1	96.4	72.4	93	92.5	95	85	83.9	91.4	86.2	71.2
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	2	0.2	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	0.09	0.09	1.8	0.18	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.07	0.07	0.07	1.4	0.14	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.04	0.04	0.8	0.08	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	2	0.2	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	2	0.2	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.475	0.753	0.13	2.6	0.664	0.13	0.13	0.13	0.13	0.13	2.6	0.13	0.521
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.4	0.4	8	0.8	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4
Subcontracted: Inorganics																																																											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.16	-	-	2.57	3.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.51	-	-	2.16	2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.91	-	-	2.42	2.93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.84	-	-	1.66	2.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.02	-	-	0.95	1.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.8	-	-	15.3	13.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.6	-	-	16.1	14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	4AB1V	4AB2V	4AC1	4AC1	4AC2	4AC2	4AC4	4AC4	4AC4	4AC5	4AC5	4AC5	4AC6	4AC6
Depth	1.7	1	0.5	1	0.5	1	0.5	1	3	0.5	1.5	3	0.5	1
Sampled Date	02/04/2019	03/04/2019	02/04/2019	02/04/2019	03/04/2019	03/04/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019
Carbon														
Soil Organic Matter (SOM)	7.26	2.93	7.72	6.95	21.6	82.1	21.2	14.3	13.3	11.9	8.24	2.64	19.7	32.1
Metals (Solids)														
Arsenic	13.6	13.2	6.66	8	1.92	4.81	38.5	25.7	45.4	14.3	10.4	6	8.04	9.9
Cadmium	0.79	0.184	0.231	0.22	0.02	0.155	31.3	17.3	20.9	1	0.509	0.432	0.219	1.47
Chromium	30.9	28.8	7.93	10.6	8.42	10.3	10.6	54.5	332	27.4	242	962	159	95.2
Copper	22.4	12.8	11.7	23.7	3.32	13.9	83.4	62	58.5	111	59.3	24.7	24.7	25.1
Lead	41.4	20.2	26.3	25.3	1	13.2	4140	2480	2360	193	115	38.6	63.6	115
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	1.4	0.14	1.4
Nickel	31.4	33.8	11.7	21.3	2.67	8.08	64.3	47.4	56.8	27.7	21.2	6.48	20.3	27.4
Selenium	2.28	1.25	3.19	1.34	3.78	1.54	11.3	10.1	19.4	2.04	5.33	21.5	7.52	10
Vanadium	52.1	51.4	32.2	24.8	10.6	18.9	147	214	395	40.5	166	673	236	126
Zinc	163	101	95.5	52.9	24.5	44.1	13300	8110	7800	551	531	108	221	425
TPH Criteria Working Group (TPH CWG)														
Benzene														
Toluene														
Ethylbenzene														
sum of detected mpo xylene by GC														
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0357	0.0285
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.182	0.112
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.299	0.107
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.235	0.196
Aliphatics >C12-C16	0.1	0.343	2.02	0.662	5.45	17.4	1.02	0.53	2.47	0.771	0.709	1.15	11.6	3.6
Aliphatics >C16-C21	2.23	20	5.62	1.71	13.6	39.3	16.6	9	20.2	2.3	2.63	6.07	54	18
Aliphatics >C21-C35	14.2	15.6	37.3	5.21	35.4	82.3	83.9	35.1	73.3	23.5	22.2	21.8	74.5	37.3
Aliphatics >C35-C44	5.29	0.442	8.45	0.851	3.98	11.5	11.6	3.81	13.5	13.1	9.6	5.67	31.7	9.56
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0288	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.038	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.199	0.0718
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.156	0.131
Aromatics >EC12-EC16	0.1	1.92	2.5	0.351	10.5	25.4	1.85	1.27	1.69	1.39	1.38	0.804	9.78	9.26
Aromatics >EC16-EC21	1.66	5.61	7.81	1.82	29.1	66.5	10.4	6.38	10.2	8.98	9.5	7.3	36	100
Aromatics >EC21-EC35	21.5	25.2	31.4	5.54	66.4	172	47.3	22.7	42.2	60.6	63.1	37.2	76.7	265
Aromatics >EC35-EC44	6.01	0.119	11.2	0.772	17.9	44.4	13	3.77	11.6	37.9	31.4	9.83	43.6	78.1
Aromatics >EC40-EC44	1.98	1.54	4.13	0.165	5.56	14.3	4.39	1.3	4.36	16.5	12.7	3.57	20.2	26.8
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	12	44.4	72.8	48.8	12	840	42.1	41	23.6	60	120	24	1070	1670
Acenaphthene	8	8	11.5	10.2	8	8	8	11.4	30.5	198	192	126	143	118
Anthracene	16	24.3	99.7	68.9	771	4420	95.8	72.7	109	162	190	201	1050	2630
Benz(a)anthracene	14	19.9	309	201	1490	2650	205	171	241	1020	1350	862	1650	7490
Benzo(a)pyrene	15	15	255	232	1250	2280	205	164	198	1090	1250	685	1320	6940
Benzo(b)fluoranthene	28.3	30.3	501	366	2340	4340	470	334	439	1830	1920	789	2300	10400
Benzo(k)fluoranthene	14	14	173	120	841	1470	162	115	176	728	635	287	963	4430
Benzo(g,h,i)perylene	24	24	248	185	929	1620	202	140	187	736	987	457	765	4510
Chrysene	29.6	35.3	390	195	1550	2620	289	217	366	1320	1380	891	1730	7590
Dibenzo(a,h)anthracene	0.023	0.023	46.6	43	252	460	42.7	31	43.2	228	0.23	116	199	1250
Indeno(1,2,3-cd)pyrene	0.018	0.018	238	170	925	1550	145	113	138	637	673	329	743	4220
Fluoranthene	53.4	47.4	657	429	3920	5770	411	288	493	1910	2240	1320	4390	18600
Fluorene	10	32.6	52.4	32.2	284	339	29.3	20	31.9	133	147	93.3	899	750
Naphthalene	9	173	253	139	2850	3160	82.4	94.2	74.8	80	90	173	4510	1690
Phenanthrene	30.6	140	465	274	3860	4580	272	196	399	869	1090	965	3470	5540
Pyrene	0.0395	0.0339	0.461	0.31	2.65	4.14	0.322	0.22	0.412	1.41	1.68	1.21	3.48	13.7
PAH, Total Detected USEPA 16	0.181	0.581	4.23	2.82	23.9	40.2	2.98	2.23	3.36	12.4	13.7	8.51	28.7	91.6
Naphthalene-d8 % recovery**	91	93.4	91	100	102	101	91	90.1	92.9	93	91	104	85	90.3
Acenaphthene-d10 % recovery**	88.8	87.1	88	94.9	95.8	94.6	88.3	87.5	92	89.8	86	104	88.9	88.4
Phenanthrene-d10 % recovery**	92.3	91.7	92.5	102	103	91.9	83.8	85.8	92.4	87.5	93.1	108	98.5	91.7
Chrysene-d12 % recovery**	76.8	78	81.5	91.5	91	85.5	70.5	73.2	79.2	84.5	101	119	89.9	96.7
Perylene-d12 % recovery**	81.2	79	77.3	87.9	82.1	79.2	50.8	56.6	61.4	77.1	93.4	112	81.8	91.6
Total Aliphatics >C12-C44	21.7	36.4	53.4	8.43	58.4	151	113	48.4	110	39.6	35.1	34.7	172	68.5
Total Aromatics >EC12-EC44	29.2	32.8	52.8	8.48	124	308	72.5	34.1	65.7	109	105	55.1	166	453
Total Aliphatics & Aromatics >C5-C44	50.9	69.2	106	16.9	182	458	186	82.5	175	148	140	89.8	339	522
Metals - (Solid)														
Iron	22300	34600	31600	22900	5310	8250	335000	275000	277000	38800	85800	136000	70300	116000
Manganese	253	787	2310	748	2860	1180	10700	9730	29200	1430	8000	37200	10200	5640
Metals - (Liquid)														
Calcium	-	-	133000	27700	179000	-	-	-	-	-	-	-	-	-
Magnesium	-	-	22200	6550	31300	-	-	-	-	-	-	-	-	-
Phenols														
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.023	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	-	-	-	-	-	-	-	-
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	-	-	-	-	-	-	-	-
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	0.0525	0.0422	0.0411	-	-	0.108	-	-	0.08	-	-	0.0769
pH	6.55	8.44	8.86	8.43	8.96	8.18	8.2	8.49	12.2	8.22	8.51	12.7	10.9	9.92
Sulphate, Total														
Sulphur, Total	-	-	0.238	0.0885	0.412	-	-	0.0954	-	-	0.0927	-	-	0.103
Sulphate, Total potential	-	-	0.714	0.266	1.24	-	-	0.286	-	-	0.278	-	-	0.309
Sulphate, acid soluble (total)	-	-	0.515	0.113	0.574	-	-	0.115	-	-	0.117	-	-	0.131
Cyanide, Total	1	1	1	1	1	1	34.3	29.4	19.2	1	1	1	1	1
Exchangeable Ammonia as N	99	17.5	12	12	12	12	-	-	-	-	-	-	-	-
Asbestos														
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	17/04/2019	17/04/19	16/04/19	-	-	18/03/19	-	-	18/03/2019	-	-	18/03/19
Analysed By	-	-	Paul Poynton	Christian Hallam	Christian Hallam	-	-	Christian Hallam	-	-	Barbara Urbanek-Walsh	-	-	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected
Amosite (Brown) Asbestos	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected
Crocidolite (Blue) Asbestos	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected
Fibrous Anthophyllite	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected
Fibrous Tremolite	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected
Fibrous Actinolite	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected
Non-Asbestos Fibre	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected
Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	110	103	100	102	83.6	109	98.1	103	99.3	89	95.4	102	77	102
Toluene-d8**	98.9	98.6	93.5	98.4	85.7	99.4	99.2	99.8	100	90.9	95.2	100	91.6	96.9
4-Bromofluorobenzene**	90	97.4	84.5	88.6	70.1	99.1	84.3	90.2	89.4	72.1	78	94.8	70.6	81.2
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.18	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.14	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.08	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.26	2.6	0.13	0.13	0.13	0.13	0.13	0.13	1.14	0.462
Sum of BTEX	0.4	0.4	0.4	0.4	0.8	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4AC1V	4AC2V	4AC6V	4AD1	4AD1	4AD2	4AD5	4AD5	4AD5	4AD1V	4AD2V	4AE1	4AE1	4AE2	4AE1V	4AE2V
Depth	1.7	1.3	2.6	0.5	1	0.5	0.5	1.2	2	2	0.8	0.5	1	0.5	1.7	0.8
Sampled Date	02/04/2019	03/04/2019	11/03/2019	02/04/2019	02/04/2019	03/04/2019	11/03/2019	11/03/2019	11/03/2019	02/04/2019	03/04/2019	02/04/2019	02/04/2019	03/04/2019	02/04/2019	03/04/2019
Carbon																
Soil Organic Matter (SOM)	5.47	0.726	3.72	2.91	5.5	38.1	16.8	46.2	9.55	0.522	0.865	5.45	26.5	18.1	7.1	0.717
Metals (Solids)																
Arsenic	14.2	7.45	10	5.32	11.1	6.8	10.4	8.8	6	13.2	10.7	6.6	18.7	11.4	16.2	10.6
Cadmium	0.384	0.159	0.193	0.338	0.18	0.281	1.29	0.773	0.375	0.21	0.119	0.859	0.623	0.304	0.55	0.171
Chromium	37.2	24.9	41.9	6.21	9.8	29.8	69.2	136	1140	39.3	40.6	57.9	5.57	22.2	41.2	30.9
Copper	19.1	8.24	24.1	14.4	29.7	16.1	39.4	34.9	14	18.1	18.3	14	31.6	17.7	24.4	12.7
Lead	31.5	19.1	23	12.7	25.5	26.3	177	83.6	31.2	20.4	18.7	42.8	61.5	29.3	37.6	26.9
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14
Nickel	33	31.2	39.9	13.9	27.8	11.8	25.4	16.3	6.78	35.6	40.4	11.6	36.8	24.9	28.5	38.8
Selenium	1.32	1	2.05	1.81	2.21	3.4	3.53	4.42	21.9	1.2	1.33	10	1.68	2.15	1.65	1
Vanadium	58.2	44	62.2	34.8	29.3	36.6	83.5	116	748	61.3	62.5	54.1	51.2	43.4	75.2	54.3
Zinc	124	85.9	110	61.5	68.5	247	695	326	45.7	111	118	144	71.5	103	120	110
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0.0342	0.0309	0.025	0.02	0.02	0.0286	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.0403	0.025	0.022	0.02	0.02	0.0201	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.0403	0.02	0.022	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.1	0.115	0.1	1.64	0.1	17.2	5.37	1.64	0.512	0.1	0.1	1.91	1.11	3.28	0.1	0.1
Aliphatics >C16-C21	0.1	0.1	0.1	3.9	0.1	33.7	12.1	29.3	7.63	0.1	0.1	8.6	2.16	40.7	0.1	0.1
Aliphatics >C21-C35	4.18	0.221	0.1	19.8	0.1	91.3	38.1	32.2	11.7	2.51	0.1	67.5	8.77	40.8	3.83	0.1
Aliphatics >C35-C44	0.1	0.1	0.1	5.37	0.1	16.2	12.8	9.56	3.41	0.209	0.1	15.4	1.42	1.42	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.0268	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.0268	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	0.1	0.1	0.1	2.21	0.1	14.8	4.87	2.93	0.852	1.47	0.1	2.97	0.881	6.13	0.1	0.1
Aromatics >EC16-EC21	0.1	0.1	0.1	6.04	0.1	63.6	16.2	19.1	11.1	3.02	0.1	17	3.79	24.5	0.1	0.1
Aromatics >EC21-EC35	9.16	1.2	4.29	21	5.57	165	74.2	64.8	54.1	18.1	0.1	71	12.1	49.3	21.2	0.1
Aromatics >EC35-EC44	2.06	0.173	0.1	8.05	0.1	42.6	34.5	26.8	17.8	5	0.1	26.9	2.84	10.7	3.72	0.1
Aromatics >EC40-EC44	0.1	0.156	0.1	3.12	0.1	12.6	13.6	10.9	5.88	1.41	0.1	9.12	0.801	3.49	0.545	0.1
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	12	79.8	75.6	12	1270	218	42.1	43.7	12	12	179	16.3	246	12	12
Acenaphthene	8	8	8	8	8	57.7	233	26.3	54.5	8	8	35.5	8	32.3	8	8
Anthracene	16	16	88.6	146	16	1130	438	154	206	16	16	319	16	336	16	16
Benz(a)anthracene	31.3	14	253	379	14	3070	1960	442	802	45	14	1000	77.9	426	37.4	14
Benzo(a)pyrene	33.1	15	200	344	24.5	2580	2080	433	839	47.6	15	877	65.4	377	39.7	15
Benzo(b)fluoranthene	61.5	15	316	604	35.6	4940	3280	722	1360	85.5	15	1440	127	624	70.8	15
Benzo(k)fluoranthene	21.7	14	111	198	14	1620	1460	275	491	31.5	14	585	41.6	242	14	14
Benzo(g,h,i)perylene	33.2	24	127	240	24	2260	1380	309	661	70.2	24	618	49	286	42	24
Chrysene	32.9	10	206	441	32.4	3070	2220	513	837	52.8	10	982	87.1	477	38.5	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	60.4	0.023	488	297	89	154	0.023	0.023	124	0.023	67.2	0.023	0.023
Indeno(1,2,3-cd)pyrene	23.5	0.018	117	225	0.018	2440	1190	250	529	29.4	0.018	559	42.9	256	34.2	0.018
Fluoranthene	74.7	0.017	534	821	31.9	7490	3510	677	1150	109	0.017	2150	160	1290	96.2	0.017
Fluorene	10	10	25.2	10	10	353	233	45.5	72.8	10	10	156	10	212	10	10
Naphthalene	9	9	106	243	22.4	4790	359	245	62.5	16.1	9	28.9	27.3	974	9	9
Phenanthrene	46.1	15	194	545	63.3	5680	1640	519	598	61.3	15	1180	141	1270	49.5	15
Pyrene	0.0591	0.015	0.372	0.596	0.0246	5.12	2.76	0.523	0.877	0.0822	0.015	1.63	0.112	0.946	0.0735	0.015
PAH, Total Detected USEPA 16	0.417	0.118	2.73	4.92	0.235	46.3	23.2	5.27	8.73	0.631	0.118	11.9	0.947	8.06	0.482	0.118
Naphthalene-d8 % recovery**	104	102	93.5	102	103	85.4	94.8	86.9	89.7	105	89.8	103	99.5	100	93	93.7
Acenaphthene-d10 % recovery**	98.7	95.3	89.9	96.8	96.4	87.1	92.8	87.7	87.7	99	87	96.4	93.5	94	91.9	87.7
Phenanthrene-d10 % recovery**	104	106	90.4	101	103	93	89.3	89.5	90.9	109	85.6	97.6	97.6	103	97.8	91.1
Chrysene-d12 % recovery**	94.5	100	83.8	98.4	90.3	89.5	89.9	80.7	91.1	108	70.5	93.4	86.5	96.2	87.3	78.3
Perylene-d12 % recovery**	100	101	81.9	93.7	87.9	75.8	83.9	78.5	85.9	104	73.8	94.5	73.8	93.4	100	82.7
Total Aliphatics >C12-C44	4.18	0.335	0.1	30.7	0.1	158	68.5	72.8	23.2	2.72	0.1	93.4	13.5	86.2	3.83	0.1
Total Aromatics >EC12-EC44	11.2	1.37	4.29	37.3	5.57	286	130	114	83.8	27.6	0.1	118	19.6	90.7	25	0.1
Total Aliphatics & Aromatics >C5-C44	15.4	1.7	4.29	68.1	5.57	444	198	186	107	30.3	0.1	211	33.1	177	28.8	0.1
Metals - (Solid)																
Iron	30300	27100	30200	39500	22700	24800	66600	49600	173000	32200	35100	71500	41700	15800	22400	33000
Manganese	357	846	409	2370	1230	2720	4670	5580	36200	375	524	2470	1670	482	400	635
Metals - (Liquid)																
Calcium	-	-	-	-	37600	140000	-	-	-	-	-	180000	-	77700	-	-
Magnesium	-	-	-	-	11300	18300	-	-	-	-	-	44900	-	7260	-	-
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0106	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	-	0.01	0.01	0.01	-	-	-	0.01	0.01	0.0212	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	-	0.015	0.015	0.015	-	-	-	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	-	0.035	0.035	0.035	-	-	-	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	0.0968	0.157	0.048	-	0.0172	-	-	0.0549	-	0.0523	-	-
pH	6.71	8.1	7.43	9.35	8.61	8.84	8.98	11.8	12.8	6.8	7.61	10	8.48	8.13	6.17	8.11
Sulphate, Total																
Sulphur, Total	-	-	-	-	0.105	0.34	0.0947	-	0.218	-	-	0.129	-	0.118	-	-
Sulphate, Total potential	-	-	-	-	0.315	1.02	0.284	-	0.654	-	-	0.387	-	0.354	-	-
Sulphate, acid soluble (total)	-	-	-	-	0.198	0.283	0.0869	-	0.259	-	-	0.197	-	0.0969	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	75.7	20.1	-	12	12	12	-	-	-	78.8	12	12	12	12	98.1	12
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	16/04/2019	16/04/2019	18/03/2019	-	18/03/19	-	-	17/04/19	-	16/04/2019	-	-
Analysed By	-	-	-	-	Paul Poynton	Paul Poynton	Barbara Urbanek-Walsh	-	Christian Hallam	-	-	Christian Hallam	-	Paul Poynton	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	N/C	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Amosite (Brown) Asbestos	-	-	-	-	Not Detected	Not Detected	Trace	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Fibrous Anthophyllite	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Fibrous Tremolite	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Fibrous Actinolite	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Non-Asbestos Fibre	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Comments	-	-	-	-	-	-	Loose fibres in soil.	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	115	105	104	104	107	81.7	94.6	106	97.2	110	105	101	109	100	105	103
Toluene-d8**	97.4	96.8	101	97.8	99	90.3	94.1	99.7	97.8	97.7	102	94.8	94.2	94.7	98.2	100
4-Bromofluorobenzene**	94.7	103	95.3	91.7	95.3	76.4	75.7	90.4	85.8	97.5	101	86	84.5	75.4	95.8	98.7
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	-	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	-	0.09	0.09	0.09	0.09	0.18	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	-	0.07	0.07	0.07	0.07	0.14	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	-	0.04	0.04	0.04	0.04	0.08	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	-	0.1	0.1	0.1	0.1	0.2	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	-	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Naphthalene	0.13	0.13	-	0.13	0.13	2.56	0.13	0.13	-	0.13	0.13	0.13	0.13	0.26	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	-	0.4	0.4	0.4	0.4	0.8	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4AF1	4AF1	4AF1	4AF2	4AF2	4AF1V	4AF2V	4AG1	4AG1	4AG1	4AG2	4AG2	4AG1V	4AG2V	4AH1	4AH1	4AH1	4AH10	4AH10	4AH2
Depth	0.4	1	1.5	0.5	1.2	2.1	1.6	0.5	1.1	1.4	0.5	1	1.5	1.6	0.5	0.8	1.1	0.5	1	0.5
Sampled Date	02/04/2019	02/04/2019	02/04/2019	03/04/2019	03/04/2019	02/04/2019	03/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	10/04/2019	10/04/2019	02/04/2019
Carbon																				
Soil Organic Matter (SOM)	4.83	34.1	3.17	14.7	6.79	0.957	0.991	3.14	5.28	4.4	8.45	8.91	8.41	1.15	9.72	49.5	1.62	9.67	0.557	19
Metals (Solids)																				
Arsenic	11.8	7.68	7.03	2.72	8.54	12.8	12.1	11.3	8.18	8.25	6.04	11	19.1	13.6	4.11	5.92	7.01	6	11.2	7.85
Cadmium	1.99	0.911	0.342	0.0919	0.285	0.122	0.155	1.87	0.676	1.03	0.824	0.415	0.598	0.116	0.242	0.0625	0.153	0.205	0.02	0.608
Chromium	69.4	94	84.8	60.6	11.8	36.7	41.5	94.2	17.2	15.4	465	66.4	43.7	40.8	25.2	130	10.8	311	1050	31.2
Copper	18.6	14	10.9	5.83	11.5	17.5	15.4	14	13.7	14.4	14	19.1	22	15.8	6.5	11	9.01	22.5	13.7	16.4
Lead	98.2	53.4	19	4.9	21.4	19.2	22	33.9	43.5	46.4	15.7	78.9	37.3	23.2	20.5	16	16	34.6	11	57.6
Mercury	1.4	1.4	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14
Nickel	32.2	12.1	14.8	6.16	11.8	36.3	39.8	25.5	15.9	14.8	15.6	20.2	28.3	39.1	5.22	6.59	18.9	8.72	6.97	14.9
Selenium	10	10	2.97	4.02	1.53	1.09	1	10	2.23	2.52	10	3.87	1.56	1.26	3.47	4.08	2.26	10	17.7	4.96
Vanadium	122	103	105	77.8	25.9	53.7	67.2	149	42.3	41.6	281	141	82	66.6	30.6	217	31.6	268	617	36.7
Zinc	334	115	82	50.7	66.5	106	124	111	70.3	65	137	328	137	119	95.3	78.8	67	190	36.9	289
TPH Criteria Working Group (TPH CWG)																				
Benzene																				
Toluene																				
Ethylbenzene																				
sum of detected mpo xylene by GC																				
Aliphatics >C5-C6	0.02	0.0319	0.0291	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.191	0.0614	0.02	0.02	0.02	0.02	0.02	0.02	0.0459	0.02	0.02	0.02	0.02	0.02	0.0289	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.177	0.0701	0.02	0.02	0.0203	0.02	0.02	0.02	0.109	0.02	0.02	0.02	0.02	0.02	0.0233	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.253	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.188	0.02	0.02	0.02	0.02	0.02	0.0377	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	1.07	35.4	3.85	12.6	4.3	0.321	0.1	2.2	2.66	1.79	2.46	1.47	0.1	0.1	5.38	24.2	0.432	5.36	1.88	6.38
Aliphatics >C16-C21	6.56	253	33.4	29	15.4	0.163	0.1	12.3	9.3	4.34	9.22	6.21	0.1	0.1	24.6	90.1	1.2	18.2	6.06	28.9
Aliphatics >C21-C35	62.2	482	62	66	39.8	1.04	0.446	78.4	37.6	16.2	31.5	38.9	6.48	0.1	59.6	203	7.36	82.1	26.7	53.7
Aliphatics >C35-C44	21.2	52.1	8.53	8.9	9.33	0.156	0.172	21.7	6.4	3.09	6.47	20.4	0.1	0.1	8.79	25.7	1.4	25.9	9.16	5.05
Aromatics >EC5-EC7	0.02	0.072	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.046	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.118	0.0464	0.02	0.02	0.02	0.02	0.02	0.02	0.0717	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.169	0.0668	0.02	0.02	0.02	0.02	0.02	0.02	0.125	0.02	0.02	0.02	0.02	0.02	0.0255	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	2.37	70	7.5	14.7	6.44	0.1	0.929	4.15	3.12	0.976	4.25	2.19	0.1	0.1	12.1	58	2.18	9.71	0.386	16.2
Aromatics >EC16-EC21	7.8	253	34.6	45.2	17.7	0.151	1.65	15.9	11.5	3.26	18.1	9.91	1.29	0.1	53.3	291	5.72	58.2	6.47	52.2
Aromatics >EC21-EC35	47.7	506	79.7	120	43.5	3.84	4.54	62.7	38.1	10.4	58	53	22.3	0.1	136	679	14.7	202	56.5	225
Aromatics >EC35-EC44	31.2	119	24.8	37.1	14.7	0.577	0.954	33.3	14.4	2.37	17.9	39.7	4.02	0.1	40.1	178	4.51	65.3	25	64.4
Aromatics >EC40-EC44	12.9	38.4	7.99	11.9	4.98	0.1	0.199	13.5	5.3	0.696	5.43	16.6	1.17	0.1	12.1	50	1.36	22.1	9.66	19.4
Polyaromatic Hydrocarbons (PAHs)																				
Acenaphthylene	153	4700	545	455	99.8	12	12	324	410	42.5	304	113	12	12	1050	8580	35.9	1250	60	1830
Acenaphthene	44.5	682	8	39.1	85	8	8	34.2	48.8	11.5	82.6	11.3	8	8	137	1840	8	227	40	702
Anthracene	268	5760	653	448	143	16	16	426	884	59.8	537	109	16	16	1900	22600	84.4	2470	80	1540
Benz(a)anthracene	759	7250	1040	1310	180	14	14	1370	1550	182	1280	432	28.5	14	3230	42600	169	6590	857	6640
Benzo(a)pyrene	725	6780	1080	1120	162	15	15	1290	1440	170	1210	414	25.9	15	3130	41800	154	7480	1230	17100
Benzo(b)fluoranthene	1280	12000	1750	2280	314	15	15	2210	2300	297	2070	675	58.5	15	5610	63100	264	11000	1680	22600
Benzo(k)fluoranthene	505	3550	771	695	95.1	14	14	778	780	117	737	212	21	14	1890	23100	84.3	3910	698	7760
Benzo(g,h,i)perylene	578	5220	871	1010	137	24	24	1110	1100	122	905	321	32.4	24	2400	28800	125	5400	978	12700
Chrysene	722	7430	848	1490	254	10	10	1390	1360	183	1310	456	34.7	10	2610	37300	156	6510	1110	18900
Dibenzo(a,h)anthracene	117	1020	177	224	0.023	0.023	0.023	207	225	32.5	230	59.2	0.023	0.023	563	6680	28.3	267	183	3520
Indeno(1,2,3-cd)pyrene	536	5810	761	1160	155	0.018	0.018	964	1230	115	876	340	0.018	0.018	2130	25600	107	4540	738	14800
Fluoranthene	1460	23700	2720	3270	441	0.017	0.017	2710	3920	362	2760	892	67.9	0.017	7360	104000	361	12400	953	7560
Fluorene	126	3650	433	178	135	10	10	186	271	36.2	176	44.2	10	10	563	5120	27.7	927	50	731
Naphthalene	550	24400	3000	1100	610	9	9	681	1200	182	1180	174	9	9	2990	10900	120	3370	45	7160
Phenanthrene	920	21700	2400	2300	718	15	15	1500	2190	278	2000	410	39.6	15	5340	39900	268	7820	240	4780
Pyrene	1.18	15.9	1.89	2.2	0.29	0.015	0.015	1.95	2.76	0.261	2.04	0.65	0.053	0.015	5.28	73.8	0.276	10.2	1.06	9.95
PAH, Total Detected USEPA 16	9.93	150	19	19.3	3.82	0.118	0.118	17.1	21.7	2.45	17.7	5.31	0.362	0.118	46.2	536	2.26	84.4	9.73	138
Naphthalene-d8 % recovery**	100	100	103	93.5	96	98.8	91	90.3	90	73.6	97.1	91.5	87.8	101	100	91.5	102	101	84.2	96.9
Acenaphthene-d10 % recovery**	95.8	96.9	97.6	89.7	89.3	92.7	85.6	91.9	87.5	68.9	92.4	85.7	0	95	96.3	79.7	95.8	86.1	72.6	89.9
Phenanthrene-d10 % recovery**	105	101	94.4	98.3	92.1	103	86.8	110	97.2	70.4	97.9	90	95.8	105	102	85.8	104	105	79.7	96.3
Chrysene-d12 % recovery**	93.3	84.1	90.3	94.6	70.6	104	71.5	104	95.1	73	86.1	79.2	91.3	95.7	91.6	90.3	91.7	85.2	82.3	90.4
Perylene-d12 % recovery**	89.3	70.9	91.5	91.3	70.1	99.8	72.5	109	93.7	70.3	86.3	80.6	86.9	97.1	87.4	83.9	90.2	82.9	79	83.1
Total Aliphatics >C12-C44	91	823	108	116	68.9	1.68	0.618	115	56	25.4	49.7	66.9	6.48	0.1	98.4	343	10.4	132	43.8	94
Total Aromatics >EC12-EC44	89	947	147	216	82.3	4.57	8.07	116	67.1	17.1	98.3	105	27.6	0.1	242	1210	27.1	335	88.4	358
Total Aliphatics & Aromatics >C5-C44	180	1770	255	333	151	6.26	8.69	231	123	43	148	172	34.1	0.1	340	1550	37.5	467	132	452
Metals - (Solid)																				
Iron	157000	84300	54600	23600	17400	28000	40200	212000	22500	21600	93000	48400	29400	35000	33800	51600	34500	67500	159000	29500
Manganese	6120	9550	5650	4470	1310	316	620	8850	1900	1920	15200	4420	376	504	3800	6930	1670	20000	35300	6970
Metals - (Liquid)																				
Calcium	79200	187000	129000	191000	-	-	-	67700	83400	-	-	96100	-	-	190000	-	49800	-	205000	102000
Magnesium	11800	13300	14300	27400	-	-	-	6560	10100	-	-	16000	-	-	33500	-	6780	-	8000	10800
Phenols																				
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0435	0.01	0.01
Cresols	0.01	0.0826	0.0108	0.025	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0137
Xylenols	0.015	0.0354	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.118	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0435	0.035	0.035
Inorganics																				
Soluble Sulphate 2:1 extract as SO4 BRE	0.0838	0.149	0.0757	0.0721	-	-	-	0.0302	0.122	-	-	0.189	-	-	0.179	-	0.0711	-	0.0845	0.0426
pH	9.38	9.15	9.7	8.51	8.63	7.72	8.1	10.4	9.41	9.5	8.99	8.31	7.32	8.06	9.78	6.68	9.02	12.1	12.2	8.13
Sulphate, Total																				
Sulphur, Total	0.135	0.277	0.141	0.226	-	-	-	0.0889	0.235	-	-	0.174	-	-	0.368	-	0.141	-	0.266	0.333
Sulphate, Total potential	0.405	0.831	0.423	0.678	-	-	-	0.267	0.705	-	-	0.522	-	-	1.1	-	0.423	-	0.798	0.999
Sulphate, acid soluble (total)	0.131	0.295	0.232	0.197	-	-	-	0.0992	0.657	-	-	0.175	-	-	0.78	-	0.77	-	0.384	0.125
Cyanide, Total	1	4.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.55	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	110	12	12	12	12	12	12	238	21.4	12	12	12	12	12	12
Asbestos																				
Asbestos Quantification - Gravimetric - %	0.0382	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	17/04/19	16/04/19	16/04/19	16/04/19	-	-	-	17/04/19	17/04/19	-	-	17/04/19	-	-	17/04/19	-	16/04/2019	-	25/04/19	16/04/19
Analysed By	Christian Hallam	Christian Hallam	Christian Hallam	Christian Hallam	-	-	-	Christian Hallam	Christian Hallam	-	-	Christian Hallam	-	-	Christian Hallam	-	Paul Poynton	-	Christian Hallam	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	N/C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	0.0384	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Comments	Soil containing material typical of asbestos gasket.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																				
Dibromofluoromethane**	101	83.8	86.1	98.9	97.4	104	103	100	94.6	105	89.1	101	107	105	75.4	86	105	90.9	106	95.7
Toluene-d8**	94.8	87.2	92.5	87.5	97.2	99	98.8	93.2	95.1	97.9	86.7	96.2	97.5	98.5	89.8	88.3	98.7	88.9	98.5	93.4
4-Bromofluorobenzene**	88.2	70.6	77.2	71.8	80.7	96.9	104	84.1	81.5	91.3	71.6	89.6	94	98.3	70.5	73.2	96.2	77.9	101	81.9
Methyl Tertiary Butyl Ether	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.18	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.14	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.08	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.26	0.532	0.26	0.13	0.13	0.13	0.13	0.198	0.13	0.13	0.13	0.13	0.13	0.23	0.666	0.13	0.449	0.13	0.13
Sum of BTEX	0.4	0.8	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																				
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	4AH2	4AH3	4AH3	4AH3	4AH3	4AH4	4AH4	4AH4
Depth	1	0.4	0.9	1.5	2.5	0.4	1	1.7
Sampled Date	02/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019
Carbon								
Soil Organic Matter (SOM)	9.17	14.2	32.9	20	12.9	16.9	22.6	6.52
Metals (Solids)								
Arsenic	9.55	14.1	6	6	6	6	6	6
Cadmium	0.229	1.88	0.2	0.619	0.2	0.665	0.2	0.532
Chromium	111	474	379	276	478	358	3090	849
Copper	17	41.6	32.2	14	16.6	14	15.3	14
Lead	19.8	31.8	33.6	25.2	17.1	13.4	7	25.4
Mercury	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Nickel	22.1	42.7	16.7	8.84	12.3	4.01	2	2
Selenium	2.35	11	10	10	10	10	10	16.9
Vanadium	81.4	598	467	272	313	344	549	773
Zinc	96.6	98.9	129	101	76.7	51.2	19	35.7
TPH Criteria Working Group (TPH CWG)								
Benzene								
Toluene								
Ethylbenzene								
sum of detected mpo xylene by GC								
Aliphatics >C5-C6	0.02	0.0216	0.0297	0.0233	0.0332	0.0146	0.0354	0.0439
Aliphatics >C6-C8	0.02	0.0625	0.0912	0.0741	0.154	0.0502	0.139	0.0541
Aliphatics >C8-C10	0.02	0.0388	0.0692	0.0476	1.63	0.0377	0.0612	0.0316
Aliphatics >C10-C12	0.02	0.0377	0.0802	0.0434	19.3	0.045	0.0569	0.0214
Aliphatics >C12-C16	0.1	5.43	11.4	5.32	43.2	10.1	13.9	4.04
Aliphatics >C16-C21	3.43	38.9	113	36.9	236	41.7	29.9	10.6
Aliphatics >C21-C35	16.3	127	122	59.4	33.6	95.6	167	38.3
Aliphatics >C35-C44	2.25	106	24.8	11.3	7.28	10.9	25.4	4.52
Aromatics >EC5-EC7	0.02	0.01	0.01	0.01	0.119	0.01	0.01	0.01
Aromatics >EC7-EC8	0.02	0.0119	0.0231	0.018	0.0271	0.01	0.0225	0.0245
Aromatics >EC8-EC10	0.02	0.0259	0.0462	0.0317	1.09	0.0251	0.0408	0.0214
Aromatics >EC10-EC12	0.02	0.0248	0.0539	0.0296	12.9	0.0303	0.0376	0.0143
Aromatics >EC12-EC16	1.8	13.3	33.7	12.3	280	13.4	14.9	7.07
Aromatics >EC16-EC21	7.8	88.3	391	74.1	773	61.4	38	20.9
Aromatics >EC21-EC35	41.1	267	994	200	773	119	95.8	48.4
Aromatics >EC35-EC44	12.4	161	250	58.3	219	32	29.6	13.8
Aromatics >EC40-EC44	3.69	68	81.7	19.5	77.5	11	10.7	4.66
Polyaromatic Hydrocarbons (PAHs)								
Acenaphthylene	104	1050	8090	2420	5240	1700	426	85.4
Acenaphthene	21.9	90.3	757	194	40600	89.9	41	52.4
Anthracene	115	1710	19100	4250	28300	4960	799	373
Benz(a)anthracene	584	5650	23600	9450	56000	7990	1470	754
Benzo(a)pyrene	637	4990	13600	8200	42600	5590	1010	610
Benzo(b)fluoranthene	1030	8200	24800	13500	65000	10000	2040	1030
Benzo(k)fluoranthene	312	3080	9580	5420	19600	3130	608	354
Benzo(g,h,i)perylene	586	3410	8560	5920	26300	3630	634	460
Chrysene	658	5750	21700	9300	42400	7380	1590	718
Dibenzo(a,h)anthracene	125	826	2540	1540	7370	793	185	132
Indeno(1,2,3-cd)pyrene	556	3600	10500	5090	24600	3760	570	480
Fluoranthene	903	10500	74400	21200	97300	23600	4640	1520
Fluorene	45.2	471	7220	1210	35200	1260	252	145
Naphthalene	284	1560	2750	4570	98800	3370	1730	517
Phenanthrene	460	4740	72000	10900	84500	18500	4330	1440
Pyrene	0.655	8.53	48.8	15.9	69.3	16.1	3.22	1.06
PAH, Total Detected USEPA 16	7.08	64.1	348	119	743	112	23.5	9.73
Naphthalene-d8 % recovery**	90.9	95.9	9.95	104	97.8	102	94.2	87.7
Acenaphthene-d10 % recovery**	90.2	94.8	9.98	96.5	106	100	90.3	91.2
Phenanthrene-d10 % recovery**	105	96.7	11.1	100	107	99.6	94.3	106
Chrysene-d12 % recovery**	104	91.6	9.12	84.7	85.2	87.7	89.8	105
Perylene-d12 % recovery**	107	94.8	6.13	82.4	89.2	85.9	80.4	95.7
Total Aliphatics >C12-C44	22	278	272	113	320	158	237	57.4
Total Aromatics >EC12-EC44	63.1	530	1670	345	2040	225	178	90.2
Total Aliphatics & Aromatics >C5-C44	85.1	807	1940	458	2400	384	415	148
Metals - (Solid)								
Iron	29200	245000	138000	75400	95800	137000	205000	158000
Manganese	2860	24200	23800	13100	26700	19000	38800	35100
Metals - (Liquid)								
Calcium	-	142000	-	171000	-	192000	-	244000
Magnesium	-	10700	-	24700	-	34000	-	14900
Phenols								
Phenol	0.01	0.01	0.011	0.0212	0.01	0.0314	0.0322	0.0102
Cresols	0.01	0.01	0.011	0.01	0.01	0.0105	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.0369	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.0418	0.035	0.035
Inorganics								
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.0928	-	0.0227	-	0.006	-	0.015
pH	7.75	11.5	11.7	11.5	10.8	12.5	12.5	12.7
Sulphate, Total								
Sulphur, Total	-	0.247	-	0.273	-	0.148	-	0.234
Sulphate, Total potential	-	0.741	-	0.819	-	0.444	-	0.702
Sulphate, acid soluble (total)	-	0.225	-	0.327	-	0.163	-	0.226
Cyanide, Total	1	1.05	11.3	1	1	1	1	1
Exchangeable Ammonia as N	15.7	12	12	12	12	12	12	12
Asbestos								
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	0.001	-	-
Date of Analysis	-	24/04/2019	-	24/04/2019	-	24/04/2019	-	24/04/2019
Analysed By	-	James Richards	-	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	0.001	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	None	-	-
Analysts Comments	-	-	-	-	-	N/A	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	0.001	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	-	Not Detected	-	Not Detected	-	Trace	-	Not Detected
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Tremolite	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Actinolite	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	-	Not Detected	-	Detected
Comments	-	-	-	-	-	Loose fibres in soil.	-	-
Volatile Organic Compounds (VOCs)								
Dibromofluoromethane**	101	87.3	91.6	94.5	103	88.7	106	87
Toluene-d8**	95.4	82.2	87.6	90.9	95.8	82.2	96.7	84.7
4-Bromofluorobenzene**	86.6	71.2	74.6	79.5	89.7	71.6	97.6	71.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1
Benzene	0.09	0.09	0.09	0.09	0.172	0.09	1.8	0.116
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	1.4	0.158
Ethylbenzene	0.04	0.04	0.04	0.04	0.259	0.04	0.8	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.629	0.1	2	0.187
o-Xylene	0.1	0.1	0.1	0.1	0.232	0.1	2	0.1
Naphthalene	0.13	0.305	0.527	0.283	167	0.13	2.6	0.235
Sum of BTEX	0.4	0.4	0.4	0.4	1.29	0.4	8	0.461
Subcontracted: Inorganics								
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-

Sample ID	4AH5	4AH5	4AH5	4AH6	4AH6	4AH7	4AH7	4AH7	4AH8	4AH8	4AH8	4AH9	4AH9
Depth	0.4	1	1.4	0.3	0.8	0.5	1	1.5	0.5	0.8	1.4	0.5	1
Sampled Date	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019
Carbon													
Soil Organic Matter (SOM)	47.6	30.9	29.5	33.6	9.17	25.7	3.02	13.1	6.5	8.03	14.9	0.379	0.593
Metals (Solids)													
Arsenic	6	2.93	6	6	6	6	6	6	3.41	1.43	6	7.74	6.95
Cadmium	0.757	0.26	0.257	0.624	0.2	0.47	0.2	0.626	0.245	0.02	0.2	0.2	1.13
Chromium	698	250	291	570	691	342	816	829	146	13.3	217	820	915
Copper	14	6.87	14	79	21.4	14	24.3	15.3	10.5	1.4	14.8	43.1	24.8
Lead	21.6	7.91	21.2	17.5	7	12	7	14.5	23	0.7	22.3	21.1	22.4
Mercury	1.4	0.14	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	1.4	1.4	1.4
Nickel	5.19	3.8	2.73	7.18	6.46	8.83	2.49	5.9	8.38	1.65	5.53	12.3	15.1
Selenium	10	6.89	10	12.2	10.7	10	10	16.4	5.19	4.21	10	19	28.8
Vanadium	319	211	205	338	627	249	827	1250	144	39.1	196	730	694
Zinc	86.9	29.9	28.7	44.7	50.5	62.4	26.7	44.1	86.7	11	109	88.4	53.3
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.02	0.02	0.058	0.0322	0.02	0.01	0.0132	0.0256	0.111	0.132	0.04	0.02	0.02
Aliphatics >C6-C8	0.02	0.0913	0.241	0.0986	0.02	0.0217	0.0265	0.0738	0.551	0.449	0.0703	0.02	0.02
Aliphatics >C8-C10	0.02	0.108	0.469	0.0716	0.02	0.0134	0.0265	0.0472	1.66	0.208	0.0995	0.02	0.02
Aliphatics >C10-C12	0.02	1.56	1.36	0.0519	0.02	0.0124	0.0652	0.0451	4.93	0.199	0.293	0.02	0.02
Aliphatics >C12-C16	10.3	32.1	22.2	9.96	9.82	12.1	20.1	7.28	33.3	12	15.3	0.1	0.469
Aliphatics >C16-C21	28.8	575	508	19.6	81.8	18.9	1160	30.5	61.6	42.6	41.3	3.37	2.88
Aliphatics >C21-C35	79.3	169	131	107	221	61.5	216	138	261	176	254	21.8	22.6
Aliphatics >C35-C44	12.1	16.3	8.42	12.1	56.5	4.41	16	37.9	409	106	296	5.85	9.02
Aromatics >EC5-EC7	0.02	0.02	0.0736	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.0963	0.0228	0.02	0.01	0.01	0.0246	0.146	0.168	0.0324	0.02	0.02
Aromatics >EC8-EC10	0.02	0.072	0.313	0.0477	0.02	0.01	0.0173	0.0308	1.11	0.139	0.0659	0.02	0.02
Aromatics >EC10-EC12	0.02	1.04	0.907	0.0353	0.02	0.01	0.0438	0.0308	3.29	0.132	0.196	0.02	0.02
Aromatics >EC12-EC16	39.7	585	200	9.55	8.64	18.9	15.2	8.25	177	12.4	45.8	0.342	0.462
Aromatics >EC16-EC21	221	2590	1130	21.2	63	67.4	407	34.7	272	56	95	6	5.66
Aromatics >EC21-EC35	356	2530	1310	67.1	194	104	624	104	469	219	330	53.6	51
Aromatics >EC35-EC44	72.9	513	280	18.6	60.9	23.2	163	34.7	612	132	410	20.3	34.1
Aromatics >EC40-EC44	23	153	88.5	6.41	22.5	7.5	55.1	12.4	273	51.8	186	6.95	15.8
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	1840	60200	199000	48.2	12	2250	206	186	1330	60	335	60	60
Acenaphthene	509	5090	193000	10.4	141	243	414	188	6660	275	437	40	40
Anthracene	5590	87200	192000	80.7	307	3480	1020	482	4190	686	1050	80	103
Benz(a)anthracene	8850	124000	190000	328	2120	5040	4420	1450	2330	765	1720	1840	923
Benzo(a)pyrene	6110	65100	186000	221	1710	3430	5340	1440	1540	424	1490	2800	1310
Benzo(b)fluoranthene	11400	127000	189000	413	4370	5270	6780	1980	2580	808	2540	3860	1830
Benzo(k)fluoranthene	3580	51400	196000	129	1500	2210	2760	779	657	212	970	1040	754
Benzo(g,h,i)perylene	3690	43900	177000	184	1840	1860	2970	860	861	300	1070	2080	897
Chrysene	8670	114000	190000	370	3550	4750	4160	1490	2090	747	1850	1940	1190
Dibenzo(a,h)anthracene	914	10400	177000	46.7	455	516	673	183	0.23	0.115	0.23	343	125
Indeno(1,2,3-cd)pyrene	4010	58500	219000	142	1340	2310	2620	875	766	223	854	1680	960
Fluoranthene	24300	425000	202000	609	4320	14500	6910	2810	8380	3760	4700	0.085	1560
Fluorene	2330	43000	202000	44	72.1	1930	258	191	3810	104	364	50	50
Naphthalene	2950	13200	208000	259	194	3250	555	847	36300	668	8140	84	45
Phenanthrene	18200	566000	203000	577	3310	13300	5410	2370	17600	4990	5640	639	1540
Pyrene	17	252	208	0.495	3.28	9.54	6.2	2.45	7.1	2.5	3.45	2.35	1.42
PAH, Total Detected USEPA 16	120	2050	3130	3.95	28.5	73.9	50.7	18.6	96.3	16.5	34.6	18.7	12.6
Naphthalene-d8 % recovery**	96.9	98	9940	87.4	94.7	91.7	96	98.9	94.8	98.8	91.5	93.2	81.2
Acenaphthene-d10 % recovery**	97.3	100	9830	92.8	91.6	91	93	95.4	103	93.1	86.5	89.6	83
Phenanthrene-d10 % recovery**	95.4	99	9920	109	95.6	92.7	97.3	103	101	100	96.8	97.9	85.7
Chrysene-d12 % recovery**	89.2	90	9460	107	93.5	88.9	98	82.5	75.9	87.9	79.3	81.3	74.3
Perylene-d12 % recovery**	82.7	79	8930	95.9	94.3	81.3	97.2	74.7	65.7	84	74.4	83.7	77.5
Total Aliphatics >C12-C44	131	793	669	148	369	96.9	1410	213	765	337	606	31	35
Total Aromatics >EC12-EC44	690	6220	2910	116	326	214	1210	181	1530	419	881	80.2	91.2
Total Aliphatics & Aromatics >C5-C44	820	7010	3590	265	695	311	2620	395	2310	757	1490	111	126
Metals - (Solid)													
Iron	137000	59500	61800	115000	135000	83300	163000	165000	56900	7680	62800	163000	152000
Manganese	18900	26100	16400	24800	34300	15200	34900	32800	10400	6750	14700	51300	58400
Metals - (Liquid)													
Calcium	155000	-	162000	145000	-	98900	-	235000	118000	-	188000	381000	-
Magnesium	25200	-	18000	26200	-	15700	-	10900	15500	-	22100	6820	-
Phenols													
Phenol	0.01	0.107	0.05	0.0311	0.032	0.01	0.0102	0.0103	0.27	0.0113	0.0108	0.0417	0.0212
Cresols	0.01	0.322	0.124	0.01	0.0107	0.01	0.01	0.01	0.659	0.01	0.0108	0.01	0.01
Xylenols	0.015	0.075	0.075	0.015	0.015	0.015	0.015	0.015	0.713	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.43	0.124	0.035	0.0427	0.035	0.035	0.035	1.64	0.035	0.035	0.0417	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	0.0286	-	0.0212	0.0079	-	0.0066	-	0.0051	0.151	-	0.142	0.0074	-
pH	9.21	12.4	12.1	12.4	12.7	12.2	12.6	12.6	11.7	11.4	11.8	12.6	12.7
Sulphate, Total													
Sulphur, Total	0.13	-	0.524	0.232	-	0.178	-	0.222	0.367	-	0.613	0.0913	-
Sulphate, Total potential	0.39	-	1.57	0.696	-	0.534	-	0.666	1.1	-	1.84	0.274	-
Sulphate, acid soluble (total)	0.0866	-	0.918	0.346	-	0.222	-	0.218	0.688	-	1.19	0.244	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	12	12	12
Asbestos													
Asbestos Quantification - Gravimetric - %	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-
Date of Analysis	24/04/19	-	24/04/2019	24/04/19	-	24/04/2019	-	24/04/2019	25/04/19	-	26/04/19	25/04/19	-
Analysed By	Christian Hallam	-	James Richards	Andrzej Ferfecki	-	Lucy Caroe	-	Marcin Magdziarek	Christian Hallam	-	Christian Hallam	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-
Additional Asbestos Components (Using TM048)	None	-	-	-	-	-	-	-	-	-	-	None	-
Analysts Comments	N/A	-	-	-	-	-	-	-	-	-	-	N/C	-
Asbestos Quantification - Total - %	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-
Chrysotile (White) Asbestos	Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	-	Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Comments	Soil containing asbestos bitumen debris.	-	-	-	-	-	-	-	-	-	-	Fibre bundles in soil.	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	83.7	115	103	92.3	102	109	103	96.9	101	94.8	91.6	99.2	94.2
Toluene-d8**	85.2	87.9	92.9	90.9	94.1	98.4	92.9	91.1	97.2	91.6	88.1	99.5	99.6
4-Bromofluorobenzene**	78.2	79.3	88.3	77	90.6	101	91.1	79.6	99	78.8	72.6	102	97.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	2	0.2	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	1.8	0.18	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	1.4	0.262	0.0869	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.8	0.08	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	2	0.26	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	2	0.2	0.1	0.1	0.1
Naphthalene	0.194	20.5	9.5	0.13	0.13	2.6	0.13	0.13	81.2	0.377	5.98	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	8	0.8	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4AH1V	4AH2V	4AH4V	4AH5V	4AH6V	4AH7V	4AH8V	4AH9V	4AH10V
Depth	2	2.8	3.8	3.8	3.8	4	3.4	3.4	3.4
Sampled Date	02/04/2019	02/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	10/04/2019	10/04/2019	10/04/2019
Carbon									
Soil Organic Matter (SOM)	2.57	1.23	1.27	1.34	0.941	2.57	1.66	3.26	2.12
Metals (Solids)									
Arsenic	13	13.5	13.6	15.2	17.1	9.73	16.4	12.4	15.2
Cadmium	0.194	0.147	0.298	0.346	0.361	0.3	0.0712	0.265	0.125
Chromium	38	35.1	39.2	37.6	37.1	44.4	31.5	41.3	35
Copper	20.2	12.8	14.5	15.6	10.4	17.8	12.5	22.4	18.2
Lead	19.5	27.8	25.2	27.8	26.7	22.9	28	23.4	25.4
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	35	38	38.9	38.8	42.8	32.3	38.5	36	33.3
Selenium	1.61	1.02	1	1	1	1	1	1	1
Vanadium	60.2	57.2	58.1	60	65.4	64.3	57	62.8	59.5
Zinc	96.6	117	113	118	129	96.5	111	113	115
TPH Criteria Working Group (TPH CWG)									
Benzene									
Toluene									
Ethylbenzene									
sum of detected mpo xylene by GC									
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aliphatics >C12-C16	0.1	0.6	0.1	0.1	0.195	0.596	0.269	0.168	1.32
Aliphatics >C16-C21	0.1	0.813	0.1	0.68	0.246	2.68	0.1	0.1	0.66
Aliphatics >C21-C35	0.229	1.67	0.1	0.1	0.1	2.17	0.1	0.635	1.21
Aliphatics >C35-C44	0.1	0.281	0.1	0.1	0.1	0.1	0.644	0.198	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aromatics >EC12-EC16	1.03	0.1	0.339	0.174	0.166	0.532	0.1	0.257	0.171
Aromatics >EC16-EC21	1.04	0.1	0.276	0.635	0.347	1.91	0.185	0.203	0.1
Aromatics >EC21-EC35	9.63	2.37	1.57	1.61	2.11	3.58	3.12	5.3	3.03
Aromatics >EC35-EC44	3.26	0.661	0.1	0.1	0.1	0.295	3.5	0.332	0.1
Aromatics >EC40-EC44	0.974	0.132	0.1	0.1	0.1	0.1	1.82	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)									
Acenaphthylene	12	12	12	12	12	12	12	12	12
Acenaphthene	8	8	8	8	8	8	8	8	8
Anthracene	16	16	16	16	16	16	16	16	16
Benz(a)anthracene	18.1	14	39.3	50.5	14	20.1	14	14	14
Benzo(a)pyrene	15	15	25.7	28.7	15	15	15	15	15
Benzo(b)fluoranthene	27	15	39.4	54	15	15	15	15	22.5
Benzo(k)fluoranthene	14	14	14	19.4	14	14	14	14	14
Benzo(g,h,i)perylene	24	24	24	24	24	24	24	24	24
Chrysene	17.7	10	41.7	42.8	10	14.3	10	10	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	26.5	0.018	0.018	0.018	0.018	0.018
Fluoranthene	0.017	0.017	51	101	0.017	31.6	0.017	0.017	0.017
Fluorene	10	10	10	10	10	10	10	10	10
Naphthalene	13.1	9	33.1	9	9	9	9	9	9
Phenanthrene	15	15	37.6	83.5	15	30.2	15	15	15
Pyrene	0.0324	0.015	0.0379	0.0669	0.015	0.022	0.015	0.015	0.015
PAH, Total Detected USEPA 16	0.118	0.118	0.306	0.473	0.118	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	101	89	102	90.9	91.2	89.9	98.2	97.5	96.1
Acenaphthene-d10 % recovery**	96.6	86.9	96.8	93.1	93.2	94.4	92.1	94.7	91.8
Phenanthrene-d10 % recovery**	108	90.6	104	108	106	110	100	104	100
Chrysene-d12 % recovery**	103	79	95.1	114	110	115	89.2	92	84.2
Perylene-d12 % recovery**	96.6	82.7	94.6	110	108	112	86.9	91.5	83.7
Total Aliphatics >C12-C44	0.229	3.36	0.1	0.68	0.441	5.45	0.913	1	3.2
Total Aromatics >EC12-EC44	14.9	3.03	2.19	2.42	2.62	6.32	6.81	6.09	3.2
Total Aliphatics & Aromatics >C5-C44	15.2	6.39	2.19	3.1	3.07	11.8	7.72	7.09	6.4
Metals - (Solid)									
Iron	32000	33800	28200	37900	30800	27000	27400	27400	28500
Manganese	433	597	399	489	583	331	409	549	791
Metals - (Liquid)									
Calcium	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-
Phenols									
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics									
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-	-	-
pH	7.89	8.53	7.68	7.79	7.77	7.64	7.37	6.88	7.37
Sulphate, Total									
Sulphur, Total	-	-	-	-	-	-	-	-	-
Sulphate, Total potential	-	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	25.4	12	91.5	118	90.3	210	192	333	201
Asbestos									
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-	-
Analysed By	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	-
Comments	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)									
Dibromofluoromethane**	107	104	109	105	105	106	105	108	107
Toluene-d8**	96.9	99.2	96.8	97.5	95.6	97.2	98.8	97	97.9
4-Bromofluorobenzene**	96.9	99.7	99.1	95.9	98.2	99.7	99.3	102	98.7
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics									
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-

Sample ID	4AI1	4AI1	4AI1	4AI1V	4AJ1	4AJ1	4AJ1V	4AL1	4AL1
Depth	0.4	1	1.5	2.5	0.5	1.2	2.2	0.25	0.8
Sampled Date	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	11/04/2019	11/04/2019
Carbon									
Soil Organic Matter (SOM)	2.26	95.2	12.8	1.05	74.6	17.1	2.95	4.95	>100
Metals (Solids)									
Arsenic	1.66	6	3.46	14.7	7	7.52	12.6	6.15	6
Cadmium	0.0403	0.703	0.12	0.126	0.371	0.392	0.168	0.329	1.17
Chromium	64.6	157	20.2	34.8	44.5	94.1	33.9	108	96.6
Copper	1.4	17.6	5.02	16.3	30.6	18	22.6	21.5	22.4
Lead	4.66	32.9	9.43	24.8	33.6	70.2	20.4	63.1	36.4
Mercury	0.14	1.4	0.14	0.14	1.08	1.4	0.14	1.4	1.4
Nickel	2.52	9.01	5.57	43	12.9	14	28.5	10.2	13.6
Selenium	4.68	10	2.97	1	1.93	10	1	10	10
Vanadium	58.6	130	31.2	56.4	46	137	56.9	132	88.2
Zinc	44.1	129	44.1	122	131	272	120	799	205
TPH Criteria Working Group (TPH CWG)									
Benzene									
Toluene									
Ethylbenzene									
sum of detected mpo xylene by GC									
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.0244	0.02	0.02	0.02	0.0702
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.0545	0.02	0.02	0.02	0.173
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.0534	0.02	0.02	0.02	0.185
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.0824	0.02	0.02	0.02	0.292
Aliphatics >C12-C16	0.622	16.1	2.35	1.84	12	6.46	1.8	2.07	4.13
Aliphatics >C16-C21	1.24	43.1	4.52	0.797	40.3	33	1.03	9.34	27.3
Aliphatics >C21-C35	12.9	172	17.9	1.67	70	63	3.43	61.6	95.6
Aliphatics >C35-C44	2.07	24.9	4.85	0.437	11.5	11.3	0.712	19.6	11.4
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0357
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.036	0.02	0.02	0.02	0.123
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.0545	0.02	0.02	0.02	0.194
Aromatics >EC12-EC16	0.795	22.3	3.45	0.155	49.8	40.4	0.1	5.74	17.1
Aromatics >EC16-EC21	8.18	196	14.1	0.268	619	345	0.388	23.9	124
Aromatics >EC21-EC35	23.1	626	38.8	1.59	1460	609	12.8	79.5	427
Aromatics >EC35-EC44	7.73	146	23.4	0.1	382	158	3.63	31.4	127
Aromatics >EC40-EC44	2.6	44	10.4	0.1	130	50.6	1.59	10.2	39.6
Polyaromatic Hydrocarbons (PAHs)									
Acenaphthylene	68.2	1970	224	12	19700	1340	12	1530	3120
Acenaphthene	17.1	355	16	8	17100	40	8	560	395
Anthracene	123	2870	400	16	107000	3050	16	3650	4620
Benz(a)anthracene	353	9110	719	14	202000	8220	14	10900	18100
Benzo(a)pyrene	323	9390	631	15	142000	7800	15	9240	16400
Benzo(b)fluoranthene	555	15900	1110	15	207000	13200	28	15700	18600
Benzo(k)fluoranthene	198	5630	397	14	98800	4230	14	5480	8050
Benzo(g,h,i)perylene	250	7100	554	24	78500	5600	24	6940	11700
Chrysene	353	8610	684	10	172000	8340	17.5	11500	13300
Dibenzo(a,h)anthracene	54.2	2190	115	0.023	25900	1550	0.023	1560	3280
Indeno(1,2,3-cd)pyrene	293	6390	471	0.018	73700	4670	0.018	5830	9810
Fluoranthene	693	16500	1990	0.017	289000	17700	53.2	20000	37000
Fluorene	43.4	770	183	10	34900	608	10	1190	1690
Naphthalene	172	2800	347	9	11400	1080	105	2640	3470
Phenanthrene	415	8550	1510	15	219000	4950	41.5	9410	15200
Pyrene	0.504	12.2	1.39	0.015	258	12.9	0.0391	15	27
PAH, Total Detected USEPA 16	4.41	110	10.7	0.118	1950	95.2	0.284	121	192
Naphthalene-d8 % recovery**	86.5	87	101	86.4	95.8	86.1	97.9	108	86.5
Acenaphthene-d10 % recovery**	83.4	86	91.8	83.7	97.2	78.4	90.4	100	77.2
Phenanthrene-d10 % recovery**	87.5	86.7	101	86.9	102	86.5	98	104	84.9
Chrysene-d12 % recovery**	80.6	83	87	77.2	64.3	81.8	87.7	109	85.2
Perylene-d12 % recovery**	84.8	77.2	82.5	82.4	88.2	84.3	86.8	102	82.8
Total Aliphatics >C12-C44	16.8	256	29.6	4.75	134	114	6.97	92.6	138
Total Aromatics >EC12-EC44	39.8	990	79.8	2.01	2510	1150	16.8	140	695
Total Aliphatics & Aromatics >C5-C44	56.7	1250	109	6.76	2650	1270	23.8	233	835
Metals - (Solid)									
Iron	29200	63400	13100	33400	25500	60200	42500	62500	60400
Manganese	10500	8520	3390	738	2610	9620	859	6880	4430
Metals - (Liquid)									
Calcium	352000	-	152000	-	-	111000	-	129000	-
Magnesium	30200	-	48700	-	-	19000	-	24700	-
Phenols									
Phenol	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics									
Soluble Sulphate 2:1 extract as SO4 BRE	0.1	-	0.0525	-	-	0.0849	-	0.126	-
pH	10	8.95	9.33	7.21	8.08	10.3	7.03	9.61	10.2
Sulphate, Total									
Sulphur, Total	0.427	-	0.209	-	-	0.221	-	0.246	-
Sulphate, Total potential	1.28	-	0.627	-	-	0.663	-	0.738	-
Sulphate, acid soluble (total)	1.46	-	0.647	-	-	0.311	-	0.327	-
Cyanide, Total	1	1	1	1	127	7.88	1	1	2.41
Exchangeable Ammonia as N	12	12	12	203	12	12	219	12	12
Asbestos									
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-
Date of Analysis	25/04/19	-	25/04/19	-	-	26/04/19	-	26/04/19	-
Analysed By	Christian Hallam	-	Christian Hallam	-	-	Christian Hallam	-	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-
Comments	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)									
Dibromofluoromethane**	103	85.1	96	107	96	98.7	108	84.1	92.9
Toluene-d8**	97.1	91	87.6	98.8	92.9	95.3	99.3	92.9	90.3
4-Bromofluorobenzene**	95.1	74.1	72.1	99.5	81.5	86.3	99.8	77	75
Methyl Tertiary Butyl Ether	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.01	0.1
Benzene	0.09	0.18	0.09	0.09	0.18	0.09	0.09	0.009	0.11
Toluene	0.07	0.14	0.07	0.07	0.14	0.07	0.07	0.007	0.07
Ethylbenzene	0.04	0.08	0.04	0.04	0.08	0.04	0.04	0.004	0.04
p/m-Xylene	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.01	0.1
o-Xylene	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.01	0.1
Naphthalene	0.13	0.26	0.13	0.13	1.21	0.169	0.13	0.157	0.959
Sum of BTEX	0.4	0.8	0.4	0.4	0.8	0.4	0.4	0.04	0.4
Subcontracted: Inorganics									
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-

Sample ID	4AL2	4AL2	4AL2	4AL2	4AL1V	4AL2V	4AM1	4AM1	4AM1V	4EA7	4EA7	4EA8
Depth	0.4	0.8	1.2	1.6	2.4	3.4	0.3	0.9	2.2	0.4	0.9	0.5
Sampled Date	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	01/11/2018	01/11/2018	31/10/2018
Carbon												
Soil Organic Matter (SOM)	4.71	3.81	11.1	1.97	0.972	2.59	52.2	23.8	0.869	6.81	8.45	51.4
Metals (Solids)												
Arsenic	8.77	2.76	7.95	6	12.7	16.5	8.26	6.33	7.87	13.6	6	6
Cadmium	0.2	0.265	0.0402	0.612	0.119	0.221	0.159	0.279	0.133	0.2	0.2	0.2
Chromium	128	51.2	84.4	347	40.8	70.9	58.5	25	22.6	188	359	9
Copper	16.3	7.16	19.7	14	18.2	21.4	15.4	14.8	8.1	25.1	20	14
Lead	91.2	8.42	22.4	18.8	23.1	22.6	23.7	32.2	15.5	86.7	36	41.9
Mercury	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4
Nickel	17.6	5.6	12.7	8.17	41	38.5	9.73	12.6	29.2	21.6	14.6	37.5
Selenium	10	1.59	4.5	17	1	1	2.15	3.49	1	10	10.9	10
Vanadium	305	53.8	86.7	548	60.1	61.4	73.4	56.6	40.8	276	419	163
Zinc	282	87.2	87.8	81.9	116	284	105	164	83.3	346	85.9	145
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.0294	0.02	0.02	0.01	0.2	0.02
Aliphatics >C6-C8	0.02	0.0355	0.02	0.02	0.02	0.02	0.0746	0.0403	0.02	0.172	3.32	0.02
Aliphatics >C8-C10	0.02	0.0323	0.02	0.02	0.02	0.02	0.102	0.0348	0.02	2.5	46.7	0.02
Aliphatics >C10-C12	0.02	0.025	0.02	0.02	0.02	0.02	0.0859	0.0392	0.02	10.8	168	0.02
Aliphatics >C12-C16	2.08	3.68	0.435	0.1	1.74	0.1	3.48	3.17	0.1	260	471	5.47
Aliphatics >C16-C21	8.15	6.1	5.75	0.1	1.72	0.1	19.8	10.7	0.1	351	579	23.9
Aliphatics >C21-C35	79.9	30.7	5.82	1.43	2.03	0.927	77.4	52.6	0.271	2980	2980	131
Aliphatics >C35-C44	28.9	4.56	0.944	0.1	0.312	0.1	8.98	8.43	0.1	513	381	27.3
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.2	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.2	0.02
Aromatics >EC8-EC10	0.02	0.0209	0.02	0.02	0.02	0.02	0.0678	0.0228	0.02	1.67	31.1	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.0576	0.0261	0.02	7.19	112	0.02
Aromatics >EC12-EC16	3.69	3.44	0.913	0.1	0.1	0.1	17.7	19.1	0.1	77.4	177	3.33
Aromatics >EC16-EC21	20.6	15.7	7.91	0.1	0.451	0.1	145	168	1.12	108	170	15.9
Aromatics >EC21-EC35	72.6	47.4	18.7	0.1	2.62	3.32	430	509	3.74	425	561	65.3
Aromatics >EC35-EC44	29.7	12.1	5.05	0.1	0.411	0.557	110	133	0.513	86.1	178	28.9
Aromatics >EC40-EC44	9.64	3.06	1.77	0.1	0.1	0.1	31.9	35.5	0.1	29.5	67	12.2
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	676	334	29.8	12	12	12	3550	8280	12	92.7	12	206
Acenaphthene	57.9	24.7	8	8	8	8	224	40	8	9.18	244	24.5
Anthracene	1000	473	86.2	16	16	16	4020	14900	16	144	60.2	478
Benz(a)anthracene	3050	2590	307	14	19.6	14	13700	24800	14	315	116	987
Benzo(a)pyrene	2870	2120	254	15	15	15	12200	20600	15	291	131	817
Benzo(b)fluoranthene	3370	4100	395	15	25.8	15	21900	33400	22.1	352	389	1360
Benzo(k)fluoranthene	1220	1400	151	14	14	14	6040	12200	14	157	140	509
Benzo(g,h,i)perylene	2000	1760	182	24	24	24	8150	14300	24	265	208	515
Chrysene	2380	2750	283	10	17.6	10	12500	22200	10	307	311	929
Dibenzo(a,h)anthracene	494	433	50.5	0.023	0.023	0.023	1920	3480	0.023	56.6	38.2	124
Indeno(1,2,3-cd)pyrene	1760	1510	157	0.018	0.018	0.018	10700	12400	0.018	217	174	567
Fluoranthene	6580	4030	634	0.017	56.1	0.017	33400	75300	0.017	781	330	2160
Fluorene	516	87.3	10	10	10	10	1660	7630	10	78.4	95.7	193
Naphthalene	717	654	63.1	9	9	9	2190	2270	9	181	31.2	556
Phenanthrene	4110	1650	380	15	15	15	13400	45600	15	511	583	1330
Pyrene	4.67	3.05	0.437	0.015	0.0416	0.015	24	52.2	0.015	0.798	0.564	1.68
PAH, Total Detected USEPA 16	35.5	27	3.41	0.118	0.161	0.118	170	350	0.118	4.56	3.42	12.4
Naphthalene-d8 % recovery**	87.9	93.3	90	92.5	83.2	92.8	79.7	88.9	93.4	93.2	89.5	92.5
Acenaphthene-d10 % recovery**	77.3	85.8	87.3	83.3	80.9	87.2	76.5	86.9	88.8	82.2	98.9	95
Phenanthrene-d10 % recovery**	89.9	89.3	84	90.2	84.2	90.8	80.6	90	94.4	103	104	92.6
Chrysene-d12 % recovery**	89.8	96.4	71.4	83.9	78.7	86.9	74.6	73.7	87.5	98.9	102	77.7
Perylene-d12 % recovery**	95.7	89.9	66.8	87	83.7	88.8	78.6	74.1	88.3	87.1	95.3	70.4
Total Aliphatics >C12-C44	119	45	12.9	1.43	5.8	0.927	110	74.9	0.271	4100	4410	188
Total Aromatics >EC12-EC44	127	78.6	32.6	0.1	3.48	3.88	703	829	5.37	696	1090	113
Total Aliphatics & Aromatics >C5-C44	246	124	45.6	1.43	9.28	4.8	813	904	5.64	4820	5850	301
Metals - (Solid)												
Iron	165000	29500	31700	96000	37600	39100	32300	38500	31800	183000	134000	133000
Manganese	20100	4340	8950	29200	315	419	4390	3660	1070	11500	26600	2070
Metals - (Liquid)												
Calcium	152000	-	186000	-	-	-	-	106000	-	-	160000	-
Magnesium	15600	-	38700	-	-	-	-	15000	-	-	4470	-
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0326	0.015	0.055	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.066	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	0.0694	-	0.395	-	-	-	-	0.109	-	-	0.133	-
pH	9.62	11.3	11.5	11.8	7.28	8.35	9.8	9.8	8.08	10.3	11.6	10.8
Sulphate, Total												
Sulphur, Total	0.396	-	0.274	-	-	-	-	0.223	-	-	0.189	-
Sulphate, Total potential	1.19	-	0.822	-	-	-	-	0.669	-	-	0.567	-
Sulphate, acid soluble (total)	0.709	-	0.814	-	-	-	-	0.473	-	-	0.549	-
Cyanide, Total	1	4.79	1	7.86	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	134	202	12	12	32.7	12	12	12
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	26/04/19	-	26/04/2019	-	-	-	-	26/04/2019	-	-	08/11/2018	-
Analysed By	Christian Hallam	-	Paul Poynton	-	-	-	-	Paul Poynton	-	-	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Comments	-	-	-	-	-	-	-	-	-	-	0	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	98.8	94.7	106	104	103	105	96.8	101	113	107	105	109
Toluene-d8**	93.6	91.9	98.7	99.8	98.8	99.8	88.2	95.3	97.3	95.8	91.8	92.8
4-Bromofluorobenzene**	80.9	79.4	96.7	100	100	96.4	73.2	86.4	102	89.5	86.2	75.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.135	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.102	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.211	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.232	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.3	0.257	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.68	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	4EA8	4EA7V	4EA8V	4EB4	4EB4	4EB7	4EB8	4EB8	4EB9	4EB9	4EB9	4EB7V	4EB8V	4EB9V
Depth	1	2.1	1.7	0.5	1	0.5	0.5	1	0.5	1	1.5	1.6	2.6	2.2
Sampled Date	31/10/2018	01/11/2018	31/10/2018	29/10/2018	29/10/2018	01/11/2018	31/10/2018	31/10/2018	31/10/2018	31/10/2018	31/10/2018	01/11/2018	31/10/2018	31/10/2018
Carbon														
Soil Organic Matter (SOM)	4.91	3.22	0.905	7.59	3.28	1.56	1.68	1.7	8.29	5.28	17.6	1.61	1.3	1.91
Metals (Solids)														
Arsenic	5.52	12.9	18.9	11.5	9.31	10.5	6	8.97	7.07	7.42	8.69	19.1	24	17.1
Cadmium	0.02	0.37	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.316	0.238	0.02
Chromium	115	38.2	27	75.9	9	775	987	825	220	255	150	40.8	30.1	36.6
Copper	11.1	14.6	12.1	26.1	14	34.4	16.2	33.4	19.4	23.5	37	11.4	11.1	12.9
Lead	48.9	33.3	28.8	144	55.6	31.2	16.5	11.1	48.8	48.7	75.1	29.4	30.8	29.8
Mercury	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14
Nickel	7.78	34.2	42.1	34.1	20.3	26.4	8.78	21.7	21.9	25.6	26.5	39.3	39.1	39.9
Selenium	6.07	1	1	10	10	22	21.1	17.1	12.3	10	10	1	1	1
Vanadium	117	64	54.2	168	98	591	499	456	269	258	200	66.9	64.2	60.6
Zinc	201	115	116	467	236	97.6	55.3	75.5	113	169	188	108	137	123
TPH Criteria Working Group (TPH CWG)														
Benzene														
Toluene														
Ethylbenzene														
sum of detected mpo xylene by GC														
Aliphatics >C5-C6	0.0336	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0495	0.02	0.0219	0.02
Aliphatics >C6-C8	0.137	0.0945	0.02	0.02	0.0361	0.0377	0.02	0.02	0.0627	0.0616	0.198	0.02	0.0876	0.02
Aliphatics >C8-C10	0.444	0.62	0.02	0.02	0.035	0.0237	0.02	0.02	0.495	1.14	3	0.02	0.299	0.02
Aliphatics >C10-C12	2.04	2.55	0.02	0.02	0.0552	0.163	0.02	0.02	2.52	7.01	11.6	0.02	0.945	0.02
Aliphatics >C12-C16	34.2	2.24	0.1	0.132	2.13	5.04	0.617	0.1	110	177	292	0.1	0.1	0.1
Aliphatics >C16-C21	79.4	4.26	0.1	4.21	9.81	21.3	0.203	0.1	255	210	469	0.1	2.5	0.1
Aliphatics >C21-C35	404	20.3	0.1	49.6	82.2	136	17.4	37.1	1140	1100	2220	0.1	21.3	0.1
Aliphatics >C35-C44	91.4	5.07	0.1	17.7	35.8	39.3	3.88	6.78	225	237	472	0.1	0.638	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.065	0.0358	1.73	0.02	0.02	0.02
Aromatics >EC7-EC8	0.0314	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.398	0.02	0.02	0.02
Aromatics >EC8-EC10	0.296	0.413	0.02	0.02	0.0233	0.02	0.02	0.02	0.33	0.758	2	0.02	0.2	0.02
Aromatics >EC10-EC12	1.36	1.7	0.02	0.02	0.0371	0.109	0.02	0.02	1.68	4.67	7.75	0.02	0.629	0.02
Aromatics >EC12-EC16	22.4	0.1	0.1	2.49	2.8	1.71	1.04	1.65	23.5	41.6	72.4	0.174	1.08	0.1
Aromatics >EC16-EC21	213	1.97	0.1	10.7	11.3	10.9	7.05	9.49	75.1	71.3	152	0.1	2.64	0.428
Aromatics >EC21-EC35	449	24.3	2.3	52.3	61.1	90.5	46	66.9	313	295	561	0.286	10.7	2.07
Aromatics >EC35-EC44	123	13.3	3.01	28.4	44.9	38.7	15.8	26.4	90.5	110	149	0.525	3.55	3.3
Aromatics >EC40-EC44	40.7	5.5	1.66	11.4	19.7	13.9	5.9	9.22	30.9	43.3	50.7	0.379	1.53	1.96
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	184	12	12	174	142	15.4	12	12	17.6	12	112	12	12	34.2
Acenaphthene	40	8	8	29.6	22.5	44.4	21.3	25.4	49.1	164	766	8	8	65.7
Anthracene	590	16	16	394	226	66.2	53.7	68.6	120	278	504	16	16	58.9
Benz(a)anthracene	1210	14	25.5	897	837	923	495	629	628	1490	1300	14	23.5	113
Benzo(a)pyrene	1040	15	19.8	804	771	1160	593	740	651	1760	1180	15	15	105
Benzo(b)fluoranthene	1230	15	28.2	1290	1250	1090	464	1400	832	2370	1160	15	30.8	179
Benzo(k)fluoranthene	491	14	14	521	436	624	297	524	353	723	519	14	14	57.5
Benzo(g,h,i)perylene	783	24	24	584	549	895	544	627	679	1250	944	24	24	80
Chrysene	1050	10	22.2	946	792	1020	605	815	611	1590	1330	10	27.7	128
Dibenzo(a,h)anthracene	187	0.023	0.023	161	130	178	119	135	144	252	206	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	815	0.018	0.018	736	726	743	513	593	634	1130	1040	0.018	0.018	64
Fluoranthene	3380	0.017	68.6	1840	1620	1240	752	1110	1330	2780	3720	0.017	70.8	297
Fluorene	252	10	10	182	78	21.1	13	11.7	32.7	10	236	10	10	53.8
Naphthalene	290	9	25.9	299	228	62.1	32.6	51.3	193	470	1760	9	55.3	118
Phenanthrene	2830	15	33.3	1290	848	427	291	431	955	1870	4050	15	44.6	193
Pyrene	2.27	0.015	0.0474	1.38	1.3	1.39	0.689	0.946	1.15	2.29	2.9	0.015	0.0519	0.253
PAH, Total Detected USEPA 16	16.6	0.118	0.271	11.5	9.95	9.91	5.48	8.1	8.38	18.4	21.7	0.118	0.304	1.8
Naphthalene-d8 % recovery**	83.8	88.4	94.1	86.1	87	94.5	82	96.6	84.4	94	84.1	86.9	92.7	90.7
Acenaphthene-d10 % recovery**	81.5	88.7	87.6	90.3	89.1	95.4	87	82.8	88.7	95.1	97.1	88.7	86.3	86.3
Phenanthrene-d10 % recovery**	89.8	90.8	90.2	98.3	95.6	101	91.4	85.9	92.3	91	92.8	90.7	88.1	89.1
Chrysene-d12 % recovery**	92.5	92.7	87.7	95.1	108	100	97.1	86.3	96.9	76.6	78.2	90.7	83.5	85
Perylene-d12 % recovery**	83.3	91	86.1	89.4	99.5	92.8	89.3	82.1	88.6	86.1	71.5	89.1	81.2	85.1
Total Aliphatics >C12-C44	609	31.8	0.1	71.7	130	202	22.1	43.9	1730	1720	3450	0.1	24.5	0.1
Total Aromatics >EC12-EC44	808	39.5	5.32	94	120	142	69.9	104	502	518	935	0.986	18	5.8
Total Aliphatics & Aromatics >C5-C44	1420	76.8	5.32	166	250	344	92.1	148	2240	2250	4410	0.986	44.6	5.8
Metals - (Solid)														
Iron	66500	37600	38900	210000	216000	220000	172000	194000	123000	118000	135000	38200	42000	35000
Manganese	13100	854	1750	9030	3260	33000	31900	33200	19000	21800	15900	523	397	367
Metals - (Liquid)														
Calcium	191000	-	-	82200	-	233000	271000	-	223000	196000	-	-	-	-
Magnesium	16600	-	-	6840	-	12100	7450	-	9730	16400	-	-	-	-
Phenols														
Phenol	0.0325	0.01	0.01	0.01	0.01	0.0108	0.0104	0.0107	0.0336	0.0112	0.0115	0.01	0.01	0.01
Cresols	0.0217	0.0139	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0115	0.01	0.01	0.01
Xylenols	0.0217	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.0759	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE	0.178	-	-	0.0679	-	0.104	0.004	-	0.442	0.604	-	-	-	-
pH	12.5	8.09	8.14	9.45	9.15	12.7	12.8	12.8	12.8	12.6	12.8	7.89	8.12	8.02
Sulphate, Total														
Sulphur, Total	0.559	-	-	0.192	-	0.506	0.186	-	0.409	0.834	-	-	-	-
Sulphate, Total potential	1.68	-	-	0.576	-	1.52	0.558	-	1.23	2.5	-	-	-	-
Sulphate, acid soluble (total)	0.533	-	-	0.184	-	0.671	0.315	-	1.01	1.27	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	15.1	1	1	1	1.58
Exchangeable Ammonia as N	12	218	76.4	12	12	21	117	12	12	12	12	130	65.2	193
Asbestos														
Asbestos Quantification - Gravimetric - %	0.001	-	-	0.001	-	-	-	-	-	0.001	-	-	-	-
Date of Analysis	09/11/2018	-	-	08/11/2018	-	14/11/2018	09/11/2018	-	06/11/2018	09/11/2018	-	-	-	-
Analysed By	Marcin Magdziarek	-	-	Lucy Caroe	-	Andrzej Ferfecki	Lucy Caroe	-	Andrzej Ferfecki	Renata Bozhkov	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	0.001	-	-	0.001	-	-	-	-	-	0.001	-	-	-	-
Additional Asbestos Components (Using TM048)	None	-	-	None	-	-	-	-	-	None	-	-	-	-
Analysts Comments	N/A	-	-	N/A	-	-	-	-	-	N/A	-	-	-	-
Asbestos Quantification - Total - %	0.001	-	-	0.001	-	-	-	-	-	0.001	-	-	-	-
Chrysotile (White) Asbestos	Detected	-	-	Detected	-	Not Detected	Not Detected	-	Not Detected	Detected	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-
Fibrous Tremolite	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-
Fibrous Actinolite	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-
Comments	Fibre bundles in soil	-	-	Soil containing ACM debris	-	0	0	-	0	Loose fibres in soil.	-	-	-	-
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	105	105	106	105	104	106	104	80	104	107	104	104	108	109
Toluene-d8**	97.8	99.9	101	99.5	97.5	99.4	101	95.9	94.8	97.3	91.3	99.7	101	97.2
4-Bromofluorobenzene**	93.1	98.8	100	88.2	86.4	97.5	94	95	92.7	93.5	86.4	97.9	100	95.7
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.869	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.193	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.16	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.119	0.1	0.1	0.1
Naphthalene	0.691	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.229	0.835	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.34	0.4	0.4	0.4
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4EC1	4EC1	4EC10	4EC10	4EC10	4EC2	4EC2	4EC4	4EC4	4EC7	4EC7	4EC8	4EC8	4EC9	4EC10V	4EC2V	4EC4V	4EC7V
Depth	0.2	0.4	0.5	1	2	0.5	1	0.5	1	0.5	1	0.5	1	0.5	2.5	1.65	2.25	1.8
Sampled Date	29/10/2018	29/10/2018	26/11/2018	26/11/2018	26/11/2018	29/10/2018	29/10/2018	30/10/2018	30/10/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018	31/10/2018	26/11/2018	29/10/2018	30/10/2018	01/11/2018
Carbon																		
Soil Organic Matter (SOM)	36.9	37.1	9.79	3.9	2.67	37.2	10.7	7.28	2.64	6.84	27.1	84.8	9.86	4.84	4.91	0.852	1.48	9.19
Metals (Solids)																		
Arsenic	6.16	6.22	9.99	4.72	10	10	12.3	9.76	12.8	15.3	9.98	4.99	8.49	10.5	17.2	11.1	16.1	15.5
Cadmium	0.388	0.02	0.2	0.02	0.2	0.893	2.07	0.2	0.2	0.2	0.2	0.02	1.14	0.2	0.269	0.02	0.02	0.02
Chromium	114	30.8	267	3.69	10.3	20.5	36.8	150	388	63.2	168	3.33	161	76.4	33.9	25.6	46.6	115
Copper	13.2	17.4	54.5	1.4	56.5	31.8	67.5	14	286	25.3	24.9	13.7	22.1	34.6	15.9	9.52	14.2	23.3
Lead	63.4	36.7	67.5	1.18	54.4	97.6	113	38.2	31.2	116	91.6	29.2	46	77.3	41.1	22.5	29.3	45.3
Mercury	0.14	0.14	1.4	0.14	1.4	1.4	0.14	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14
Nickel	15.7	13.6	34.9	1.66	32.6	30.2	35	17.1	36.3	31.6	24.2	12	15.4	39.8	33.4	32	43.7	22.1
Selenium	3.2	1.85	10	6.08	10	10	1.47	10	16.4	10	10	2.17	5.34	10	1.7	1	1	2.88
Vanadium	132	65	224	23.2	71	45.7	37.6	179	405	226	140	17.7	177	113	57.5	45.3	71.4	108
Zinc	542	260	277	11.3	188	332	395	164	122	422	323	112	183	238	136	96.5	129	149
TPH Criteria Working Group (TPH CWG)																		
Benzene																		
Toluene																		
Ethylbenzene																		
sum of detected mpo xylene by GC																		
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.0697
Aliphatics >C6-C8	0.02	0.02	0.0463	0.02	0.02	0.02	0.02	0.01	0.01	0.0314	0.02	0.01	0.02	0.07	0.02	0.02	0.01	0.219
Aliphatics >C8-C10	0.02	0.02	0.0516	0.02	0.02	0.02	0.02	0.01	0.01	0.0238	0.02	0.01	0.02	0.373	0.02	0.02	0.01	0.481
Aliphatics >C10-C12	0.02	0.02	0.0613	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.02	2.05	0.02	0.02	0.01	1.32
Aliphatics >C12-C16	1.86	3.69	5.69	15	59.4	3.11	2.48	3.7	4.04	2.48	2.39	7.26	0.1	120	0.1	0.1	0.1	1.15
Aliphatics >C16-C21	11.9	22.2	31.7	24.5	175	13.6	10.8	35.9	21.7	17	21.9	42.4	0.808	290	0.947	0.1	1.14	3.98
Aliphatics >C21-C35	52.3	66.6	200	355	582	52.5	40.6	64.9	83.4	143	80.3	241	109	2010	13.8	0.1	1.79	17.1
Aliphatics >C35-C44	25.2	19.9	56.7	212	138	24.2	20.1	16.2	27.7	92.4	15.3	71.6	32.6	590	1.03	0.1	0.1	14.9
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.0956
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.0308
Aromatics >EC8-EC10	0.02	0.02	0.0344	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.249	0.02	0.02	0.01	0.321
Aromatics >EC10-EC12	0.02	0.02	0.0409	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.02	1.36	0.02	0.02	0.01	0.881
Aromatics >EC12-EC16	7.28	8.07	3.37	3.57	24.9	5.84	2.72	2.98	0.856	4.01	2.92	7.02	2.65	43	0.1	0.1	0.23	1.63
Aromatics >EC16-EC21	28.1	46.6	13.8	31	95.8	26.1	12.7	29.3	13.3	14.2	9.06	25.1	12.2	95.3	1.9	0.1	1.42	5.65
Aromatics >EC21-EC35	108	122	76.3	451	302	96	69.3	91.2	79.2	97.9	42	144	153	377	26.9	3.49	6.09	55.3
Aromatics >EC35-EC44	61	39.1	39.4	481	134	49.8	42.9	33.6	33.6	116	17.3	82.1	94.9	160	6.41	0.173	3.1	10.8
Aromatics >EC40-EC44	27.1	14.8	15.6	230	56.2	21.1	17.3	13	12.6	55	7.23	36.3	38.8	58.7	1.86	0.1	1.28	2.82
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	220	157	66.3	120	50.3	97.6	37.9	234	112	43.1	12	60	43.9	41.2	12	12	12	12
Acenaphthene	43	49.1	14.9	80	49.7	27	12	40	60.9	17.3	8	40	17.4	97.8	8	8	8	21.6
Anthracene	475	365	99.5	160	110	177	102	404	503	74.7	93.8	144	69	82.3	16	16	16	16
Benz(a)anthracene	1590	1290	262	198	236	736	673	1620	3050	247	192	381	700	113	29.4	14	33.6	142
Benzo(a)pyrene	1440	1130	223	272	214	623	645	1620	3060	238	209	288	898	100	28.8	15	38.7	154
Benzo(b)fluoranthene	2370	1910	288	299	253	1120	976	2620	4820	267	376	545	932	158	35.6	15	62.3	155
Benzo(k)fluoranthene	860	675	114	140	105	338	338	808	1690	106	14	174	372	60.9	14	14	30	74.6
Benzo(g,h,i)perylene	1080	742	187	386	200	465	415	1190	2040	206	167	256	664	109	24	24	35.5	106
Chrysene	1510	1480	228	153	246	705	638	1550	3270	256	574	398	699	150	25.3	10	41.6	153
Dibenzo(a,h)anthracene	288	232	39.8	0.23	39.3	124	132	311	598	46.7	33.6	0.115	153	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	1310	890	195	315	185	452	554	1010	1880	157	190	203	528	93.1	0.018	0.018	32.3	106
Fluoranthene	3030	2460	531	393	605	1230	1090	3080	6330	492	576	894	815	332	55	0.017	69.4	175
Fluorene	114	101	44.8	0.1	54.1	52.8	18.2	94.5	88.1	29	10	77.9	19.2	260	10	10	10	10
Naphthalene	279	378	229	90	205	219	77.2	922	471	95.6	9	123	79.2	146	13.6	9	15.6	213
Phenanthrene	1470	1510	425	213	429	685	361	1740	2340	291	376	790	277	769	27.9	15	45.2	87.1
Pyrene	2.25	1.95	0.444	0.31	0.564	0.932	0.806	2.43	4.32	0.388	0.43	0.703	0.806	0.419	0.0439	0.015	0.0569	0.224
PAH, Total Detected USEPA 16	18.3	15.3	3.39	2.54	3.55	7.98	6.87	19.6	34.6	2.95	3.22	4.98	7.07	2.93	0.259	0.118	0.461	1.61
Naphthalene-d8 % recovery**	90.3	88.6	91	89.4	93.2	91.1	86.2	87.7	85.3	86	0	91.4	88.1	85.8	92	87.1	93.1	86.9
Acenaphthene-d10 % recovery**	92.6	94.1	86.4	80.5	94.8	88.9	89.8	81.4	77.6	90.1	0	92	89.7	92.6	89.3	89.7	98.5	88.9
Phenanthrene-d10 % recovery**	96	95.2	89.7	77.5	90.7	87.3	93.7	78	81.9	98.8	88.4	93.9	99.2	97.9	84.8	97.3	97	89.6
Chrysene-d12 % recovery**	103	94.7	80.4	72.2	80.8	72.5	93	75.7	76.5	103	77.2	91.7	104	96.1	77.3	110	84	92.7
Perylene-d12 % recovery**	91.9	79.8	75.8	72.4	78.3	70.1	88.1	77	79.6	97.4	69.5	82.2	98.8	83.1	84.8	105	81	90.3
Total Aliphatics >C12-C44	91.3	112	294	606	954	93.5	74	121	137	255	120	362	142	3010	15.7	0.1	2.93	37.2
Total Aromatics >EC12-EC44	204	216	133	967	557	178	128	157	127	232	71.3	258	263	675	35.2	3.66	10.8	73.4
Total Aliphatics & Aromatics >C5-C44	295	328	427	1570	1510	271	202	278	264	488	191	620	405	3690	51	3.66	13.8	114
Metals - (Solid)																		
Iron	47600	57700	179000	4940	170000	80100	63800	160000	223000	174000	152000	48100	88300	198000	33200	33400	49700	68100
Manganese	6110	3690	10600	3730	3660	2780	3570	11200	28300	11400	7850	3070	12700	11200	563	1260	1260	6170
Metals - (Liquid)																		
Calcium	151000	-	153000	-	75800	97700	-	138000	-	143000	-	104000	-	133000	-	-	-	-
Magnesium	27100	-	26200	-	9830	14300	-	9150	-	12000	-	14000	-	24000	-	-	-	-
Phenols																		
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	0.0845	-	0.0853	-	0.475	0.0521	-	0.0774	-	0.196	-	0.0695	-	0.0794	-	-	-	-
pH	9.04	9.51	10.5	8.39	10.1	8.98	11.6	11.2	12.6	10.4	11.4	8.9	10.8	11.2	7.84	8.46	6.54	8.25
Sulphate, Total																		
Sulphur, Total	0.284	-	0.0983	-	0.524	0.282	-	0.196	-	0.311	-	0.673	-	0.289	-	-	-	-
Sulphate, Total potential	0.852	-	0.295	-	1.57	0.846	-	0.588	-	0.933	-	2.02	-	0.867	-	-	-	-
Sulphate, acid soluble (total)	0.21	-	0.185	-	0.382	0.13	-	0.28	-	0.381	-	0.396	-	0.325	-	-	-	-
Cyanide, Total	1	1	1	1	2.28	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	13.6	12	12	12	12	223	341	194	269
Asbestos																		
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	09/11/2018	-	11/12/2018	-	11/12/2018	09/11/2018	-	09/11/2018	-	13/11/2018	-	14/11/2018	-	13/11/2018	-	-	-	-
Analysed By	Andrzej Ferfecki	-	Marcin Magdziarek	-	Paul Poynton	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	-	-	-
Comments	0	-	0	-	0	0	-	0	-	0	-	0	-	0	-	-	-	-
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	98.7	107	108	116	114	104	106	120	118	101	102	95.6	104	110	108	105	117	103
Toluene-d8**	95	90.2	95.6	90.7	92.4	95.8	100	96.4	97.1	99	98.9	95.5	98.1	94.5	98.8	98.4	99.9	98.8
4-Bromofluorobenzene**	80.3	74	85	82.1	88.5	75	92.7	97.7	98	91.5	92.2	79	94.1	86.6	95.3	96	104	95
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.275	0.13	0.13	0.167	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4ED1	4ED1	4ED10	4ED10	4ED2	4ED2	4ED4	4ED4	4ED7	4ED8	4ED8	4ED9	4ED9	4ED10V	4ED1V	4ED4V	4ED7V	4ED8V
Depth	0.5	1	0.5	1	0.25	1	0.5	1.2	0.5	0.5	0.9	0.5	1	2.8	1.8	2.1	1.9	1.7
Sampled Date	29/10/2018	29/10/2018	26/11/2018	26/11/2018	29/10/2018	29/10/2018	30/10/2018	30/10/2018	01/11/2018	01/11/2018	01/11/2018	31/10/2018	31/10/2018	26/11/2018	29/10/2018	30/10/2018	01/11/2018	01/11/2018
Carbon																		
Soil Organic Matter (SOM)	11.8	48.8	2.47	3.45	44	4.19	29	8.4	2.78	21.6	12.3	4.05	1.23	5.28	1	1.15	5.07	1.55
Metals (Solids)																		
Arsenic	5.35	6.63	11	4.97	8.33	7.33	10.4	8.56	12.2	8.99	8.83	3.68	6	17.7	13.7	15.2	15	20.7
Cadmium	0.02	0.02	0.562	0.281	0.02	0.342	0.02	0.02	0.2	1.11	0.2	0.02	0.2	0.271	0.02	0.02	0.2	0.394
Chromium	16.5	32	137	24.5	126	732	16.2	480	9	190	732	53.4	567	34.4	28.1	36.4	39.8	55.9
Copper	7.2	20	19.8	6.71	19.5	30	14.7	23.9	14	22.3	36.5	2.48	15.4	18.5	10.5	10.6	14	12.7
Lead	15.7	30.5	52.8	105	28.8	24.1	23.5	19.6	94.4	43.7	11.4	11.5	21	41.4	24.5	27.8	39.8	27.7
Mercury	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	1.4	1.4	0.14	1.4	0.14	0.14	0.14	1.4	0.14
Nickel	7.56	14.7	22	6.8	13.5	22.2	18.4	14.4	14.3	14.9	26.3	4.31	9.49	34.4	36.9	43	29.4	38.1
Selenium	1.13	2.57	7.47	3.59	3.53	17.9	1.72	13.1	10	2.91	18	5.93	22	1.88	1	1	10	1
Vanadium	33.7	45.6	163	77.5	96.4	397	52.3	443	43.7	138	507	115	397	54.5	50.4	61.6	63.9	81
Zinc	47.6	293	234	572	329	69.1	109	92.3	270	165	45.5	58.8	60.3	156	104	117	106	103
TPH Criteria Working Group (TPH CWG)																		
Benzene																		
Toluene																		
Ethylbenzene																		
sum of detected mpo xylene by GC																		
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.0532
Aliphatics >C6-C8	0.02	0.02	0.051	0.0582	0.02	0.02	0.02	0.01	0.02	0.0606	0.0435	0.02	0.0246	0.0581	0.02	0.01	0.0526	0.161
Aliphatics >C8-C10	0.02	0.02	0.0632	0.0538	0.02	0.02	0.02	0.01	0.02	0.0412	0.0498	0.02	0.02	0.0969	0.02	0.01	0.092	0.557
Aliphatics >C10-C12	0.02	0.02	0.142	0.483	0.02	0.02	0.02	0.01	0.02	0.231	1.52	0.154	0.108	0.128	0.02	0.01	0.209	1.19
Aliphatics >C12-C16	6.9	5.84	13.9	13.7	3.5	7.19	1.61	8.13	0.1	2.36	2.84	7.49	6.17	1.24	0.1	0.1	1.31	0.1
Aliphatics >C16-C21	26.7	22.1	36.9	52.2	20.8	59.4	19	29.4	9.87	10.5	15.8	20.1	20.5	1.53	0.1	0.1	2.88	0.1
Aliphatics >C21-C35	70.4	64.3	74.8	151	65.3	118	80.5	65.9	158	81.7	79.5	275	133	6.38	0.1	0.1	14.7	2.43
Aliphatics >C35-C44	25.9	18.1	25.8	96.7	20.5	43.3	14.8	7.3	37.1	28.1	27.5	150	61.7	0.1	0.1	0.1	1.14	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.0213
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.0418	0.0358	0.02	0.02	0.02	0.01	0.02	0.0271	0.0329	0.02	0.02	0.0641	0.02	0.01	0.0613	0.371
Aromatics >EC10-EC12	0.02	0.02	0.0949	0.323	0.02	0.02	0.02	0.01	0.02	0.154	1.02	0.102	0.0717	0.0849	0.02	0.01	0.139	0.793
Aromatics >EC12-EC16	7.07	15.2	5.27	3.22	9.33	4.25	5.57	2.76	0.1	2.16	1.92	2.4	3	0.1	0.1	0.1	0.53	0.1
Aromatics >EC16-EC21	20.1	89	17.9	21.2	66	38.2	22.6	18.4	1.25	7.2	9.26	15.5	29.9	1.37	1.38	0.1	1.63	0.1
Aromatics >EC21-EC35	82.9	292	59.2	148	161	150	107	96.4	17.7	51.7	71.8	294	165	28.4	6.82	0.1	16.1	4.96
Aromatics >EC35-EC44	44.9	78.3	43.3	185	54.2	60.6	31.6	35.7	1.63	36.9	43	294	115	3.73	1.06	0.1	3.55	5.54
Aromatics >EC40-EC44	19.1	21.2	20.2	89.1	20.7	18.6	11.1	12.9	0.1	16.8	18	135	51.1	0.644	0.1	0.1	1.16	2.43
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	132	192	61.2	120	180	80.8	51.6	77.8	35.9	31.2	12	60	12	12	12	12	12	12
Acenaphthene	25.8	111	31.1	80	43.4	63.1	28.5	73.9	8	8	8	40	10.2	13.9	8	8	50.5	113
Anthracene	223	735	114	160	773	212	158	232	41.1	47.3	27.7	80	75.3	16	16	16	16	28.9
Benz(a)anthracene	648	3130	488	622	2320	1630	456	1650	98.3	289	583	114	219	14	14	14	103	160
Benzo(a)pyrene	614	2930	510	565	1950	1880	397	2150	81.7	303	760	130	235	15	15	15	103	39.2
Benzo(b)fluoranthene	1040	4410	708	806	3280	2980	658	3170	160	640	1330	138	269	28.2	15	15	107	78.7
Benzo(k)fluoranthene	293	1380	235	177	1150	940	181	1150	49.1	226	451	70	137	14	14	14	54.8	35.7
Benzo(g,h,i)perylene	458	1980	416	476	1300	1530	315	1690	68.8	320	661	155	209	24	24	24	86.1	24
Chrysene	679	3000	481	560	2250	1910	463	1950	110	340	727	112	259	22.6	10	10	115	185
Dibenzo(a,h)anthracene	119	574	86.8	0.23	370	288	95.8	401	0.023	77.8	142	0.115	35.8	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	388	2540	460	462	1740	1340	242	1750	63	269	566	123	150	0.018	0.018	0.018	77.4	0.018
Fluoranthene	1180	4710	822	804	5470	3100	738	2530	195	368	642	262	740	42.9	0.017	0.017	216	766
Fluorene	78	256	29.5	0.1	285	50	75	66.5	15.5	14.7	10	50	10	10	10	10	17.8	47.6
Naphthalene	229	465	353	90	360	186	136	102	116	66.6	43.9	45	11.4	458	9	9	1330	545
Phenanthrene	605	2740	393	223	4080	968	549	904	150	180	183	132	347	33.5	15	15	141	513
Pyrene	0.918	3.93	0.732	1.95	3.79	2.88	0.594	2.36	0.171	0.372	0.689	0.218	0.589	0.0326	0.015	0.015	0.192	0.664
PAH, Total Detected USEPA 16	7.64	33.1	5.92	6.64	29.4	20	5.14	20.3	1.35	3.54	6.8	1.38	3.29	0.632	0.118	0.118	2.6	3.17
Naphthalene-d8 % recovery**	86.4	87.6	91.7	89.3	86.7	88.1	86.3	94.2	93.6	90.5	86.8	85.4	85	91.2	88.6	92.1	96.2	91.2
Acenaphthene-d10 % recovery**	85.6	90.2	92.8	83.9	91.1	87.2	86.7	99.8	87.4	89.7	92.5	91.6	88.9	90.3	90.2	94.7	96.1	92.9
Phenanthrene-d10 % recovery**	86.8	97.2	88.9	82.8	92.6	84.8	85.8	97.6	86.8	89.4	100	93.5	92.3	87.1	94	92.7	101	94.1
Chrysene-d12 % recovery**	82.8	93.5	81.7	79	86.6	76.8	74.7	83.6	81.2	90.6	104	97.8	77.9	79.7	109	80.8	98.7	97.7
Perylene-d12 % recovery**	78.8	81.3	82.4	82.2	76.7	78.8	70.2	79.3	80.4	84.5	99.4	85.1	72.8	86.9	106	76.8	91.8	97
Total Aliphatics >C12-C44	130	110	151	314	110	228	116	111	205	123	126	453	222	9.15	0.1	0.1	20.1	2.43
Total Aromatics >EC12-EC44	155	474	126	357	290	253	166	153	20.6	98	126	606	313	33.5	9.25	0.1	21.8	10.5
Total Aliphatics & Aromatics >C5-C44	285	585	277	672	400	481	282	264	226	221	254	1060	535	43.1	9.25	0.1	42.4	16.1
Metals - (Solid)																		
Iron	32900	33300	144000	44100	57900	201000	51700	151000	77100	110000	228000	36000	106000	36400	34200	41500	42200	46000
Manganese	2290	3490	11100	5400	7680	45700	3220	35900	1940	11500	42500	12000	37700	477	1640	866	1300	1500
Metals - (Liquid)																		
Calcium	171000	-	-	194000	-	219000	98100	-	196000	-	232000	203000	-	-	-	-	-	-
Magnesium	12800	-	-	31100	-	7260	6120	-	16800	-	13700	33500	-	-	-	-	-	-
Phenols																		
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.01	0.01
Cresols	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	0.121	-	-	0.102	-	0.108	0.336	-	0.15	-	0.0476	0.79	-	-	-	-	-	-
pH	9.62	9.85	11.4	10.7	11	11.7	8.35	11.8	10.3	11.2	12.4	9.94	12.7	7.73	8.35	8.06	7.87	7.99
Sulphate, Total																		
Sulphur, Total	0.273	-	-	0.22	-	0.276	0.225	-	0.131	-	0.233	0.852	-	-	-	-	-	-
Sulphate, Total potential	0.819	-	-	0.66	-	0.828	0.675	-	0.393	-	0.699	2.56	-	-	-	-	-	-
Sulphate, acid soluble (total)	0.393	-	-	1.05	-	0.507	0.202	-	0.296	-	0.32	0.868	-	-	-	-	-	-
Cyanide, Total	1	1	1	1	7.46	15.8	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	15.4	19.2	19.4	12	12	12	12	12	28.2	12	19.1	12	12	227	137	164	262	92.4
Asbestos																		
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	0.001	-	-	-	-	0.001	0.001	-	-	-	-	-	-
Date of Analysis	08/11/2018	-	-	11/12/2018	-	08/11/2018	09/11/2018	-	09/11/2018	-	13/11/2018	09/11/2018	-	-	-	-	-	-
Analysed By	James Richards	-	-	Paul Poynton	-	Lucy Caroe	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Lucy Caroe	Barbara Urbanek-Walsh	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	0.001	-	-	-	-	0.001	0.001	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	None	-	-	-	-	None	None	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	N/A	-	-	-	-	N/A	N/A	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	0.001	-	-	-	-	0.001	0.001	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	-	Not Detected	-	Detected	Not Detected	-	Not Detected	-	Not Detected	Detected	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Detected	Not Detected	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Comments	0	-	-	0	-	Soil containing Fibre bundles	0	-	0	-	Loose fibres in soil	Fibre bundles in soil.	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	103	95.6	111	113	106	114	103	117	111	101	109	117	91.3	107	107	122	112	110
Toluene-d8**	94.8	91.7	95.2	92.5	98.3	100	97.1	98.1	98.6	98.6	95.6	90.1	93.1	98.8	98.6	99.1	99.3	99.9
4-Bromofluorobenzene**	82.1	73.5	90.8	87.2	83.1	95.2	83.9	94.6	91.9	90	92.6	82.6	96	95.4	95.9	106	97.5	97.9
Methyl Tertiary Butyl Ether	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.308	0.13	0.13	0.13	1.15
Sum of BTEX	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	4ED9V	4EE1	4EE1	4EE1	4EE10	4EE10	4EE2
Depth	2	0.5	1	2	0.4	1.5	0.2
Sampled Date	31/10/2018	01/11/2018	01/11/2018	01/11/2018	26/11/2018	26/11/2018	29/10/2018
Carbon							
Soil Organic Matter (SOM)	3.29	10.7	19.3	6.6	6.74	3.21	6.72
Metals (Solids)							
Arsenic	13.3	7.22	8.25	6.69	10.9	6.05	14.8
Cadmium	0.02	0.02	0.877	0.02	0.2	0.2	0.02
Chromium	35.7	37	115	143	129	525	48
Copper	13.7	14.6	29.2	15.4	19.7	18.3	36.2
Lead	30.5	29.2	35.4	26.2	29.9	9.99	79.8
Mercury	0.14	0.14	0.14	0.14	1.4	1.4	0.14
Nickel	36.4	17.1	16	10.1	56.6	13.4	17.6
Selenium	1	1.44	4.09	5.45	10	21	1.86
Vanadium	58.1	47	155	247	123	416	86.8
Zinc	128	128	130	83.5	236	38.6	454
TPH Criteria Working Group (TPH CWG)							
Benzene							
Toluene							
Ethylbenzene							
sum of detected mpo xylene by GC							
Aliphatics >C5-C6	0.0187	0.01	0.02	0.02	0.02	0.923	0.02
Aliphatics >C6-C8	0.0518	0.01	0.0549	0.0418	0.0294	0.363	0.02
Aliphatics >C8-C10	0.753	0.01	0.0373	0.0237	0.0272	2.59	0.02
Aliphatics >C10-C12	0.657	0.01	0.0461	0.0203	0.0958	651	0.02
Aliphatics >C12-C16	0.107	5.78	2.61	2.01	0.1	2.85	2.26
Aliphatics >C16-C21	11.1	23.7	39.4	12.1	1.5	7.05	22.7
Aliphatics >C21-C35	4.58	94.5	77.6	45.5	30.6	36.9	123
Aliphatics >C35-C44	0.1	43.7	16.7	14.2	6.9	9.07	36.3
Aromatics >EC5-EC7	0.0504	0.01	0.02	0.02	0.02	0.427	0.02
Aromatics >EC7-EC8	0.0259	0.01	0.02	0.02	0.02	0.2	0.02
Aromatics >EC8-EC10	0.503	0.01	0.0253	0.02	0.02	1.73	0.02
Aromatics >EC10-EC12	0.438	0.01	0.0307	0.02	0.0643	434	0.02
Aromatics >EC12-EC16	0.472	6.88	10.1	4.05	0.461	17.3	4.35
Aromatics >EC16-EC21	8.99	28.9	114	29.6	3.93	20.5	18
Aromatics >EC21-EC35	5.72	133	292	93.2	21.7	91.3	78.7
Aromatics >EC35-EC44	0.1	79.5	84.9	29.2	13.1	32.3	36.5
Aromatics >EC40-EC44	0.1	33.5	28.5	10.2	6.01	12.9	14.1
Polyaromatic Hydrocarbons (PAHs)							
Acenaphthylene	68.9	133	616	231	28.6	16.7	198
Acenaphthene	38.4	40	57.2	31.2	8	43.1	63.8
Anthracene	53.5	362	1590	434	295	70.4	668
Benz(a)anthracene	168	1150	4960	1780	129	1170	1840
Benzo(a)pyrene	161	1000	4090	1160	129	1630	1400
Benzo(b)fluoranthene	227	1200	5490	1910	151	1750	2350
Benzo(k)fluoranthene	95.3	553	1960	685	51.7	637	843
Benzo(g,h,i)perylene	107	718	2820	792	136	1440	879
Chrysene	173	1080	4270	1680	140	1210	1720
Dibenzo(a,h)anthracene	0.023	177	686	216	28	288	275
Indeno(1,2,3-cd)pyrene	100	665	3360	679	133	1420	1230
Fluoranthene	387	2550	10400	4250	215	1530	4040
Fluorene	19.9	121	607	284	39.2	31.6	209
Naphthalene	325	325	715	176	89	411	301
Phenanthrene	168	1370	6700	2350	180	696	2310
Pyrene	0.331	1.96	8.01	2.67	0.17	1.49	2.91
PAH, Total Detected USEPA 16	2.42	13.4	56.3	19.3	1.92	13.8	21.2
Naphthalene-d8 % recovery**	93.9	91.9	88.7	89	92.9	90.6	87.6
Acenaphthene-d10 % recovery**	86.4	95.3	89.8	91.4	88.6	90.5	91.5
Phenanthrene-d10 % recovery**	93.4	97.2	94.9	98.5	83.4	86.8	101
Chrysene-d12 % recovery**	91.2	88.7	92	104	72.3	77.7	105
Perylene-d12 % recovery**	87.7	73	89.4	99.2	72.4	83.6	98.5
Total Aliphatics >C12-C44	15.8	168	136	73.7	39	55.8	184
Total Aromatics >EC12-EC44	15.2	249	501	156	39.3	161	138
Total Aliphatics & Aromatics >C5-C44	33.5	417	637	230	78.5	1310	322
Metals - (Solid)							
Iron	27400	41600	64500	84900	189000	147000	53900
Manganese	721	3000	10400	17100	7510	32800	4340
Metals - (Liquid)							
Calcium	-	123000	-	171000	101000	226000	122000
Magnesium	-	17000	-	2470	17400	7200	14600
Phenols							
Phenol	0.01	0.01	0.01	0.01	0.01	0.011	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics							
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.137	-	0.168	0.063	1.46	0.4
pH	8.04	9.42	11.2	11.5	9.69	11.6	10.8
Sulphate, Total							
Sulphur, Total	-	0.383	-	0.3	0.142	1.31	0.338
Sulphate, Total potential	-	1.15	-	0.9	0.426	3.93	1.01
Sulphate, acid soluble (total)	-	0.548	-	0.42	0.102	3.43	0.494
Cyanide, Total	1	1	1	1	1	1	1.17
Exchangeable Ammonia as N	171	12	12	12	12	12	12
Asbestos							
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	0.001
Date of Analysis	-	14/11/2018	-	09/11/2018	11/12/2018	11/12/2018	08/11/2018
Analysed By	-	Andrzej Ferfecki	-	Renata Bozhkov	Paul Poynton	Paul Poynton	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	0.001
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	None
Analysts Comments	-	-	-	-	-	-	N/A
Asbestos Quantification - Total - %	-	-	-	-	-	-	0.001
Chrysotile (White) Asbestos	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Detected
Amosite (Brown) Asbestos	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	Detected	Not Detected	Not Detected
Comments	-	0	-	0	0	0	Fibre bundles in soil
Volatile Organic Compounds (VOCs)							
Dibromofluoromethane**	105	97.8	107	99.7	107	111	107
Toluene-d8**	96.6	97	96	97.9	95.7	96.2	99.7
4-Bromofluorobenzene**	94.7	81.6	90	87.3	87.8	94.9	90.9
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.171	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.189	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	1.25	0.13	0.258	0.13	0.13	0.389	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics							
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-

Sample ID	4EE2	4EE2	4EE4	4EE4	4EE4	4EE5	4EE5	4EE6	4EE6	4EE7	4EE7	4EE8	4EE8	4EE9	4EE9	4EE9	4EE10V	4EE1V	4EE2V
Depth	0.5	1.3	0.5	1	1.5	0.2	0.8	0.25	0.8	0.3	0.8	0.5	1	0.5	1	1.5	2.5	2.5	2.6
Sampled Date	29/10/2018	29/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018	31/10/2018	31/10/2018	31/10/2018	31/10/2018	31/10/2018	26/11/2018	01/11/2018	29/10/2018
Carbon																			
Soil Organic Matter (SOM)	59.8	43.4	32.2	45.2	31.7	7.36	27.8	1.52	1.14	2.1	1.19	3.93	1.49	4.88	0.803	1.14	2.97	1.81	5.03
Metals (Solids)																			
Arsenic	4.96	7.34	10.5	12.1	11.2	6	6	10.3	8.95	13.4	5.77	7.54	16.3	4.66	6	6	13.6	14	13.3
Cadmium	0.02	0.462	0.02	0.02	0.02	0.2	0.2	0.2	0.02	0.2	0.02	0.2	0.2	0.02	0.2	0.2	0.0786	0.428	0.02
Chromium	95.8	187	34	37.7	69.8	454	369	220	297	60.5	466	46.1	864	62.5	677	361	37	34.4	35
Copper	12.8	15.9	17.9	26.2	21.1	19	14	26.7	24.8	17.1	12.5	16.5	59.4	8.23	14.3	17.2	12.9	12.1	15.3
Lead	23.7	30.2	33	24.7	58.6	16.6	21.8	20	2.92	74.8	0.7	69.2	17.1	22.6	7	14.3	31.5	28.7	31.6
Mercury	0.14	1.4	1.61	2.17	0.757	1.4	1.4	1.4	0.14	1.4	0.14	1.4	1.4	0.14	1.4	1.4	0.14	0.14	0.14
Nickel	9.88	10	13.3	15.5	18	13.5	6.83	22.5	14.2	21.1	5.87	21.5	49.2	6.74	7.52	49.6	35.2	35.7	25.1
Selenium	4.92	10	2.36	2.91	3.3	19.3	12	13.3	10.2	10	13.9	10	35.7	5.56	25.3	17.9	1.52	1	1
Vanadium	116	190	59.2	92.1	84.3	508	335	249	360	95	439	104	614	70.3	486	348	58.8	59.9	50.9
Zinc	77	107	97.9	103	156	43.3	45.1	56.1	53.8	239	14.6	249	86.6	115	29.2	54.9	105	113	112
TPH Criteria Working Group (TPH CWG)																			
Benzene																			
Toluene																			
Ethylbenzene																			
sum of detected mpo xylene by GC																			
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.023	0.0283	0.74	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.0463	0.0155	0.0391	0.0111	0.02	0.0561	0.045	0.0281	0.0367	0.0513	0.0523	0.66	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.0328	0.0155	0.0467	0.01	0.02	0.619	0.0364	0.0562	0.04	0.627	0.384	1.77	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.276	0.164	0.981	0.0477	0.02	0.74	0.16	1.45	0.638	2.31	3.28	17.4	0.02	0.02
Aliphatics >C12-C16	5.52	7.21	5.28	3.06	4.72	5.34	1.38	23.5	1.25	0.683	8.03	2.54	13.8	0.1	1.66	12.9	0.1	0.59	0.1
Aliphatics >C16-C21	28.9	26.2	20.9	21.4	21.6	28.6	11.1	109	7.31	3.8	13	11.3	31.8	25.9	3.03	36.3	0.1	0.1	0.1
Aliphatics >C21-C35	77.6	111	51.3	33.7	43	61.1	35.4	119	28.8	41.6	73.8	82.3	254	118	44.4	173	0.1	2.43	4.89
Aliphatics >C35-C44	12	38.1	7.89	4.55	8.94	18.7	8.93	52.1	16	16.3	20.4	26.3	124	51.3	29.9	92.2	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.156	0.02	0.01	0.02	0.196	0.0871	1.09	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.373	0.02	0.013	0.02	0.349	0.142	0.2	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.0215	0.01	0.0315	0.01	0.02	0.412	0.0246	0.0378	0.0259	0.418	0.256	1.18	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.184	0.11	0.654	0.0311	0.02	0.494	0.107	0.964	0.426	1.54	2.18	11.6	0.02	0.02
Aromatics >EC12-EC16	6.9	6.88	10.4	6.3	7.22	2.3	2.16	5.66	1.7	1.97	3.21	3.68	4.93	3.43	0.565	3.23	0.1	0.1	0.1
Aromatics >EC16-EC21	29.6	34.2	86.9	39.7	55	16.2	17.1	45.8	8.59	8.5	34.8	11.6	30.2	25.6	12.9	24.4	0.1	0.299	1.3
Aromatics >EC21-EC35	118	155	358	149	189	80.3	73.3	136	68.6	45.3	216	52.9	208	111	99.3	145	2.19	5.4	39.8
Aromatics >EC35-EC44	34.2	62.5	84.7	36.3	53.5	30.4	25.3	86.9	50.5	28.7	76.5	26.8	139	74.7	60.9	103	0.1	1.76	8.98
Aromatics >EC40-EC44	11.8	24.1	24.8	12.5	18.2	12.1	9.41	39.9	22.9	12.3	27.6	11	55.6	32	25.3	44.1	0.1	0.1	2.98
Polyaromatic Hydrocarbons (PAHs)																			
Acenaphthylene	56.5	44.4	800	1390	571	12	12	155	12	116	60	145	32.9	60	60	13.2	12	12	12
Acenaphthene	35.9	28.3	221	396	192	47	58.3	40	29.2	18.6	255	62.3	79.2	61.9	40	38.5	8	8	8
Anthracene	187	201	1450	2830	1360	112	145	80	30.2	188	484	289	156	179	113	105	16	16	16
Benz(a)anthracene	942	632	6210	8900	4250	787	853	1250	712	551	5400	829	1460	1200	1870	1330	14	42.1	14
Benzo(a)pyrene	908	591	6780	8460	4060	918	887	1960	1020	464	6200	664	1540	1020	2230	1440	15	31.9	15
Benzo(b)fluoranthene	1490	952	9900	12900	6610	1290	1060	2730	1460	511	8320	1150	2440	1230	3360	1650	15	39.8	15
Benzo(k)fluoranthene	594	297	3520	3690	2160	458	462	1090	496	234	3300	355	762	479	1340	790	14	14	14
Benzo(g,h,i)perylene	603	458	4930	5810	3450	635	608	1480	710	365	4050	518	1150	669	1610	1300	24	24	24
Chrysene	1020	698	6200	7020	4120	799	828	1560	831	512	6030	681	1700	1170	1920	1500	10	39.7	10
Dibenzo(a,h)anthracene	175	98.3	1340	1490	1020	172	146	376	181	82.8	822	134	254	143	397	212	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	741	408	4160	4800	3580	504	546	1200	554	333	5770	479	1100	756	1350	1130	0.018	23.1	0.018
Fluoranthene	1340	1140	10700	16600	7720	1210	1350	1220	745	1020	7160	1730	2150	1860	2430	2710	0.017	107	0.017
Fluorene	56.9	46.9	488	1110	464	26.6	26.5	50	10	59.7	107	207	50.7	50	50	18.9	23	10	10
Naphthalene	143	105	2460	2240	1550	59.6	102	45	45.4	293	2000	415	152	83	240	709	2450	17.4	9
Phenanthrene	814	596	5810	10300	5030	513	803	361	185	659	2930	1420	873	545	943	1280	15	66.7	15
Pyrene	1.3	0.93	8.71	13.1	6.06	1.1	1.23	1.35	0.777	0.727	6.84	1.24	2.68	2.47	2.55	2.72	0.015	0.0834	0.015
PAH, Total Detected USEPA 16	10.4	7.22	73.6	101	52.2	8.63	9.11	14.7	7.77	6.13	59.7	10.3	16.6	11.9	20.4	16.9	2.47	0.451	0.118
Naphthalene-d8 % recovery**	85.6	91.4	86.3	85	93.6	86.6	94.9	89.1	87.8	82.4	76.6	96.3	93.1	86.4	106	90.4	92.8	96.8	83.6
Acenaphthene-d10 % recovery**	89.6	89.3	82.8	81.7	99.3	80.9	94.4	81.1	84.6	84.6	81.4	90.8	91.7	89.4	85.2	93.8	90.2	96.2	87.8
Phenanthrene-d10 % recovery**	93.2	87.1	78.1	77.5	95.4	82	98.8	82.2	87.1	87.1	81.7	90.4	91.5	93.9	92.8	98	87.5	101	93.9
Chrysene-d12 % recovery**	86.8	72.7	72.8	73.1	77.6	78	91.4	76	84.6	76.8	81.2	81.4	81.5	96.2	96.9	85.8	91.6	97.9	96.6
Perylene-d12 % recovery**	72.1	71.8	71.3	70.7	75.6	80.5	77.9	79.3	80.3	70.7	77.1	83.1	88.8	86.8	95.2	78.9	86.1	84.3	95.8
Total Aliphatics >C12-C44	124	182	85.5	62.7	78.3	114	56.9	304	53.4	62.4	115	122	424	196	79	314	0.1	3.02	4.89
Total Aromatics >EC12-EC44	189	258	540	232	305	129	118	275	129	84.5	330	95	382	215	174	275	2.19	7.46	50.1
Total Aliphatics & Aromatics >C5-C44	313	440	626	294	383	244	175	580	183	147	448	218	809	412	258	596	36.6	10.5	55
Metals - (Solid)																			
Iron	57600	67400	43800	41500	43600	130000	92900	125000	185000	114000	188000	144000	2390000	64800	181000	114000	34100	37200	24600
Manganese	9350	15600	3750	4240	5570	28800	22300	18000	32400	4850	49400	6740	408000	13500	43600	35500	414	1600	188
Metals - (Liquid)																			
Calcium	-	166000	74600	-	133000	224000	-	193000	-	153000	-	173000	-	193000	-	242000	-	-	-
Magnesium	-	12400	7220	-	13500	12600	-	14000	-	9950	-	12900	-	26100	-	21600	-	-	-
Phenols																			
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0444	0.01	0.0104	0.01	0.01	0.01	0.01	0.0109	0.013	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0111	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0555	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																			
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.173	0.111	-	0.187	0.244	-	0.174	-	0.0991	-	0.0641	-	0.11	-	0.0942	-	-	-
pH	11.4	11.3	8.94	8.86	10.9	12.1	12.2	11.8	12.2	9.95	12.6	10.6	11.1	11	12.6	12.3	7.9	8.36	7.2
Sulphate, Total																			
Sulphur, Total	-	0.663	0.285	-	0.29	0.304	-	0.631	-	0.153	-	0.115	-	0.671	-	0.739	-	-	-
Sulphate, Total potential	-	1.99	0.855	-	0.87	0.912	-	1.89	-	0.459	-	0.345	-	2.01	-	2.22	-	-	-
Sulphate, acid soluble (total)	-	0.53	0.21	-	0.261	0.729	-	0.796	-	0.303	-	0.255	-	0.589	-	0.923	-	-	-
Cyanide, Total	1	1	20.9	18.5	12.7	1	1	1	3.56	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	126	227	353
Asbestos																			
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	0.0174	-	0.001	-	-	-	-	-	-	-	-	-
Date of Analysis	-	08/11/2018	09/11/2018	-	09/11/2018	09/11/2018	-	09/11/2018	-	09/11/2018	-	09/11/2018	-	09/11/2018	-	09/11/2018	-	-	-
Analysed By	-	James Richards	Lucy Caroe	-	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Lucy Caroe	-	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	Marcin Magdziarek	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	0.0017	-	0.001	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	-	None	-	None	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	N/A	-	N/A	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	0.0191	-	0.001	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Amosite (Brown) Asbestos	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Fibrous Anthophyllite	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Fibrous Tremolite	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Fibrous Actinolite	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Non-Asbestos Fibre	-	Not Detected	Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Comments	-	0	0	-	0	0	-	Soil containing debris typical of AIB	-	Fibre bundles in soil	-	0	-	0	-	0	-	-	-
Volatile Organic Compounds (VOCs)																			
Dibromofluoromethane**	109	111	85.9	103	95.8	104	118	122	118	100	123	102	116	105	99.1	109	110	103	110
Toluene-d8**	95.5	99.9	89.7	90.8	95.3	99.8	98.1	95.7	99	97.4	106	96.7	84.3	99	95.8	98.9	98.4	101	95.1
4-Bromofluorobenzene**	72.7	95.8	69.3	66.6	78.2	95.5	94.3	100	107	85.2	106	82.4	71.6	93.7	94.9	95.9	95.8	98.7	92.1
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.0991	0.09	1.76	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.102	0.07	0.07	0.07	0.101	0.077	0.153	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.582	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.928	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.297	0.1	0.1
Naphthalene	0.13	0.13	0.159	0.367	0.183	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	10.6	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.72	0.4	0.4
Subcontracted: Inorganics																			
Gross Calorific Value in Dry Matter Q(V/gr/d)	15.3	-	-	11.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	13.4	-	-	9.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	15.2	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	13	-	-	9.34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	1.08	-	-	0.95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	11.6	-	-	11.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	12.6	-	-	12.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4EE4V	4EE5V	4EE6V	4EE7V	4EE8V	4EE9V	4EF10	4EF10	4EF4	4EF4	4EF6	4EF6	4EF8	4EF8	4EF9A	4EF9A	4EF9AV	4EF10V	4EF4V	4EF6V	4EF8V	4EG4	4EG4
Depth	2.1	1.95	1.8	1.75	2	2.1	0.4	1	0.5	1	0.3	0.8	0.5	0.9	0.5	1	2	2.5	2.1	1.55	1.5	0.5	1
Sampled Date	30/10/2018	30/10/2018	30/10/2018	30/10/2018	31/10/2018	31/10/2018	26/11/2018	26/11/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018	01/11/2018	01/11/2018	31/10/2018	31/10/2018	31/10/2018	26/11/2018	30/10/2018	30/10/2018	01/11/2018	30/10/2018	30/10/2018
Carbon																							
Soil Organic Matter (SOM)	1.05	5.78	1.23	5.65	6	1.13	2.43	2.57	28.1	30.5	1.25	0.972	0.722	0.76	7.78	0.35	2.78	1.27	1.33	3.78	1.23	22.8	28.3
Metals (Solids)																							
Arsenic	12.4	13.1	13.6	14	14.9	17.3	81.7	4.05	11.7	9.29	4.75	6	6	6	6	6	13	21.8	12.3	11.9	13.2	10.8	10.9
Cadmium	0.02	0.02	0.02	0.02	0.02	0.02	0.2	0.02	0.02	0.02	0.02	0.2	0.2	0.2	0.2	0.2	0.02	0.0827	0.02	0.02	0.02	0.129	0.02
Chromium	31.7	37.7	33.7	35.9	51	25.6	86.7	52.4	108	59	352	439	528	824	106	734	37.2	34.9	29.8	41.4	34	38.9	36.2
Copper	10.3	16.3	11.8	22.5	16.8	16.6	41.1	25.8	18.5	18.7	12.4	14	18	14.8	18.2	19.3	12.8	11.5	11.1	13.7	11.3	31.2	107
Lead	22.7	45.1	24.5	39.1	41.7	22.3	46.2	13.6	45.6	33.2	0.992	10.5	19.7	7	17.3	7	27.6	33.4	24.5	32	28.6	72.6	112
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	34	27.7	38.8	30.4	25.8	30.3	88.3	8.26	12.9	11.6	6.38	8.31	12.8	4.68	16	9.16	34.9	41	32.6	30.3	43.7	28.1	33
Selenium	1	1	1	1	1	1	24.8	4.12	3.27	3.11	10.8	21.1	20.7	25.1	10	26.8	1	1	1	1	1	2.25	1.6
Vanadium	53.6	57.8	56.5	58	66.9	44.2	183	149	112	128	283	379	380	542	99.4	540	62.6	58.2	52.7	65.9	59.5	87.9	64.4
Zinc	103	129	107	165	128	83.9	188	94.2	116	96.3	30.9	30.2	89.1	25.6	64.3	19	107	113	102	114	115	151	864
TPH Criteria Working Group (TPH CWG)																							
Benzene																							
Toluene																							
Ethylbenzene																							
sum of detected mpo xylene by GC																							
Aliphatics >C5-C6	0.02	0.01	0.02	0.0311	0.0143	0.0494	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.0201	0.02	0.02	0.01	0.0354	0.02	0.02
Aliphatics >C6-C8	0.0715	0.01	0.02	0.124	0.0445	0.0806	0.0601	0.0396	0.01	0.01	0.02	0.02	0.0645	0.0596	0.01	0.0304	0.0884	0.0683	0.02	0.01	0.128	0.02	0.02
Aliphatics >C8-C10	0.195	0.01	0.02	0.891	0.159	0.209	0.0848	0.0451	0.01	0.01	0.02	0.02	0.123	0.565	0.01	0.0933	0.423	0.0898	0.02	0.01	0.365	0.02	0.02
Aliphatics >C10-C12	0.542	0.01	0.02	1.53	0.984	1.28	0.392	0.235	0.01	0.01	0.02	0.02	0.421	0.965	0.01	0.405	0.945	0.225	0.02	0.01	0.199	0.02	0.02
Aliphatics >C12-C16	70.9	0.1	0.1	0.1	23.6	0.1	0.1	1.47	1.15	1.09	0.718	14.5	0.1	2.78	0.1	1.14	0.1	0.1	0.1	0.1	0.1	0.233	1.25
Aliphatics >C16-C21	67.6	0.1	0.1	0.1	27.9	0.1	5.01	10.2	12.2	12.2	5.58	75.1	5.14	9.32	1.06	0.612	0.1	0.1	0.1	0.1	0.1	9.83	10.3
Aliphatics >C21-C35	14.1	5.27	0.1	5.15	5.03	0.1	32.8	140	27.1	31.4	18.2	63.1	68.4	64.4	46	13.9	0.1	0.1	0.1	1.71	0.225	46.5	64.8
Aliphatics >C35-C44	0.1	0.1	0.1	0.1	0.1	0.1	10.8	31.2	5.28	3.78	8.55	36.3	14.2	14	7.73	4.65	0.1	0.1	0.1	0.1	0.1	17.4	29.7
Aromatics >EC5-EC7	0.02	0.01	0.02	0.02	0.01	0.0702	0.02	0.02	0.01	0.01	0.02	0.02	0.0333	0.218	0.01	0.0252	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.0688	0.561	0.01	0.0566	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Aromatics >EC8-EC10	0.13	0.01	0.02	0.593	0.105	0.14	0.0558	0.0297	0.01	0.01	0.02	0.02	0.0817	0.377	0.01	0.0618	0.283	0.059	0.02	0.01	0.244	0.02	0.02
Aromatics >EC10-EC12	0.361	0.01	0.02	1.02	0.657	0.853	0.261	0.157	0.01	0.01	0.02	0.02	0.282	0.644	0.01	0.269	0.63	0.15	0.02	0.01	0.132	0.02	0.02
Aromatics >EC12-EC16	21.8	0.1	0.1	0.1	9.37	0.1	1.54	1.05	1.69	3.5	0.197	3.18	2.3	6.74	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.58	1.6
Aromatics >EC16-EC21	26.2	0.268	0.1	0.1	17.5	0.1	17.7	16.8	12	29.6	4.06	25.8	28.9	30.6	6.22	3.41	0.1	0.1	0.1	0.1	0.5	56.6	16.3
Aromatics >EC21-EC35	9.14	25.1	0.1	50.5	8.02	0.1	101	67.3	48.4	118	24.4	85.4	153	135	29.3	22.5	1.47	0.1	0.282	11.3	4.84	174	93.1
Aromatics >EC35-EC44	1.62	3.81	0.1	7.63	0.1	0.1	46.1	27.8	15.9	32.8	14.5	51.3	56.1	55.2	14	13.7	0.1	0.1	0.1	1.67	3.24	64.5	43.7
Aromatics >EC40-EC44	1.2	0.831	0.1	1.88	0.197	0.1	19	9.49	5.74	10.6	5.98	22.6	19.2	18.8	5.25	6.11	0.1	0.1	0.1	0.523	1.07	23.8	17.3
Polyaromatic Hydrocarbons (PAHs)																							
Acenaphthylene	12	12	12	12	12	12	364	448	148	124	12	60	30.4	18.5	12	12	12	12	12	12	12	236	446
Acenaphthene	8	8	8	28.2	29	19.8	63.8	32.8	28	132	8	40	175	104	21.1	13.7	8	8	8	8	8	49.4	88
Anthracene	25.8	16	16	16	16	16	230	399	177	461	20.6	80	468	246	22.2	29.1	16	16	16	16	16	475	779
Benz(a)anthracene	14	14	14	14	111	14	2020	3480	737	1940	249	519	4530	2150	195	756	14	42	14	14	14	2170	2960
Benzo(a)pyrene	15	15	15	15	98.6	15	2000	3190	788	2210	255	745	5180	2240	214	921	15	52.3	15	15	15	2290	3480
Benzo(b)fluoranthene	15	15	15	15	161	15	3460	3920	1310	2960	340	1170	5950	3390	220	944	15	51.6	15	15	15	3580	5190
Benzo(k)fluoranthene	14	14	14	14	66	14	1190	1470	457	1030	150	394	2490	1400	96.5	458	14	25	14	14	14	1590	1670
Benzo(g,h,i)perylene	24	24	24	24	74.8	24	1470	1720	679	1630	206	604	3640	1570	180	681	24	48	24	24	24	2000	3610
Chrysene	10	10	10	16.2	128	17	1930	2560	716	1880	287	565	4670	2310	215	818	10	45.7	10	10	10	2020	2960
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	291	441	189	427	45.1	148	774	366	35.8	137	0.023	0.023	0.023	0.023	0.023	488	824
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	0.018	66.1	0.018	1590	1400	531	1480	183	497	3520	1380	200	748	0.018	46.2	0.018	0.018	0.018	1550	2790
Fluoranthene	24	0.017	0.017	33.5	293	49.7	2880	5580	1270	3120	624	648	7660	3690	239	987	0.017	56.9	0.017	0.017	0.017	3330	5180
Fluorene	34.4	10	10	10	27.7	10	55.4	62.7	68.8	122	10	50	75.6	27.3	10	10	10	10	10	10	10	123	365
Naphthalene	27.2	9	9	545	983	524	227	121	382	429	50.3	45	143	222	117	229	639	24.4	9	97.8	9	561	621
Phenanthrene	71.8	15	15	24	279	37.9	762	1170	698	1550	220	176	4450	2490	111	259	15	20.9	15	15	15	1540	2810
Pyrene	0.0201	0.015	0.015	0.0253	0.24	0.0442	2.43	4.98	0.999	2.6	0.546	0.711	7.01	3.28	0.253	0.987	0.015	0.0602	0.015	0.015	0.015	2.64	3.98
PAH, Total Detected USEPA 16	0.203	0.118	0.118	0.672	2.56	0.693	21	31	9.17	22.1	3.18	6.17	50.8	24.9	2.12	7.97	0.639	0.473	0.118	0.118	0.118	24.6	37.8
Naphthalene-d8 % recovery**	94	79.7	81.4	78.5	103	91.8	93.3	87.9	87.7	91	82.2	90.4	92.4	88.6	84.5	84.9	97.1	93.2	84.9	83.1	92.9	87.2	86.9
Acenaphthene-d10 % recovery**	98.3	82.8	84.3	83.2	97.1	97.4	92.7	88.6	89.5	86.3	85.1	81.3	92.8	91.2	91.1	91.3	94.8	90.3	81.4	80.1	93.2	77.2	88.3
Phenanthrene-d10 % recovery**	97.4	85.8	86.1	85.6	99.8	101	89.7	91.3	85.9	81	86	81.4	99.7	99.4	96.1	96.5	97.7	83.8	75.8	73.7	98.6	83.3	78.7
Chrysene-d12 % recovery**	82.3	79.5	84.9	77.4	93.1	90.4	96.8	103	74.5	72.3	77.2	70.8	97.2	105	94.4	93.4	86.2	75	71.6	70.2	94.5	74	74.4
Perylene-d12 % recovery**	77.7	76.4	82.6	74.3	92.6	82.2	96.6	109	72.8	72.4	73.5	72.3	90.3	96.5	88.6	90.6	91.9	79	70.7	72.8	84.5	71.8	72.9
Total Aliphatics >C12-C44	153	5.27	0.1	5.15	56.5	0.1	48.6	182	45.7	48.4	33	189	87.8	90.5	54.8	20.3	0.1	0.1	0.1	1.71	0.225	73.9	106
Total Aromatics >EC12-EC44	58.8	29.2	0.1	58.2	34.9	0.1	167	113	77.9	184	43.1	166	240	228	49.6	39.7	1.47	0.1	0.282	13	8.58	299	155
Total Aliphatics & Aromatics >C5-C44	213	34.4	0.1	67.5	93.3	2.68	216	296	124	232	76.1	355	329	322	104	60.9	3.86	0.592	0.282	14.7	9.91	373	261
Metals - (Solid)																							
Iron	40000	34400	41300	39900	33500	27400	61700	45900	36200	37500	129000	112000	150000	184000	91900	186000	38500	42900	37400	39800	36000	38700	52300
Manganese	1390	267	736	349	1390	432	34700	6820	5510	5380	29500	32200	26700	44000	10100	134000	825	311	1220	639	803	3590	2860
Metals - (Liquid)																							
Calcium	-	-	-	-	-	-	203000	192000	-	192000	-	253000	235000	-	-	288000	-	-	-	-	-	-	114000
Magnesium	-	-	-	-	-	-	23800	21200	-	35200	-	8910	9850	-	-	9480	-	-	-	-	-	-	9950
Phenols																							
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0215	0.0106	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																							
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	0.0706	0.213	-	0.0796	-	0.127	0.0212	-	-	0.0639	-	-	-	-	-	-	0.141
pH	8.12	6.64	7.63	7.18	8.06	8.14	9.92	11.3	10.1	9.64	12.7	12.1	12.7	12.4	10.7	12.3	7.79	7.76	7.97	6.87	8	10.1	9.46
Sulphate, Total																							
Sulphur, Total	-	-	-	-	-	-	0.302	0.466	-	0.221	-	0.505	0.141	-	-	0.395	-	-	-	-	-	-	0.247
Sulphate, Total potential	-	-	-	-	-	-	0.906	1.4	-	0.663	-	1.52	0.423	-	-	1.19	-	-	-	-	-	-	0.741
Sulphate, acid soluble (total)	-	-	-	-	-	-	0.309	0.507	-	0.133	-	0.539	0.37	-	-	0.574	-	-	-	-	-	-	0.231
Cyanide, Total	1	1	1	1	1	1	1.25	1.67	1.06	1.84	1	1.02	1	1	1	1	1	1	1	1	1	1	1.98
Exchangeable Ammonia as N	205	190	102	378	322	152	12	12	12	12	12	12	12	12	12	12	177	169	89.8	216	321	12	12
Asbestos																							
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	11/12/2018	11/12/2018	-	09/11/2018	-	09/11/2018	09/11/2018	-	-	09/11/2018	-	-	-	-	-	-	09/11/2018
Analysed By	-	-	-	-	-	-	Paul Poynton	Paul Poynton	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	Lucy Caroe	-	-	Renata Bozhkov	-	-	-	-	-	-	Marcin Magdziarek
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	-	Not Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	-	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	-	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	-	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	-	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	-	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	Detected	Detected	-	Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	-	Detected
Comments	-	-	-	-	-	-	0	0	-	0	-	0	0	-	-	0	-	-	-	-	-	-	0
Volatile Organic Compounds (VOCs)																							
Dibromofluoromethane**	126	119	128	107	111	107	110	110	115	114	106	105	101	103	106	107	107	109	122	121	103	102	101
Toluene-d8**	108	100	107	97.5	95.2	97.2	97.2	97.3	95.7	95.9	101	99.2	99.3	99.4	97.3	101	97	98	99.3	97.2	100	98.2	96.9
4-Bromofluorobenzene**	108	104	106	94.6	94.1	94.9	95.2	94.3	87.2	84.9	97.3	96	96.9	99.3	98.2	99.2	95.7	96.5	103	99.8	99.1	88.9	83.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.171	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.121	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.436	0.706	0.402	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1.64	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																							
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	4EG4V	4GA4	4GA4	4GA6	4GA6	4GA7	4GA8	4GA8	4GA4V	4GA6V	4GA7V	4GA8V	4GB1	4GB1	4GB2	4GB2	4GB3	4GB4
Depth	1.9	0.2	1	0.5	0.7	0.5	0.4	0.7	1.8	2.8	1.8	2.1	0.2	0.7	0.7	1.3	0.5	0.3
Sampled Date	30/10/2018	06/11/2018	06/11/2018	05/11/2018	05/11/2018	20/11/2018	20/11/2018	20/11/2018	06/11/2018	05/11/2018	20/11/2018	20/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018	05/11/2018	05/11/2018
Carbon																		
Soil Organic Matter (SOM)	0.953	8.84	11.8	5.69	3.22	24.8	6.1	10.8	9.74	59.8	1.56	4.14	4.43	19.8	14.3	0.35	0.35	0.378
Metals (Solids)																		
Arsenic	14.2	9.63	6.72	13.8	6	6.83	7.85	2.33	10.7	10.2	12.4	11	8.77	8.72	21.6	7.76	8.77	8.77
Cadmium	0.02	0.0973	0.02	1.19	0.2	0.02	0.686	0.604	0.02	0.222	0.267	0.264	0.372	0.2	0.2	0.02	0.2	0.02
Chromium	30.3	33.3	43.3	240	533	33	245	49.4	38.6	3.2	74.3	33.1	81.3	112	9	0.9	22.5	56.3
Copper	12.2	18.9	13.4	32.3	15.9	10.7	19.2	4.82	15.7	15.6	12	14.7	25.9	18.9	15.7	3.21	17.6	10.9
Lead	23.8	72.2	21.6	30.1	14.3	32.4	37.2	28.5	32.4	4.61	24.8	29.7	106	134	9.11	9.73	46.4	59.6
Mercury	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	1.4	0.14
Nickel	35.1	13	14.5	22.3	12.7	13.1	18.9	2.88	28.9	9.29	36	30.9	24.4	44.9	31.1	6.59	26.7	10.9
Selenium	1	6.06	1.73	6.38	15.5	1.3	10	1	1	1.55	1.04	1	10	10	10	1	10	3.23
Vanadium	52.9	44.3	59.5	430	985	58.8	225	38.8	57.3	10.5	89.4	54.1	89.2	137	128	17.9	64.8	90.7
Zinc	104	279	102	99.3	50.6	114	112	109	114	47.1	97.8	108	435	221	68.5	25.9	200	233
TPH Criteria Working Group (TPH CWG)																		
Benzene																		
Toluene																		
Ethylbenzene																		
sum of detected mpo xylene by GC																		
Aliphatics >C5-C6	0.02	0.0242	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.119	0.0598	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0652	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.366	0.0736	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0576	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.265	0.153	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0489	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.1	7.62	25.8	2.03	1.5	0.793	2.71	0.593	0.1	0.546	0.1	0.156	1.78	0.281	0.1	4.97	0.1	2.89
Aliphatics >C16-C21	0.1	25	51.8	8.87	3.86	4.98	26.9	5.21	0.1	0.1	0.1	0.1	9.08	26	4.52	20.6	6.48	11.6
Aliphatics >C21-C35	0.1	112	148	53.5	21.9	60.5	167	24.7	3.1	42.8	0.1	0.692	90.1	46.8	42.6	48.3	39.3	79.1
Aliphatics >C35-C44	0.1	41.4	37.8	25.2	15.1	17.2	45.8	4.74	0.1	0.1	0.1	0.235	34.4	3.82	3.13	13.1	7.93	24.9
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.0264	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.244	0.0495	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.038	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.177	0.102	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0326	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	0.1	6.44	0.135	1.41	0.1	1.82	2.11	0.867	0.1	2.52	0.1	0.122	3.14	12.1	0.928	0.795	7.26	1.74
Aromatics >EC16-EC21	0.1	36.8	9.6	12.4	5.95	7.24	11.8	6.21	0.1	8	0.1	0.1	11.5	93.2	10.9	4.69	72.8	10.1
Aromatics >EC21-EC35	1.53	134	41.2	98	57	50.3	109	16.8	21.7	159	4.61	3.67	73.7	245	26.6	9.07	3310	49.4
Aromatics >EC35-EC44	2.26	63.5	4.58	41	20	22.5	60.2	4.96	5	32.5	0.547	0.395	45.3	67.6	1.5	1.61	74.4	24.8
Aromatics >EC40-EC44	2.05	26.1	0.354	15	6.7	10.5	27.9	1.75	1.55	11.9	0.1	0.1	18.8	22	0.1	0.533	24.6	9.64
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	12	60	60	27.2	12	40.2	120	12	12	120	12	12	816	589	51.1	12	47.6	116
Acenaphthene	8	40	40	51.1	30.3	15.9	80	11.3	8	80	8	8	70.7	105	10.8	8	9.61	44.7
Anthracene	16	195	80	111	46.3	89.7	254	35.7	16	160	16	16	1560	1290	113	25.9	68.6	261
Benz(a)anthracene	14	651	70	1460	1040	333	486	178	14	140	38.3	14	2340	3660	287	58.7	287	846
Benzo(a)pyrene	15	498	75	1960	1390	371	580	214	15	150	66.9	15	1860	3790	216	47.6	347	742
Benzo(b)fluoranthene	15	412	75	1620	1070	582	950	355	15	150	65.8	15	2390	5110	328	59.1	532	658
Benzo(k)fluoranthene	14	255	70	914	695	219	318	97.1	14	140	19.8	14	817	2000	104	21.3	197	398
Benzo(g,h,i)perylene	24	384	120	1320	946	250	435	158	24	0.24	50.2	24	1280	3080	194	39.2	279	556
Chrysene	10	537	50	1470	1140	375	608	189	10	0.1	44.1	10	1810	3450	278	55.5	296	779
Dibenzo(a,h)anthracene	0.023	0.115	0.115	283	207	59.9	0.23	39.1	0.023	0.23	0.023	0.023	301	700	48.4	0.023	73.6	132
Indeno(1,2,3-cd)pyrene	0.018	319	90	1340	875	190	328	149	0.018	180	37.8	0.018	1380	2950	175	39.8	254	474
Fluoranthene	0.017	1680	0.085	1790	1200	497	1060	221	0.017	0.17	38.7	0.017	6240	7210	668	133	431	1670
Fluorene	10	50	50	33	13.9	22.3	0.1	17.8	10	0.1	10	10	1040	381	50.7	12.8	26.1	93.6
Naphthalene	9	117	45	83.5	33.2	105	167	26.8	9	90	9	9	361	1220	171	29	115	220
Phenanthrene	15	596	75	464	276	239	432	186	15	150	15	15	6030	3910	557	98.2	234	778
Pyrene	0.015	1.26	0.075	1.84	1.26	0.408	0.903	0.216	0.015	0.15	0.0401	0.015	4.16	5.65	0.511	0.101	0.358	1.33
PAH, Total Detected USEPA 16	0.118	6.91	0.59	14.8	10.2	3.8	6.52	2.09	0.118	1.18	0.402	0.118	32.4	45.1	3.76	0.72	3.56	9.1
Naphthalene-d8 % recovery**	81.9	84.2	91	97.9	98.5	73.8	71	86.8	94.6	90.7	88.1	68.9	91.2	94.5	94.3	91.1	91.3	86.6
Acenaphthene-d10 % recovery**	79.9	82.9	83.3	98.1	97.5	73.6	68.2	87.4	91.2	87.2	83	71.2	92.7	95.6	93.2	91.3	85.2	92.5
Phenanthrene-d10 % recovery**	76	82.2	90.4	99.8	100	74.5	72.8	89.6	93.3	92.7	81.4	69.7	99.7	100	95.8	92.9	91.4	100
Chrysene-d12 % recovery**	73.3	80.9	78.6	101	102	71	72.7	85.4	82.4	87	86.3	72.8	99.1	95.9	86.4	93.2	91	101
Perylene-d12 % recovery**	72.6	76.5	76.3	96.4	95.7	72.2	75.1	84.1	82.2	85.2	94.8	74.4	91.5	82.3	70.1	88.2	91.5	94
Total Aliphatics >C12-C44	0.1	186	263	89.6	42.3	83.5	242	35.2	3.1	43.3	0.1	1.08	135	76.9	50.2	87	53.7	118
Total Aromatics >EC12-EC44	3.78	241	55.6	153	82.9	81.8	183	28.9	26.7	202	5.16	4.18	134	418	40	16.2	3470	86.1
Total Aliphatics & Aromatics >C5-C44	3.78	428	319	242	125	165	425	64.1	29.8	245	5.16	5.27	269	495	90.2	103	3520	205
Metals - (Solid)																		
Iron	38300	51400	50900	165000	159000	43400	91800	26700	29000	13200	38300	22300	59600	221000	339000	49700	131000	53600
Manganese	1710	12600	3880	23700	30100	4350	15700	2950	370	292	2710	328	4370	9310	10200	467	3380	67.6
Metals - (Liquid)																		
Calcium	-	-	145000	-	157000	136000	175000	-	-	-	-	-	147000	-	-	273000	131000	83100
Magnesium	-	-	11800	-	8180	14000	19900	-	-	-	-	-	27500	-	-	4540	7540	12700
Phenols																		
Phenol	0.01	0.01	0.0345	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.0115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.046	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	0.105	-	0.0858	0.125	0.0917	-	-	-	-	-	0.112	-	-	0.12	0.169	0.172
pH	8.63	10.9	11.2	11.9	11.6	10.7	10.1	11.4	7.47	6.85	8.76	7.48	9.52	10.6	9.72	11.4	11	10.9
Sulphate, Total																		
Sulphur, Total	-	-	0.263	-	0.208	0.159	0.389	-	-	-	-	-	0.2	-	-	0.0558	0.31	0.414
Sulphate, Total potential	-	-	0.789	-	0.624	0.477	1.17	-	-	-	-	-	0.6	-	-	0.167	0.93	1.24
Sulphate, acid soluble (total)	-	-	0.54	-	0.316	0.02	0.731	-	-	-	-	-	0.26	-	-	0.0713	0.381	1.59
Cyanide, Total	1	1.29	1	1	1	1	1	1	1	1	1	1	1	1.95	1	1	1	1
Exchangeable Ammonia as N	68	12	12	22.7	12	12	12	12	302	97.3	59.7	202	12	19.9	12	12	12	12
Asbestos																		
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.0047
Date of Analysis	-	-	15/11/2018	-	09/11/2018	03/12/2018	03/12/2018	-	-	-	-	-	14/11/2018	-	-	09/11/2018	14/11/2018	14/11/2018
Analysed By	-	-	Andrzej Ferfecki	-	Andrzej Ferfecki	Christian Hallam	Christian Hallam	-	-	-	-	-	Andrzej Ferfecki	-	-	Renata Bozhkov	Lucy Caroe	James Richards
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.001
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	None
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	N/A
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.0047
Chrysotile (White) Asbestos	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	-	Not Detected	Detected	Detected
Amosite (Brown) Asbestos	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Comments	-	-	0	-	0	0	0	-	-	-	-	-	0	-	-	0	Soil containing ACM debris	Fibre bundles in soil
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	120	103	107	112	108	107	109	109	114	112	108	108	106	90.9	106	108	105	108
Toluene-d8**	105	90.9	94.4	98.7	99.8	101	98.2	102	96.7	93.6	97.5	101	96.4	89.9	96.2	101	113	101
4-Bromofluorobenzene**	107	70.2	74.5	91.2	108	81.1	76.5	85.6	83.5	74.4	100	85.2	96.1	70.2	85.1	102	94.6	97.5
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.26	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4GB4	4GB5	4GB5	4GB6	4GB6	4GB8	4GB8	4GB9	4GB1V	4GB5V	4GB6V	4GB7V	4GB8V	4GB9V	4GC1	4GC1	4GC2
Depth	0.6	0.5	1	0.5	0.9	0.4	0.8	0.5	1.9	2.1	1.8	1.2	1.6	1.6	0.4	1	0.5
Sampled Date	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	06/11/2018	06/11/2018	20/11/2018	02/11/2018	05/11/2018	05/11/2018	06/11/2018	06/11/2018	20/11/2018	02/11/2018	02/11/2018	02/11/2018
Carbon																	
Soil Organic Matter (SOM)	3.65	9.03	1.08	6.47	4.26	14.3	0.35	9.64	4.24	0.926	1.86	3.64	6.26	0.85	8.29	28.1	4.48
Metals (Solids)																	
Arsenic	27.1	8.81	6	10.7	6	12	6	7.56	16.3	141	11.8	9.92	10.8	8.08	9.5	6	11.7
Cadmium	1.15	0.245	0.2	0.932	0.2	0.2	0.2	1.84	0.462	0.408	0.317	0.02	0.02	0.02	1.11	0.2	0.02
Chromium	6.54	21.7	763	79.1	421	65.8	397	403	38.3	26.9	38.6	33.3	31	25.9	139	30.3	116
Copper	31.3	26.5	28.3	23	16.1	84.5	26.4	62.8	18.9	66	11.5	19.6	12.9	7.73	17.7	16.4	15.6
Lead	39.1	25.2	19.4	54.8	18.3	107	26.2	30.4	33.2	29.4	28	32	34.3	20	44.7	49.8	42.5
Mercury	0.14	0.14	1.4	0.14	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14
Nickel	26.5	24.5	12	17.5	12.2	54.3	15.4	24.3	31.2	33	36.1	28	24.3	31.1	30.1	39.5	14.6
Selenium	1	1	24.3	2.33	12	10	20.9	15.6	1	1	1	1	1	1	3.67	10	4.15
Vanadium	43	40.4	702	113	286	106	416	453	62.7	48.4	62.5	47.4	48.6	43.3	142	41.3	163
Zinc	130	45.1	51.8	332	75.2	446	89.5	69.1	139	130	97.7	142	101	83.5	202	92.5	471
TPH Criteria Working Group (TPH CWG)																	
Benzene																	
Toluene																	
Ethylbenzene																	
sum of detected mpo xylene by GC																	
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0	0.02	0.042	0.02	0.02	0.02	0.02	0.02	0.0755	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0405	0.02	0.02	0.02	0.02	0.02	0.054	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0405	0.02	0.02	0.02	0.02	0.02	0.0583	0.02	0.02
Aliphatics >C12-C16	1.18	1.67	1.61	15	2.03	2.6	2.13	1.85	0.1	0.1	0.1	0.1	0.1	0.1	2.61	8.85	4.2
Aliphatics >C16-C21	6.52	4.36	7.42	13.4	9.5	21.8	9.8	9.2	0.861	0.1	0.1	0.1	0.1	0.1	29.4	33.2	42.4
Aliphatics >C21-C35	23.3	11.9	51.5	121	74.1	226	60.1	60.7	10.1	0.1	2.07	7.61	6.58	0.1	145	131	167
Aliphatics >C35-C44	8.51	1.46	8.9	91.6	47.5	76.7	23.4	13.7	12.1	0.1	0.1	0.1	0.1	0.1	29.4	42.5	48.7
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.027	0.02	0.02	0.02	0.02	0.02	0.0356	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.027	0.02	0.02	0.02	0.02	0.02	0.0388	0.02	0.02
Aromatics >EC12-EC16	0.1	1.18	0.435	5.94	2.16	4.83	0.595	1.44	0.1	0.1	0.1	0.1	0.1	0.1	7.37	21.4	7.44
Aromatics >EC16-EC21	1.17	5.16	13.2	13.9	10.7	36.8	6.37	17.7	0.543	0.34	0.1	0.1	0.1	0.1	28.9	103	54.1
Aromatics >EC21-EC35	19.4	18.6	108	229	108	187	45.2	130	35.7	3.05	5.95	11.5	29.2	0.1	107	431	168
Aromatics >EC35-EC44	15.8	6.72	35.5	228	74.8	115	27.6	42.1	5.18	0.95	0.607	1.98	3.75	0.1	48.8	128	70.3
Aromatics >EC40-EC44	6.88	2.43	12.6	90.1	32.3	44.3	10.8	17.8	1.58	0.1	0.1	0.1	0.1	0.1	19	38.9	27.5
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	12	50.1	12	210	64.8	185	60	32.8	12	12	12	12	12	12	195	488	297
Acenaphthene	8	8.92	34.2	28.7	18.4	40	40	124	8	8	8	8	8	8	55.7	148	40
Anthracene	16	82.4	60.2	374	119	235	80	247	16	16	16	16	16	16	437	1320	345
Benz(a)anthracene	94.3	328	1220	1150	662	794	172	2570	14	14	14	14	14	14	1300	5810	1470
Benzo(a)pyrene	113	316	1630	1130	775	726	187	3190	15	15	15	15	15	15	1100	5580	1320
Benzo(b)fluoranthene	122	519	1610	1240	747	858	167	4910	15	15	15	15	31.4	15	1110	7740	2290
Benzo(k)fluoranthene	51.5	201	718	470	373	363	102	1730	14	14	14	14	14	14	569	2750	644
Benzo(g,h,i)perylene	101	240	1110	862	638	566	147	2240	24	24	24	24	24	24	812	3950	1040
Chrysene	107	305	1290	1050	714	696	171	2730	10	10	10	10	20.2	10	1220	4830	1480
Dibenzo(a,h)anthracene	26.6	74.4	264	209	135	123	0.115	539	0.023	0.023	0.023	0.023	0.023	0.023	203	1260	244
Indeno(1,2,3-cd)pyrene	93.5	227	960	729	614	469	114	2580	0.018	0.018	0.018	0.018	0.018	0.018	697	3730	817
Fluoranthene	145	445	1520	2130	966	1900	393	3180	0.017	0.017	0.017	0.017	30.4	0.017	2500	9720	2550
Fluorene	10	35.7	12.6	126	33.7	110	50	57.4	10	10	10	10	10	10	153	363	150
Naphthalene	33.7	136	27.2	243	141	288	45	95.1	9	9	9	9	9	9	469	855	523
Phenanthrene	97.6	306	616	999	393	1030	195	1130	15	15	15	15	15	15	1340	4990	1230
Pyrene	0.127	0.379	1.45	1.67	0.88	1.41	0.328	3.43	0.015	0.015	0.015	0.015	0.025	0.015	2.02	7.88	2.33
PAH, Total Detected USEPA 16	1.11	3.65	12.5	12.6	7.27	9.75	1.98	28.8	0.118	0.118	0.118	0.118	0.118	0.118	14.2	61.4	16.7
Naphthalene-d8 % recovery**	95.7	86.9	86.5	85.7	97	84.9	87.5	84.1	94.6	99.3	93.1	85.1	92.6	86.4	88.3	88.8	87.5
Acenaphthene-d10 % recovery**	97.6	83.5	91.9	89.9	96.3	87.2	86.7	90	96.3	97	89.4	88.7	88.2	83.4	89.8	90.8	84.4
Phenanthrene-d10 % recovery**	96.7	82	98.6	99.2	95.6	88.6	87	98.2	102	97.8	89.7	92.5	91.1	83.8	99.4	97.7	95.4
Chrysene-d12 % recovery**	94.3	79.3	104	101	97.2	89.4	86.1	90.8	101	99.3	90.5	84.7	87.2	84.9	105	104	100
Perylene-d12 % recovery**	83.5	74.2	99.7	94.7	90.9	81.6	82.4	95.2	93.6	92.9	92.6	81.2	87.1	89.7	99.9	102	94.1
Total Aliphatics >C12-C44	39.5	19.4	69.4	241	133	327	95.5	85.4	23	0.1	2.07	7.61	6.58	0.1	207	215	262
Total Aromatics >EC12-EC44	36.3	31.6	157	476	196	343	79.7	192	41.4	4.34	6.55	13.5	32.9	0.1	192	683	300
Total Aliphatics & Aromatics >C5-C44	75.8	51.1	226	717	329	671	175	277	64.6	4.34	8.62	21.1	39.5	0.1	399	899	562
Metals - (Solid)																	
Iron	105000	25000	207000	58700	115000	205000	177000	196000	38500	31500	33400	27900	28000	23600	101000	88200	90200
Manganese	3760	1110	4310	6010	2070	7300	413	3380	428	1050	688	277	274	650	12100	3850	10700
Metals - (Liquid)																	
Calcium	-	-	168000	-	190000	-	219000	190000	-	-	-	-	-	-	-	97000	-
Magnesium	-	-	23000	-	11600	-	10000	10300	-	-	-	-	-	-	-	18600	-
Phenols																	
Phenol	0.01	0.01	0.0323	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0111	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	0.041	-	0.177	-	0.0446	0.103	-	-	-	-	-	-	-	0.0411	-
pH	9.26	8.81	12.3	10.5	11.9	10.6	12.2	11.7	7.56	8.16	7.58	7.43	7.54	8.48	11.6	10.7	11.3
Sulphate, Total																	
Sulphur, Total	-	-	0.177	-	0.667	-	0.293	0.498	-	-	-	-	-	-	-	0.208	-
Sulphate, Total potential	-	-	0.531	-	2	-	0.879	1.49	-	-	-	-	-	-	-	0.624	-
Sulphate, acid soluble (total)	-	-	0.454	-	1.2	-	0.703	0.0292	-	-	-	-	-	-	-	0.166	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
Exchangeable Ammonia as N	12	12	12	15.6	12	22.5	12	12	720	12	200	235	264	113	12	12	12
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	0.0028	-	-	-	-	-	-	-	-	0.0074	-
Date of Analysis	-	-	14/11/2018	-	09/11/2018	-	09/11/2018	03/12/2018	-	-	-	-	-	-	-	14/11/2018	-
Analysed By	-	-	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	-	Renata Bozhkov	Christian Hallam	-	-	-	-	-	-	-	Andrzej Ferfecki	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	0.001	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	Chrysotile	-
Analysts Comments	-	-	-	-	-	-	N/A	-	-	-	-	-	-	-	-	Loose fibres in soil	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	0.0028	-	-	-	-	-	-	-	-	0.0077	-
Chrysotile (White) Asbestos	-	-	Not Detected	-	Not Detected	-	Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-
Amosite (Brown) Asbestos	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Detected	-
Crocidolite (Blue) Asbestos	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-
Fibrous Anthophyllite	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-
Fibrous Tremolite	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-
Fibrous Actinolite	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-
Non-Asbestos Fibre	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-
Comments	-	-	0	-	0	-	Loose fibres in soil.	0	-	-	-	-	-	-	-	loose fibres in soil	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	109	105	107	104	104	103	94.6	108	113	110	111	111	109	108	99.1	101	106
Toluene-d8**	97.8	96.9	115	108	101	90.6	95.5	100	96.6	99	98.6	98.9	98.4	102	92.9	96.6	101
4-Bromofluorobenzene**	85.2	80.1	100	91.9	93.7	73.4	87.8	82	94.6	91.9	96.7	88.1	89.8	85.2	82.5	79.9	95
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.534	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.155	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4GC2	4GC3	4GC3	4GC4	4GC4	4GC5	4GC5	4GC6	4GC6	4GC7	4GC7	4GC1V	4GC2V	4GC4V	4GC5V	4GC6V	4GC7V
Depth	1	0.5	1	0.3	0.8	0.7	1.2	0.5	0.8	0.5	1	2.2	2.3	2.1	1.9	2.5	1.8
Sampled Date	02/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	06/11/2018	06/11/2018	06/11/2018	06/11/2018	02/11/2018	02/11/2018	05/11/2018	05/11/2018	06/11/2018	06/11/2018
Carbon																	
Soil Organic Matter (SOM)	0.35	1.81	3.83	10.1	1.31	34.1	12.6	2.02	5.12	0.521	1.55	1.2	0.957	4.5	1.3	21.4	0.841
Metals (Solids)																	
Arsenic	7.34	11.6	9.95	9.69	9.25	10.9	6.62	5.67	6.37	7.49	6	11.3	14.5	10.8	13.4	16.1	11.4
Cadmium	0.2	0.2	0.775	0.702	0.02	0.02	0.0249	0.02	0.02	0.2	0.2	0.362	0.377	0.409	0.363	0.0926	0.02
Chromium	114	256	99.4	104	12.6	14.4	25.6	14.4	24.2	695	717	34.4	31.7	40.1	33.2	23.5	28.6
Copper	14	21.6	22	32.8	14.1	20	8.24	11.1	18	35.8	26.8	10.8	11.7	24.8	11.4	23	9.1
Lead	7	40.1	41.4	54.6	27.4	38.1	21.6	25.7	18.9	15.9	26.4	27.7	23.9	27	23.8	35	22.2
Mercury	1.4	1.4	0.14	0.268	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	27.6	12.2	11.5	24.7	17.6	13.4	7.55	10.2	15	27.2	18.5	41.1	36.9	37.8	35.8	27.8	32.3
Selenium	10	10	3.69	3.92	1	1.5	2.04	3.7	2.13	23	27.3	1	1	1	1	1	1
Vanadium	591	226	124	170	33.5	38.7	52.4	35.4	33.7	2400	2400	59.2	56	63.4	58.7	43.2	51.9
Zinc	28.1	202	338	165	145	173	46.7	218	63	120	78.2	108	101	119	103	129	96.2
TPH Criteria Working Group (TPH CWG)																	
Benzene																	
Toluene																	
Ethylbenzene																	
sum of detected mpo xylene by GC																	
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.0357	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0782	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.194	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.177	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.115	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.244	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.0656	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	1.73	0.02
Aliphatics >C12-C16	0.1	2.58	1.93	0.267	0.918	5.99	1.21	0.809	0.1	2.27	2.29	0.243	0.1	0.443	0.1	5.06	0.1
Aliphatics >C16-C21	5.33	18.4	17.6	3.07	8.81	27.1	7.45	4.67	1.7	7.03	6.93	0.376	0.1	0.1	0.1	2.5	0.1
Aliphatics >C21-C35	43.1	198	399	18.7	14.9	151	21.3	33.6	17.4	51.5	51.6	2.8	0.1	1.22	0.1	23.3	0.1
Aliphatics >C35-C44	9.87	37.4	46.3	3.25	3.77	43.5	2.38	17	9.3	17.2	14.4	10.4	0.462	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.0449	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.0759	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.161	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.0437	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	1.16	0.02
Aromatics >EC12-EC16	2.01	4.04	1.7	1.11	0.302	8.94	2.07	1.98	0.1	1.27	1.42	0.1	0.363	0.1	0.1	16.6	0.1
Aromatics >EC16-EC21	8.83	21.4	10.9	6.46	2.02	35.4	10.2	12.9	1.7	11.7	21.5	0.1	0.866	0.212	0.1	23.8	0.1
Aromatics >EC21-EC35	52.6	133	152	41.3	19.5	135	32.8	84.9	20.6	68.7	114	4.53	10.8	7.47	3.2	230	0.1
Aromatics >EC35-EC44	26.9	63	40.7	14.2	14.3	40.7	9.99	49.9	17.2	29.5	43.3	0.892	7.35	1.11	0.1	23.3	0.1
Aromatics >EC40-EC44	9.92	25.4	15.7	5.18	6.23	13.7	3.64	20.2	7.37	10.9	14.2	0.1	3.43	0.1	0.1	5.71	0.1
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	15.5	212	120	28.9	14.5	218	65.9	113	12	40.5	120	12	12	12	12	33.7	12
Acenaphthene	20.2	51.5	80	22.1	8	44.1	9.59	18	8	94.7	80	8	8	8	8	1140	8
Anthracene	64	400	160	104	34.7	472	215	179	36.4	322	160	16	16	16	16	619	16
Benz(a)anthracene	408	1710	218	646	245	1920	646	750	184	1320	187	14	14	14	14	222	14
Benzo(a)pyrene	465	1850	261	906	364	1800	656	802	181	1510	235	15	15	15	15	130	15
Benzo(b)fluoranthene	718	2040	378	1200	505	2940	762	1330	182	2310	228	15	15	15	15	282	15
Benzo(k)fluoranthene	292	898	140	465	167	959	292	343	89.7	701	140	14	14	14	14	86.9	14
Benzo(g,h,i)perylene	361	1340	0.24	684	278	1370	503	690	149	1190	0.24	24	24	24	24	118	24
Chrysene	481	1540	261	647	261	1720	632	636	198	1260	182	10	10	10	10	278	10
Dibenzo(a,h)anthracene	77	349	0.23	164	67.3	361	126	161	35.9	246	0.23	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	296	1150	180	589	240	1300	447	618	116	1040	180	0.018	0.018	0.018	0.018	106	0.018
Fluoranthene	550	3040	391	785	288	3240	1070	1250	300	2300	318	0.017	0.017	0.017	0.017	1450	0.017
Fluorene	16.1	160	0.1	35.8	10	157	34.3	50.8	11.4	74.2	0.1	10	10	10	10	1380	10
Naphthalene	50.1	303	90	131	49.2	909	224	402	60.5	105	90	9	16.7	9	9	300	9
Phenanthrene	244	1410	276	388	130	1920	517	611	198	966	150	15	15	15	15	3610	15
Pyrene	0.599	2.61	0.449	0.707	0.271	2.67	0.882	0.995	0.239	2.1	0.306	0.015	0.015	0.015	0.015	0.942	0.015
PAH, Total Detected USEPA 16	4.66	19.1	2.23	7.5	2.92	22	7.08	8.94	1.98	15.6	1.46	0.118	0.118	0.118	0.118	10.7	0.118
Naphthalene-d8 % recovery**	87.8	85.7	86.5	91.2	87.9	93.3	85.4	94.4	90.2	95.3	88.7	95.1	86.8	99.3	98.7	94.7	95.1
Acenaphthene-d10 % recovery**	90.4	90.8	77.7	89.4	86.8	93.6	89.7	92.3	89.8	91.5	80.9	94.2	89.9	97.6	97.3	93.4	91.6
Phenanthrene-d10 % recovery**	97.6	101	84.6	87.4	87.5	94	97.4	93.7	89.9	92.7	81.7	98.6	95.3	94.6	95.8	96	91.9
Chrysene-d12 % recovery**	102	101	92.7	89.1	91.1	93.8	100	87.9	83.6	90.4	81.2	91.8	98.1	100	98	86.4	85.7
Perylene-d12 % recovery**	98.2	95.8	93.5	91.7	94.4	87.5	94.3	87	75.6	89.9	75.1	82.4	88.7	89	87	82.7	86.3
Total Aliphatics >C12-C44	58.3	256	465	25.2	28.4	227	32.3	56.1	28.4	78	75.2	13.8	0.462	1.67	0.1	30.9	0.1
Total Aromatics >EC12-EC44	90.3	222	205	63.1	36.1	220	55.1	150	39.6	111	180	5.43	19.4	8.8	3.2	294	0.1
Total Aliphatics & Aromatics >C5-C44	149	478	670	88.4	64.5	448	87.4	206	68	189	255	19.2	19.8	10.5	3.2	328	0.1
Metals - (Solid)																	
Iron	260000	91600	49500	49100	48100	35600	17200	19300	24600	192000	143000	40000	38700	29900	34400	29200	35500
Manganese	13700	1230	9570	10300	2020	2070	2930	4470	2650	4710	48800	1310	1380	535	1270	352	1070
Metals - (Liquid)																	
Calcium	103000	187000	-	-	121000	-	212000	161000	-	207000	-	-	-	-	-	-	-
Magnesium	3890	9200	-	-	30400	-	8010	26800	-	7670	-	-	-	-	-	-	-
Phenols																	
Phenol	0.01	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0111	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.0217	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE	0.0672	0.204	-	-	0.261	-	0.215	0.25	-	0.081	-	-	-	-	-	-	-
pH	11.4	10.9	11.3	11.3	11.2	11.4	12	8.98	8.81	12.4	12.7	7.87	7.84	7	8.12	7.32	8.1
Sulphate, Total																	
Sulphur, Total	0.115	0.233	-	-	0.26	-	0.291	0.314	-	0.463	-	-	-	-	-	-	-
Sulphate, Total potential	0.345	0.699	-	-	0.78	-	0.873	0.942	-	1.39	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	0.231	0.427	-	-	0.812	-	1.37	1.66	-	0.858	-	-	-	-	-	-	-
Cyanide, Total	1	1	1	1.27	1.02	1.64	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	20.3	12	12	12	12	12	12	274	136	134	79.3	155	45.6
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Date of Analysis	09/11/2018	14/11/2018	-	-	09/11/2018	-	09/11/2018	09/11/2018	-	09/11/2018	-	-	-	-	-	-	-
Analysed By	Marcin Magdziarek	Andrzej Ferfecki	-	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	Marcin Magdziarek	-	Renata Bozhkov	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	N/C	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Comments	0	0	-	-	0	-	Loose fibres in soil.	0	-	0	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	106	109	108	97.1	108	84.2	103	107	115	82.8	56.7	108	118	108	133	110	112
Toluene-d8**	99	97	96.8	93.6	98.5	77.4	94.5	95.5	96.5	98.3	96.1	102	95.9	101	91.2	92.3	99.7
4-Bromofluorobenzene**	85.9	83.1	86.7	70	109	64.7	80	84.2	82.7	86.4	84.9	103	97.1	99.8	103	77.9	89.5
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.108	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.364	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9	34		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	22	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	2	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	591	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	52	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	232	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	45	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	17	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	693	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	785	365.79	11.57
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	16	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	25	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	166	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	441	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	150	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	414	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	5475	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	11985	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	10570	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15870	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	7273	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	1857	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	29555	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	5657	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	18025	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	29	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76	169		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100	107		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98	105		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99	105		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96	107		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94	110		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234	802		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416	1516		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039	277000		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574	33520		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387	237950		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35290		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0	0.00	96.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	13	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	18700	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	1	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	1	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	263	0.00	94.61
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Date of Analysis	TM048	No units		1371	0	0					0.00	
Analysed By	TM048	No units		1371	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Additional Asbestos Components (Using TM048	TM304	No units		1002	0	0					0.00	
Analysts Comments	TM304	No units		1002	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	
Comments	TM048	No units		1371	0	0			0		0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	120	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	102	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	102	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	3	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	1	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	21	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00	

Sample ID	4GD1	4GD1	4GD2	4GD2	4GD3	4GD3	4GD4	4GD4	4GD5	4GD6	4GD6	4GD7	4GD7
Depth	0.5	1	0.4	0.8	0.2	0.5	0.2	0.5	0.5	0.2	0.6	0.3	0.6
Sampled Date	06/11/2018	06/11/2018	07/11/2018	07/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	20/11/2018	20/11/2018
Carbon													
Soil Organic Matter (SOM)	17.1	4.41	38.1	6.6	20.9	0.459	10.7	3.02	18.8	7.88	>100	7.57	>100
Metals (Solids)													
Arsenic	6	7.6	14.5	8.79	9.39	14.3	8.57	12.3	10.5	8.24	7.93	6.99	8.13
Cadmium	0.2	0.02	2.07	0.02	0.2	0.2	0.02	0.02	0.2	0.02	0.15	1.39	0.678
Chromium	12.8	14.2	81.7	56.7	21	360	2.8	24.7	18.1	43.3	7.04	210	10.3
Copper	14	17.4	34.4	23.6	17.2	69.7	17.2	8.2	28	9.53	28.6	52.3	22.6
Lead	43.8	44.8	103	31.2	39.7	89	47.8	21.5	82.9	32.6	45.2	151	63
Mercury	1.4	0.14	1.4	0.14	1.4	1.4	0.14	0.14	1.4	0.14	0.575	1.4	0.59
Nickel	14.2	16.4	40.4	20.6	23.1	32.3	13.1	29.3	27.3	9.47	11.8	36.5	10.9
Selenium	10	1.83	10	1.7	10	11.6	2.69	10	10	1.7	1	10	2.02
Vanadium	37.4	31.7	86.4	78.9	50.8	515	27.5	46.1	54.2	73.5	17.5	1080	31.2
Zinc	135	86.1	254	70.3	149	289	156	102	320	398	225	440	285
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.765	0.1	0.1	0.1	2.03	0.1	2.21	0.1	2.3	2.24	4.56	3.42	10.8
Aliphatics >C16-C21	5.69	4.2	10.1	2.95	7.91	2.72	7.77	0.1	9.98	12.4	103	26.3	373
Aliphatics >C21-C35	45.2	18.6	86.2	23.3	49	12.1	64.4	0.1	93.6	67.6	63.3	99.7	127
Aliphatics >C35-C44	18.2	6.57	15.9	8.15	12.4	4.06	15.5	0.1	34.8	31.5	8.84	26.6	19.3
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	1.08	0.945	3.46	1.45	2.23	0.447	3.42	0.1	2.55	1.04	16.6	3.13	5.52
Aromatics >EC16-EC21	4.97	4.11	19	4.41	13.2	6.68	15.4	0.1	12.5	8.13	134	24.3	72.5
Aromatics >EC21-EC35	34	28.5	113	32.7	66.1	24.4	76.4	2.21	84.6	41.9	482	86.5	190
Aromatics >EC35-EC44	24.1	21.8	51.2	22	29.1	9.37	36.7	0.566	56.4	38.2	104	30.5	48.3
Aromatics >EC40-EC44	10.1	9.44	18.9	9	10.3	3.32	14.1	0.1	23.1	17	29.9	10.7	13.3
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	216	36.9	234	67.9	194	49	259	12	130	64.2	277	219	186
Acenaphthene	31.5	12.6	52.7	8	10.2	14.4	19.2	8	21.9	14.4	66.5	30.6	10.2
Anthracene	191	43.6	438	40.9	120	88.3	178	16	147	97.3	366	409	108
Benz(a)anthracene	849	197	1530	214	668	1380	1100	14	578	601	1740	1410	238
Benzo(a)pyrene	906	213	1520	275	836	987	1030	15	458	955	1910	1360	337
Benzo(b)fluoranthene	1550	356	2440	424	1450	2310	1980	15	895	1170	3230	2330	614
Benzo(k)fluoranthene	526	117	885	137	472	773	564	14	307	284	981	833	189
Benzo(g,h,i)perylene	801	194	1220	215	685	318	982	24	369	882	1580	940	413
Chrysene	737	207	1380	231	863	1450	1140	10	618	546	2080	1510	313
Dibenzo(a,h)anthracene	195	47.3	339	57.8	158	102	230	0.023	82.3	204	368	213	85.2
Indeno(1,2,3-cd)pyrene	758	168	1120	206	726	395	1050	0.018	504	908	1630	735	309
Fluoranthene	1630	311	3140	310	973	1150	1600	0.017	895	861	2020	2680	315
Fluorene	47.6	13.3	84.3	18.8	29.3	16.2	82.3	10	46.3	31.9	141	131	17.5
Naphthalene	360	91.8	220	266	87.3	35.6	245	9	131	116	1110	341	1080
Phenanthrene	776	182	1780	167	343	189	709	15	457	322	1080	1500	215
Pyrene	1.21	0.251	2.28	0.266	0.78	0.826	1.18	0.015	0.659	0.83	1.69	2.35	0.249
PAH, Total Detected USEPA 16	10.8	2.44	18.7	2.89	8.4	10.1	12.4	0.118	6.3	7.89	20.3	17	4.68
Naphthalene-d8 % recovery**	94.9	94.4	93.7	95.5	75.4	76.2	74.1	83.2	73.4	89.2	67.7	73.2	70.2
Acenaphthene-d10 % recovery**	92.8	89.7	90	90	81.2	79.6	79.9	90.8	78.7	85.7	75.4	74	70.6
Phenanthrene-d10 % recovery**	93	89.8	90.8	89.5	89.8	86.8	86	90.3	80.2	86.2	74.4	73.5	66.9
Chrysene-d12 % recovery**	90.3	82.3	82.1	84.2	99.6	102	97.5	88.4	73	85.1	71.5	70.8	39.1
Perylene-d12 % recovery**	88.8	80.9	74.7	83.9	91.8	95.6	90.2	73.6	58.2	82	56.6	70.5	29
Total Aliphatics >C12-C44	69.8	29.4	112	34.4	71.4	18.9	89.9	0.1	141	114	179	156	531
Total Aromatics >EC12-EC44	64.2	55.4	187	60.5	111	40.9	132	2.78	156	89.3	736	144	317
Total Aliphatics & Aromatics >C5-C44	134	84.8	299	94.9	182	59.8	222	2.78	297	203	915	300	848
Metals - (Solid)													
Iron	77000	26400	190000	36800	124000	64700	72200	30400	95800	48600	23800	161000	18100
Manganese	3710	2730	7160	2960	5490	19100	7400	778	3770	4370	574	17900	1610
Metals - (Liquid)													
Calcium	160000	-	95500	-	-	113000	-	43300	109000	-	14700	144000	-
Magnesium	18100	-	13700	-	-	9540	-	9360	14400	-	1570	9380	-
Phenols													
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	0.128	-	0.0518	-	-	0.0402	-	0.0211	0.0717	-	0.0339	0.0581	-
pH	11.1	10.1	8.85	8.93	9.04	9.2	8.8	7.99	9	11.5	10.4	11.4	8.55
Sulphate, Total													
Sulphur, Total	0.246	-	0.183	-	-	0.128	-	0.02	0.212	-	0.534	0.187	-
Sulphate, Total potential	0.738	-	0.549	-	-	0.384	-	0.06	0.636	-	1.6	0.561	-
Sulphate, acid soluble (total)	0.671	-	0.149	-	-	0.0815	-	0.0317	0.207	-	0.0633	0.02	-
Cyanide, Total	1	1	1.96	1	1	1	1	1	2.8	1	2.41	1.38	7.38
Exchangeable Ammonia as N	12	12	12	12	12	12	12	71.6	12	141	12	12	12
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	0.0034	-	-	-	-
Date of Analysis	09/11/2018	-	09/11/2018	-	-	26/11/2018	-	26/11/2018	19/11/2018	-	19/11/2018	03/12/2018	-
Analysed By	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	-	Marcin Magdziarek	-	Marcin Magdziarek	Lucy Caroe	-	Andrzej Ferfecki	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	0.001	-	-	-	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	-	-	Chrysotile detected.	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	Loose fibres in soil.	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	0.0035	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Comments	0	-	0	-	-	0	-	0	Fibre bundles in soil	-	0	0	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	106	109	116	125	106	99.4	95.6	102	104	102	99.5	105	112
Toluene-d8**	94.6	98	97.5	100	99.5	98.2	94.6	98.8	96.7	98.5	95.8	99.7	101
4-Bromofluorobenzene**	77.4	81.4	74.4	76.9	94.4	99.2	84.6	102	89.1	89.5	76.1	75.1	79.2
Methyl Tertiary Butyl Ether	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.296
Toluene	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.311	0.13	0.201
Sum of BTEX	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4GD1V	4GD2V	4GD3V	4GD4V	4GD5V	4GD6V	4GD7V	4GE1	4GE1	4GE2	4GE3	4GE4	4GE5	4GE5	4GE6	4GE6
Depth	2.1	1.8	1.8	1.7	1.7	1.7	1.7	0.5	1	0.8	0.8	0.4	0.2	0.6	0.3	0.5
Sampled Date	06/11/2018	07/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	20/11/2018	06/11/2018	06/11/2018	07/11/2018	07/11/2018	19/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018
Carbon																
Soil Organic Matter (SOM)	5.6	0.741	0.56	9.1	4.93	0.765	0.8	23.1	0.521	17.6	9.28	5.81	13.7	>100	24.8	
Metals (Solids)																
Arsenic	16.1	12.8	12.2	10.1	15.9	11.2	15.1	8.99	9.44	16.5	13.6	6	10.6	6.73	7.12	5.96
Cadmium	0.02	0.02	0.277	0.505	0.02	0.02	0.02	0.2	0.2	0.02	0.553	0.2	0.2	0.2	0.2	0.02
Chromium	32.7	29.5	23.5	10	35	25.2	27.7	9	267	11.2	18.7	137	58.5	9	446	3.08
Copper	16.7	9.12	10.1	33.2	16.4	8.94	9.05	22.9	27.9	42.6	40.8	14	19.6	14	18.6	23.2
Lead	33.5	21	20.6	31.6	40.2	22.2	22.4	150	43.7	27.9	33.1	9.62	84.1	8.2	58.6	12.2
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	1.4	1.4	1.4	1.4	0.81
Nickel	27.5	33.4	29.3	21.9	29.7	31.9	32.6	37.4	18	38.8	42.5	44.1	24	11.7	18.1	8.3
Selenium	1	1	1	2.57	1	1	1	10	10.3	1	1.11	10	10	10	10.4	1
Vanadium	57.2	53.7	41.7	34.8	53.1	43.7	46.8	120	271	33.3	38.2	106	85.4	18	327	8.23
Zinc	119	100	94.3	78.1	139	90.7	95.2	228	125	78.5	137	133	353	25.1	206	23.7
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0244	0.0694	0.0725	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0267	0.0524	0.069	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.0301	0.0761	0.02
Aliphatics >C12-C16	0.419	0.1	0.1	0.525	0.1	0.1	0.1	1.66	0.1	0.793	0.1	1.13	2.48	4.02	4.32	4.96
Aliphatics >C16-C21	0.1	0.1	0.1	2.48	0.1	0.1	0.1	7.21	2.14	0.835	0.195	8.1	15.7	94.9	29.3	140
Aliphatics >C21-C35	4.58	0.1	0.1	14.2	3.17	0.1	0.1	25	28	4.1	4.38	70.6	105	46.2	110	44.3
Aliphatics >C35-C44	0.1	0.1	0.1	3.23	0.875	0.1	0.1	5.55	8.66	0.1	0.1	15.4	38.3	5.19	46.7	3.7
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.0341	0.0456	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.0503	0.02
Aromatics >EC12-EC16	0.418	0.608	0.1	1.37	0.858	0.1	0.1	3.2	1.11	0.782	1.15	0.556	5.86	4.19	10.9	12.4
Aromatics >EC16-EC21	1.22	1.39	0.1	2.86	0.1	0.1	0.1	29.5	7.16	1.36	6.67	8.71	35.6	19.4	74.6	108
Aromatics >EC21-EC35	44.8	2.42	0.1	9.26	31.8	1.49	2.55	155	57.3	4.57	14.8	37.9	114	55	206	256
Aromatics >EC35-EC44	3.13	0.267	0.1	3.42	4.3	0.1	0.1	60.7	26.6	0.657	4.75	11.3	54.6	9.53	97.6	37.7
Aromatics >EC40-EC44	0.1	0.1	0.1	1.08	1.1	0.1	0.1	20.3	10.1	0.1	1.6	3.79	21.7	2.85	35.3	11.3
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	12	12	42.3	12	12	12	120	110	14.6	86.4	28.4	201	51	1200	252
Acenaphthene	8	8	8	8	8	8	8	80	39.6	8	8	14.6	43.3	20.7	448	24.5
Anthracene	16	16	16	26.3	16	16	16	160	81.3	18.7	47.3	132	506	40.2	3030	247
Benz(a)anthracene	14	14	14	70.3	14	14	14	259	796	60.9	202	513	1630	173	5330	192
Benzo(a)pyrene	15	15	15	72.1	15	15	15	470	1140	53.1	267	506	1410	179	4200	185
Benzo(b)fluoranthene	27.4	24.4	15	132	15	15	15	505	1650	62	467	777	2440	379	6470	402
Benzo(k)fluoranthene	14	14	14	44.5	14	14	14	201	554	25.1	157	191	772	105	2310	122
Benzo(g,h,i)perylene	24.3	24	24	86	24	24	24	467	903	51.2	241	372	971	167	2550	202
Chrysene	10	10	10	84	10	10	10	213	685	81.8	170	546	1450	270	5370	290
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.23	196	0.023	63.1	82.4	242	39.9	706	71.6
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	109	0.018	0.018	0.018	391	834	50.5	234	397	847	161	3150	234
Fluoranthene	53	0.017	0.017	145	0.017	0.017	0.017	359	893	97.1	317	1020	3280	211	12800	379
Fluorene	10	10	10	10	10	10	10	0.1	18.8	10	13	23.6	162	38.5	1840	103
Naphthalene	22.6	9	9	43.3	9	9	9	90	67.8	51	118	96.3	373	407	4730	5100
Phenanthrene	32.7	15	15	167	15	15	15	150	256	121	287	481	1750	281	9170	1030
Pyrene	0.0435	0.015	0.015	0.105	0.015	0.015	0.015	0.32	1.04	0.0774	0.261	0.843	2.47	0.187	9.83	0.368
PAH, Total Detected USEPA 16	0.203	0.118	0.118	1.13	0.118	0.118	0.118	3.19	9.27	0.765	2.93	6.03	18.5	2.71	73.1	9.21
Naphthalene-d8 % recovery**	85.6	99.4	89.7	90.4	86.3	91.2	85.8	85.8	94.6	96.5	85	82.7	88.6	63.9	85.5	82.4
Acenaphthene-d10 % recovery**	89.7	96.3	88	91	88.8	88.1	82.8	80.1	91.1	95.7	81.2	85.9	88	69.1	91	91.4
Phenanthrene-d10 % recovery**	93.8	94.7	86.5	96.5	92.9	87.8	84	85	90.3	94.3	75.8	83	95	64.7	96.2	93
Chrysene-d12 % recovery**	86.5	86.3	79.4	85.9	111	78.6	89	84.3	87.8	88.2	69.9	76.9	105	47.4	89.5	57.6
Perylene-d12 % recovery**	83.2	87.1	75.7	81.8	101	76.3	94	78.7	89.1	76.3	65.7	74.1	103	35.5	78.5	43.4
Total Aliphatics >C12-C44	5	0.1	0.1	20.4	4.04	0.1	0.1	39.5	38.8	5.73	4.57	95.2	161	150	191	193
Total Aromatics >EC12-EC44	49.6	4.69	0.1	16.9	37	1.49	2.55	249	92.1	7.37	27.4	58.5	210	88.1	389	414
Total Aliphatics & Aromatics >C5-C44	54.6	4.69	0.1	37.3	41	1.49	2.55	288	131	13.1	32	154	372	239	580	607
Metals - (Solid)																
Iron	38300	37800	25900	38500	25400	31100	32600	228000	125000	32900	32300	232000	101000	59400	113000	8800
Manganese	441	1530	917	1850	268	1190	954	4770	207	661	1520	8590	4010	1060	16700	164
Metals - (Liquid)																
Calcium	-	-	-	-	-	-	-	-	152000	3230	16000	95800	130000	-	160000	-
Magnesium	-	-	-	-	-	-	-	-	6670	2530	4690	17000	17600	-	18700	-
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0117	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0117	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-	-	0.154	0.0394	0.0549	0.104	0.103	-	0.169	-
pH	7.61	8.08	8.38	8.69	6.79	8.5	7.99	9.25	11.2	8.34	8.63	11.7	9.99	9.21	11.1	8.61
Sulphate, Total																
Sulphur, Total	-	-	-	-	-	-	-	-	0.276	0.201	0.155	0.194	0.189	-	0.284	-
Sulphate, Total potential	-	-	-	-	-	-	-	-	0.828	0.603	0.465	0.582	0.567	-	0.852	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	-	-	0.995	0.256	0.214	0.39	0.2	-	0.375	-
Cyanide, Total	1	1	1	1	1	1	1	3.26	1	1	1.56	1	1	1	1	1
Exchangeable Ammonia as N	427	76	29	20.9	271	48.5	47.1	12	12	12	12	38.4	12	12	12	12
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-	19/11/2018	09/11/2018	09/11/2018	30/11/2018	19/11/2018	-	27/11/2018	-
Analysed By	-	-	-	-	-	-	-	-	Renata Bozhkov	Lucy Caroe	Lucy Caroe	Paul Poynton	Lucy Caroe	-	Andrzej Ferfecki	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	No	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Trace	-	Not Detected	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Tremolite	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Actinolite	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Comments	-	-	-	-	-	-	-	-	0	0	0	0	Loose fibres in soil	-	0	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	110	126	104	109	102	105	108	108	113	117	115	107	96.8	93.6	132	102
Toluene-d8**	99	101	99.2	98.1	98.7	99.8	103	97.9	97.7	99.9	98.6	94.3	95.3	95.5	97.4	96.6
4-Bromofluorobenzene**	86.8	84.7	97.6	98.6	93.3	94.5	85.8	80.4	87.8	75.7	84	91.9	76.5	75.1	97.7	80.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09	0.314
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	2.6	0.13	0.184	0.423	0.621	0.376
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.54
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.52
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.41
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.16
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.69
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.7

Sample ID	4GE1V	4GE2V	4GE3V	4GE4V	4GE5V	4GE6V	4GF1	4GF1	4GF2	4GF3	4GF3	4GF4	4GF4	4GF5	4GF6	4GF6	4GF6	4GF7	4GF7	4GF8	4GF8	4GF1V	4GF2V
Depth	3.6	1.95	2.2	2.2	3	2.2	0.5	1	0.5	0.2	0.6	0.2	0.4	0.5	0.4	0.6	1.2	0.4	0.8	0.5	1	2.4	2
Sampled Date	06/11/2018	07/11/2018	07/11/2018	19/11/2018	13/11/2018	13/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	19/11/2018	19/11/2018	19/11/2018	13/11/2018	13/11/2018	13/11/2018	19/11/2018	19/11/2018	20/11/2018	20/11/2018	07/11/2018	07/11/2018
Carbon																							
Soil Organic Matter (SOM)	47.9	5.65	1.62	3.88	0.94	1.9	11.7	25	2.95	40.2	2.74	4.17	8	13.7	18.6	4.93	12.5	4.88	15.3	12.2	2.78	1.13	4.02
Metals (Solids)																							
Arsenic	3.74	13.1	13.7	14.1	12.8	15.4	11.6	11.3	6.18	10.2	6	21.9	11.8	11.5	8.24	10.1	11.6	12.8	7.91	11.9	10	9.4	13.7
Cadmium	0.0218	0.02	16.9	0.02	0.02	0.02	0.2	0.821	0.2	0.02	1.62	0.2	0.2	0.634	0.2	0.2	0.2	0.2	0.2	0.2	0.02	0.02	0.02
Chromium	12.6	36	56.7	31.7	24.9	30.6	9	1.56	36.2	0.9	547	47.2	9	9	9	9	19.1	9	9	9	3.57	28.9	34.8
Copper	16.8	14.9	356	11.4	7.9	11.2	31.6	50.8	16.9	14	18	36.9	14	14	15.8	15.2	17.6	22.1	15.9	21.7	11.4	9.07	15.5
Lead	4.85	31.5	276	30	23	29.3	167	36.7	35.3	20	47.2	76.9	24	37.4	29.3	32.1	40.9	21.4	48.9	21.6	24	21.2	24.8
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14
Nickel	13.7	28.5	41.2	34.3	30.3	34.7	60.2	26.3	14.6	15	8.22	36.6	12	52.3	31	32.8	24.2	37.1	17.9	27	13.9	31.6	32.2
Selenium	2.25	1	1	1	1	1	10	1.26	10	1	18.4	10	10	10	10	10	10	10	10	10	1	1	1
Vanadium	20.4	57	60.9	54.2	44.3	55	179	41.1	116	38.1	1270	70.2	29.4	28.2	87.7	112	96.1	93.6	46.1	47.1	68.9	51.8	59.4
Zinc	25.5	115	1680	107	95.1	107	250	203	106	93.6	91	270	125	95.8	160	195	167	149	89.7	136	59.5	122	116
TPH Criteria Working Group (TPH CWG)																							
Benzene																							
Toluene																							
Ethylbenzene																							
sum of detected mpo xylene by GC																							
Aliphatics >C5-C6	0.02	0.033	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.122	0.02	0.02	0.02	0.05	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0239	0.0412	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.137	0.02	0.02	0.02	0.0459	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0229	0.039	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.057	0.02	0.02	0.02	0.023	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0466	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.1	0.216	0.1	0.1	0.1	0.1	0.1	0.1	0.182	0.1	0.1	1.26	0.1	0.1	2.6	2.28	2.54	0.888	4.51	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	0.1	0.1	0.1	0.1	0.1	0.1	7.64	1.21	1.14	8.35	1.03	11.3	0.1	4.37	13.7	16.4	10.9	5.14	16.3	0.1	3.02	0.1	0.1
Aliphatics >C21-C35	22.9	1.66	0.1	4.06	0.1	1.65	26.2	6.45	16	34.9	17.2	60.9	0.1	20.7	70.7	118	71	27.7	36.6	13.9	12	3.44	0.782
Aliphatics >C35-C44	0.655	0.537	0.1	0.1	0.1	0.1	7.35	0.948	5.11	13.5	2.79	19.7	0.1	5.23	30.8	23.7	21.4	4.18	11.5	1.25	3.42	1.53	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.09	0.02	0.02	0.02	0.0297	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.026	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.0375	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0314	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	3	0.1	0.1	0.1	0.1	0.1	2.51	1.23	0.711	1.79	1.29	1.58	0.1	1.31	1.94	0.966	0.973	0.216	0.644	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	9.36	0.1	0.1	0.1	0.1	0.1	15.3	4.5	5.21	13.9	18.9	8.71	2.14	6.31	8.2	5.67	4.94	1.55	3.9	0.1	0.971	0.1	0.219
Aromatics >EC21-EC35	217	22.7	3.14	13	0.1	5.68	93.7	12.5	40.9	64.1	147	48.3	5.55	29	45.7	37.3	33.1	10.8	18.4	6.57	8.16	5.22	10.1
Aromatics >EC35-EC44	29.3	6.1	0.463	1.26	0.1	0.1	40.7	5.9	16.5	36.7	43.6	24.1	0.824	11.7	30.9	14.5	18.4	1.21	7.79	5.17	3.63	4.45	1.09
Aromatics >EC40-EC44	11	2.33	0.1	0.1	0.1	0.1	14.5	2.8	6.02	15.8	14	9.38	0.1	4.52	13.1	5.3	6.88	0.1	2.56	2.77	1.75	1.76	0.1
Polyaromatic Hydrocarbons (PAHs)																							
Acenaphthylene	12	12	12	12	12	12	913	12	13	108	60	98.7	12	57.1	91.9	12	48.3	12	13.3	20.4	13.6	12	12
Acenaphthene	8	8	8	8	8	8	8	8	16.8	13.4	40	19.1	8	8	18.2	13.8	13.8	8	8	9	8	8	8
Anthracene	16	16	16	16	16	16	227	16	45.3	161	80	150	16	68.3	137	38.5	113	16	23.1	62	31.3	16	16
Benz(a)anthracene	14	14	14	14	14	14	1780	55.8	274	674	70	602	62.8	277	391	95.9	349	27.1	98	161	90.8	32.9	14
Benzo(a)pyrene	15	15	15	15	15	15	3080	53	309	610	75	637	71.8	284	321	75.9	286	24.3	80.2	144	88.3	35.6	15
Benzo(b)fluoranthene	15	15	15	15	15	23.5	4890	115	539	1140	75	1050	100	474	583	160	511	50.5	163	270	151	58	15
Benzo(k)fluoranthene	14	14	14	14	14	14	1350	37.5	170	331	70	343	36.7	163	233	43.5	197	14	81.4	93	46.3	14	14
Benzo(g,h,i)perylene	24	24	24	24	24	24	3460	52.7	297	496	120	486	49.5	238	243	75.6	206	26	75	116	77.3	24	24
Chrysene	10	10	10	10	10	19.7	1230	66.9	327	594	50	614	71.5	303	433	134	391	32.2	131	179	96.1	33.5	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	720	0.023	63.5	143	0.115	129	0.023	59.3	56.3	0.023	46.7	0.023	0.023	28.6	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	0.018	0.018	0.018	3020	44.1	247	449	90	589	53.4	253	292	73.8	257	29.7	76.9	91.9	69.4	28.4	0.018
Fluoranthene	0.017	0.017	0.017	0.017	0.017	23.2	2010	101	508	1470	0.085	1000	90.6	402	778	219	622	39.4	167	275	172	59.8	0.017
Fluorene	10	10	10	10	10	10	43.4	10	10.8	36.9	50	39	10	23.1	73.7	20.4	27.1	10	10	12.4	15.5	10	10
Naphthalene	9	9	9	9	20.5	9	240	106	30.4	103	45	167	15	77.8	143	47.9	123	16.1	30.7	35.2	19.1	94.8	9
Phenanthrene	15	15	15	15	15	15	359	179	229	675	75	488	72.6	195	612	168	319	45.4	86.3	148	132	34.1	15
Pyrene	0.015	0.015	0.015	0.015	0.015	0.015	1.95	0.0877	0.443	1.1	0.075	0.943	0.0789	0.322	0.607	0.175	0.487	0.0319	0.148	0.201	0.136	0.0443	0.015
PAH, Total Detected USEPA 16	0.118	0.118	0.118	0.118	0.118	0.118	25.3	0.899	3.52	8.1	0.59	7.35	0.703	3.2	5.01	1.34	4	0.322	1.17	1.85	1.14	0.421	0.118
Naphthalene-d8 % recovery**	95.5	93.2	89.8	88.7	88	70.3	94.5	92	97.3	93.4	92.6	88.9	86.1	85.5	82.8	75.6	84.5	92.4	85.2	77.5	81	92.5	93.8
Acenaphthene-d10 % recovery**	89.9	88.7	84.6	86.5	91.4	73.8	93.3	89	93.1	92.7	80.9	86.9	64.1	88.9	89.5	78.9	90.5	90.9	87.1	75.7	85.5	86.5	88.4
Phenanthrene-d10 % recovery**	92.7	88.5	87.8	85.5	94.7	78.6	91.2	83.5	94.1	92.1	88.7	87.5	83.7	85	93.3	84.2	93.5	90.1	92.6	75.5	94.7	88.7	89.5
Chrysene-d12 % recovery**	85.1	84.1	83.2	85.7	92.9	89.7	89.2	72.4	85.7	77.2	82.1	83	79.3	80.7	86.4	89.8	85.9	84.1	82.6	73.2	83.2	85.1	85.4
Perylene-d12 % recovery**	81.4	84.9	82.3	88.1	81.2	88.9	88.3	62.4	84.6	72.4	82.9	79.9	73.6	76.8	71.9	85.3	72.8	81.7	78.8	75.1	85.7	83.7	85.6
Total Aliphatics >C12-C44	23.6	2.42	0.1	4.06	0.1	1.65	41.2	8.6	22.4	56.8	21	93.1	0.1	30.3	118	160	106	37.9	69	15.2	18.5	4.98	0.782
Total Aromatics >EC12-EC44	258	28.8	3.6	14.3	0.1	5.68	152	24.1	63.3	117	211	82.7	8.51	48.3	86.7	58.4	57.4	13.7	30.7	11.7	12.8	9.66	11.5
Total Aliphatics & Aromatics >C5-C44	282	31.7	3.6	18.3	0.1	7.48	193	32.7	85.7	173	232	176	8.51	78.6	205	219	163	51.7	99.9	26.9	31.2	14.6	12.2
Metals - (Solid)																							
Iron	7810	29700	35700	32700	31300	36700	30300	54100	49400	107000	183000	74500	204000	179000	173000	264000	155000	452000	134000	337000	149000	41100	34200
Manganese	226	228	342	361	1170	472	4750	1400	2990	3260	39500	4760	2840	7110	3380	3880	3530	4220	3550	4030	3670	1820	590
Metals - (Liquid)																							
Calcium	-	-	-	-	-	-	67200	-	274000	-	222000	-	134000	126000	142000	-	157000	94500	-	44900	-	-	-
Magnesium	-	-	-	-	-	-	7520	-	8030	-	6830	-	35200	16100	11000	-	31700	8570	-	5890	-	-	-
Phenols																							
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.0141	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																							
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	0.0377	-	0.0829	-	0.123	-	0.028	0.0283	0.108	-	0.0796	0.0232	-	0.0188	-	-	-
pH	7.4	6.94	7.32	7.35	8.2	7.14	9.95	8.57	10	9.39	12.2	10.7	10.4	9.44	11	12.2	10.7	9.55	10.6	10.3	9.7	8.52	7.39
Sulphate, Total																							
Sulphur, Total	-	-	-	-	-	-	0.14	-	0.154	-	0.495	-	0.0816	0.115	0.182	-	0.265	0.0708	-	0.0711	-	-	-
Sulphate, Total potential	-	-	-	-	-	-	0.42	-	0.462	-	1.49	-	0.245	0.345	0.546	-	0.795	0.212	-	0.213	-	-	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	0.068	-	0.374	-	1.33	-	0.0473	0.0715	0.213	-	0.212	0.0387	-	0.0319	-	-	-
Cyanide, Total	1	1	1	1	1	1	1.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5.64	1
Exchangeable Ammonia as N	1590	702	133	281	105	331	12	12	12	12	12	20.8	19	12	12	12	12	30.5	12	12	12	573	661
Asbestos																							
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	09/11/2018	-	09/11/2018	-	09/11/2018	-	30/11/2018	30/11/2018	26/11/2018	-	26/11/2018	30/11/2018	-	03/12/2018	-	-	-
Analysed By	-	-	-	-	-	-	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Barbara Urbanek-Walsh	-	Paul Poynton	Paul Poynton	Marcin Magdziarek	-	Marcin Magdziarek	Paul Poynton	-	Christian Hallam	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	N/A	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Fibrous Anthophyllite	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Fibrous Tremolite	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Fibrous Actinolite	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Non-Asbestos Fibre	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Comments	-	-	-	-	-	-	0	-	0	-	Loose fibres in soil.	-	0	0	0	-	0	0	-	0	-	-	-
Volatile Organic Compounds (VOCs)																							
Dibromofluoromethane**	122	125	123	121	107	122	112	115	126	117	133	113	115	110	103	108	105	111	115	109	110	125	115
Toluene-d8**	88.1	96.6	101	103	99.9	98.5	98.6	98.9	100	96.2	100	102	104	102	97.1	96.8	98.5	102	103	102	103	101	99.3
4-Bromofluorobenzene**	70.9	78.7	83.1	85.2	95	100	79.2	70.4	81.1	70	84.5	79.8	83.3	85.4	94.2	90	91.2	72.8	83.6	86.2	85	88	82.1
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																							
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1392	1370	0	0.35	95	9	34	
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1393	1393	1064	0.65	397	13	22	6.74
Cadmium	TM181	mg/kg	<0.02	1393	1393	964	0.02	31	1	2	0.219
Chromium	TM181	mg/kg	<0.9	1393	1393	1060	0.90	3090	135	591	25.08
Copper	TM181	mg/kg	<1.4	1393	1393	1393	1.40	1700	71	521	7.25
Lead	TM181	mg/kg	<0.7	1393	1393	507	0.70	4220	93	232	41.85
Mercury	TM181	mg/kg	<0.14	1393	1393	606	0.14	6	1	1	0.355
Nickel	TM181	mg/kg	<0.2	1393	1393	427	1.34	313	26	45	30.61
Selenium	TM181	mg/kg	<1	1393	1393	833	1.00	52	4	17	1.87
Vanadium	TM181	mg/kg	<0.2	1393	1378	1377	<0.2	2680	207	683	4.27
Zinc	TM181	mg/kg	<1.9	1393	1393	1002	7.15	13200	291	785	365.79
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0	0.01
Toluene	TM089	mg/kg	<0.002	271	271	0	0.002	0	0	0	0.232
Ethylbenzene	TM089	mg/kg	<0.0003	271	271	0	0.004	0	0	0	0.213
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0	0.19
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	0	311.47
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	0	1134.88
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	0	784.34
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	0	60406.47
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	15	1198344.53
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	83	1506392543.34
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	175	1506392543.34
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	69	1506392543.34
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	0	19.81
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1382	0	0.01	20	0	0	451.11
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	430	2	0	180.19
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	0	600.15
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	0	0.10	5600	13	51	1198344.53
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9600	41	161	1783.48
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	4810	121	440	3052.88
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1040	41	160	3052.88
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	79	3052.88
Polycyclaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	3179	44.45
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	298	0.05	193000	466	414	79.05
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	0.03	1860000	3698	5475	90.78
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	938	14.00	1150000	4645	11985	161.3193
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3735	10570	91.65
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	15970	9.09
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	5956	13.44
Benzo(g,h,i)perylene	TM218	µg/kg	<0.016	1383	1383	989	0.24	333000	2514	7273	91.65
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	11470	1651.53
Dibenz(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.03	177000	748	1857	2227.85
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	7460	67.35
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1133	0.03	2640000	11088	29555	17.87
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	2724	72.09
Naphthalene	TM218	µg/kg	<0.009	1383	1383	814	<0.009	4680000	10974	5657	72.28
Phenanthrene	TM218	µg/kg	<0.015	1383	1382	977	15.00	3810000	9794	18025	72.09
Pyrene	TM218	µg/kg	15	1008	1008	11	0.03	1950	10	25	203.18
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	1	<0.118	24600	76	169	
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0	1	9946	100	107	
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0	1	9830	98	105	
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0	1	9920	99	105	
Chrysene-d12 % recovery**	TM218	%		1383	1380	0	1	9460	96	107	
Perylene-d12 % recovery**	TM218	%		1383	1380	0	1	8930	94	110	
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117	342	
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25000	294	802	
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27600	416	1516	
Metals - (Soils)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	22950000	103039	277000	
Manganese	TM224	mg/kg	<0.13	1383	1382	0	<0.13	4080000	8574	32500	
Metals - (Liquid)											
Calcium	TM224	mg/kg	<23	1371	622	0	<23	398000	131387	237950	
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371	35250	
Phenols											
Phenol	TM062 (S	mg/kg	<0.01	1373	1373	1373	0.01	1	0	0	0
Cresols	TM062 (S	mg/kg	<0.01	1373	1317	1317	<0.01	9	0	0	0
Xylenols	TM062 (S	mg/kg	<0.015	1373	1317	1317	<0.015	4	0	0	0
Phenols, Total Detected monohydric	TM062 (S	mg/kg	<0.035	1373	1317	1317	<0.035	10	0	0	0
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0	0
pH	TM133	pH Units	>1	1002	972	972	2.1	13	10	13	0
Sulphate, Total	TM221	mg/kg	<48	375	20	10	<48	22900	6530	18700	0
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	3	0	1	0
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	2	0
Sulphate, acid soluble (total)	TM221	%	<0.02	1003	425	425	<0.02	3	0	1	0
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	4	0
Exchangeable Ammonia as N	TM024	mg/kg	<12	1003	948	948	<12	1000	61	263	0
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	80	80	<0.001	0	0	0	
Date of Analysis	TM048	No units		1371	0	0					
Analysed By	TM048	No units		1371	0	0					
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	66	66	<0.001	0	0	0	
Additional Asbestos Components Eulang TM048	TM304	No units		1002	0	0					
Analysis Comments	TM304	No units		1002	0	0					
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	95	80	<0.001	0	0	0	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					
Anthophyllite Asbestos	TM048	No units		1371	0	0					
Fibrous Tremolite	TM048	No units		1371	0	0					
Fibrous Actinolite	TM048	No units		1371	0	0					
Non-Asbestos Fibre	TM048	No units		1371	0	0					
Comments	TM048	No units		1371	0	0					
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1373	1100	1100		175	105	120	0.00
Toluene-d8**	TM116	%		1373	1100	1100		115	97	102	0.00
4-Bromofluorobenzene**	TM116	%		1373	1100	1100		113	90	102	0.00
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1373	1099	1099	<0.1	2	0	0	0.00
Benzene	TM116	mg/kg	<0.09	1373	1099	1099	<0.09	7	0	0	0.00
Toluene	TM116	mg/kg	<0.07	1373	1099	1099	<0.07	28	0	0	0.00
Ethylbenzene	TM116	mg/kg	<0.04	1373	1099	1099	<0.04	3	0	0	0.00
p/m-Xylene	TM116	mg/kg	<0.1	1373	1099	1099	<0.1	62	0	0	0.00
o-Xylene	TM116	mg/kg	<0.1	1373	1099	1099	<0.1	18	0	0	0.00
Naphthalene	TM116	mg/kg	<0.13	1373	1211	1211	<0.13	15000	17	3	0.00
Sum of BTEX	TM116	mg/kg	<0.4	1373	1096	1096	<0.4	116	1	1	0.00
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter QV(cp/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00
Gross Calorific Value Original QV(cp/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	21	0.00
Net Calorific Value in Dry Matter QV(net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	26	0.00
Net Calorific Value in Original QV(net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	20	0.00
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	1	0.00
Water Gross M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	14	23	0.00
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	22	0.00

Sample ID	4GF2V	4GF4V	4GF5V	4GF6V	4GF7S	4GF8V	4GG5	4GG5	4GG6	4GG6	4GG7	4GG7	4GG5V
Depth	2.5	2.4	2.5	2.5	2.5	2.5	0.4	0.7	0.2	0.5	0.5	1	2
Sampled Date	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/10/2018	19/10/2018	01/10/2018
Percentage of exceedances													
	0	1.03	0.909	8.41	1.3	0.962	1.21	7.1	7.03	0.712	1.72	45.3	10.5	0.91
	11.6	13.2	13.4	12.9	11.4	16.5	11.4	5.49	2.38	14.2	11.5	8.44	11.6
	0.03	0.03	0.03	0.03	0.03	0.03	0.54	0.525	0.03	0.7	0.3	0.3	0.536
	25.08	28.8	31.2	31.9	29.1	34.4	9	5.37	17.8	9	9	9	27.1
	100.00	11.3	9.01	20	10.4	9.57	13	14	5.67	1.4	14	22.1	14	13
	36.66	23.5	24.7	45.8	26.7	22.4	28.5	27.6	3.77	3.57	35.1	33.4	47	25.5
	43.82	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.142
	30.87	31.8	34.1	24.2	37.3	34.3	40.2	15.8	6.93	1.36	23.7	40.4	30.6	35.2
	58.93	1	1	1	1	1	1	1	1	1.07	10	10	10	1
	99.57	51.1	51	46.7	54.6	49.7	58.9	38.3	36.7	46	76.2	155	87.3	49.4
	11.57	143	104	144	103	102	104	72.8	57.3	11.8	134	170	120	105
	100.00													
	0.00	0.32	0.00											
	0.00	0.213	0.00											
	0.00		0.19	0.00										
100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
96.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
96.06	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
42.42								0.254		1.61		0.14		
97.01	8.18	8.01	7.14	7.88	7.76	6.98	8.82	8.91	10.4	8.82		9.4	9.3	8.98
5.33														
40.32								0.26		0.916		0.234		
40.32	-	-	-	-	-	-	-	0.78	-	2.75	-	0.708	-	-
42.42	-	-	-	-	-	-	-	0.683	-	0.736	-	0.216	-	-
99.90	3	3	3	3	3	3	1	1	1	1	3	3	3	3
54.61	19.6	317	410	115	123	140	12	12	12	12	12	14.3	12	89
0.00	-	-	-	-	-	-	-	30/11/2018	-	19/11/2018	-	30/11/2018		
0.00	-	-	-	-	-	-	-	Paul Pounsord	-	Andrzej Farfecki	-	Paul Pounsford		
0.00	-	-	-	-	-	-	-	-	-	-	-	-		
0.00	-	-	-	-	-	-	-	-	-	-	-	-		
0.00	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected		
0.00	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected		
0.00	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected		
0.00	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected		
0.00	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected		
0.00	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected		
0.00	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected		
0.00	-	-	-	-	-	-	-	0	-	0	-	0		
0.00	128	122	111	121	137	110	108	113	114	106	112	105	114	
0.00	100	102	90	97.8	102	101	99.1	102	99.4	96.4	102	97.4	102	
0.00	82.3	86.6	80.8	107	85.2	86.1	95.8	85.3	108	97	80.2	94.1	88.2	
0.00	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.00	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.00	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.00	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.00	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.00	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	

													Sample ID	40AF28	40AF28	40AF28	40AF28	40AF28V	40AG28	40AG28	40AH28	40AI28	40AI28	40AI28	40AI28	40AJ28	40AJ28	40AK28	40AK28	40ATP01	40ATP01	40ATP01
													Depth	0.500.50	1.001.00	1.501.50	2.002.00	2.602.60	0.500.50	0.900.90	0.500.50	0.500.50	1.001.00	1.501.50	2.202.20	0.700.70	1.201.20	0.700.70	1.101.10	0.500.50	1.001.00	1.501.50
													Sampled Date	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	23/05/2018	23/05/2018	23/05/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**Upper 95th Percentile**	**WQS**	**Percentage of exceedances**																				
Carbon																																
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00	73.4	9.48	48.4	29	6.36	5.14	6.86	7.55	7.33	2.95	11.4	35.9	2.59	2.67	7.79	4.83	3.79	5.34	12	3.91
Metals (Solids)																																
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51	2.08	2.47	17.6	20	13.4	8.28	8.8	13	10.1	6	16.8	6.7	20.7	4.07	7.51	21.2	17.9	3.98	8.94	5.63
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30	0.112	0.401	1.89	1.62	0.499	0.768	2.08	3.87	1.2	1	0.966	0.374	0.689	0.326	0.811	0.849	0.961	0.21	0.243	0.23
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14	5.44	62.5	9	9	26.1	35.3	10.8	24.5	15.8	454	76.9	166	109	50.3	74.5	46.5	121	5.66	11.2	6.66
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00	4.9	5.63	30.3	39.6	19.1	23.6	22.4	46.7	22.8	17.9	26.6	21.5	24.6	12.4	40.9	17.8	43.2	6.75	42.6	18
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26	13.4	23.8	125	144	38.7	70.8	153	363	202	51.4	62.5	30.1	73.8	23.2	144	130	24.2	21.9	31.3	21.8
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.396	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05	4.25	9.87	25.1	37.6	29.7	17.4	14.4	28.4	15.6	9.9	24.7	12.2	19.7	9.35	33.9	26	28.7	4.23	26.8	19.4
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77	2.13	4.07	10	10	1.26	3.53	2.35	1.1	2.41	13.3	10	5.7	5.71	4.46	2.73	5.26	3.93	1	1.88	1
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00	20.8	92.7	60.5	86.5	45.7	140	58.3	72.6	40.4	1120	331	589	193	175	345	156	130	6.56	29.9	24.2
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49	49.8	113	239	250	130	432	1170	3260	888	141	162	146	1060	395	825	1240	129	65.7	71.5	74.3
TPH Criteria Working Group (TPH CWG)																																
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00																				
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00																				
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00																				
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00																				
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00	0.04	0.0424	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0746	0.0938	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00	0.04	0.0532	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.105	0.04	0.04	0.04	0.04	0.04	0.04	0.0896	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00	0.0844	0.253	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0531	0.106	0.04	0.04	0.04	0.04	0.0672	0.04	0.244	0.04
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00	10.2	3.37	0.595	0.1	0.1	1.59	1.16	2.17	1.92	2.84	1.28	0.1	1.19	0.1	1.47	0.909	11.2	0.216	1.34	2.57
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00	41.8	15.3	8.52	4.97	0.1	8.82	7.37	24.1	21.3	21.5	5.91	2.94	9.22	5.5	15.2	8.83	33.1	1.88	3.64	9.28
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00	747	201	24.7	52.6	8.05	105	86.5	247	474	253	43.6	47.2	97.7	72.2	198	145	195	41.5	22.9	45.2
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00	836	224	6.09	30.7	0.1	46.1	33.5	82.5	244	109	18.8	20.6	25.4	17.4	69.1	31	227	37.3	18.4	26.4
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0554	0.085	0.04	0.04	0.04	0.04	0.04	0.04	0.0739	0.04
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00	0.0563	0.168	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0713	0.04	0.04	0.04	0.04	0.0448	0.04	0.162	0.04
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00	5.5	2.54	0.2	0.626	3.83	0.709	0.1	2.59	1.8	1.03	1.75	0.1	0.841	0.1	1.66	0.1	4.96	0.616	4.48	2.6
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00	29.6	11.4	2.45	2.56	7.62	3.5	2.77	15.2	15.7	6.75	2.9	2.1	5.67	3.3	26.6	2.83	15.3	2.19	13.4	7.7
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00	1150	243	12.3	56.4	35.8	58.7	34.4	88.3	289	124	31.3	33.8	54.1	40.2	184	27.6	193	52.1	37.8	46.6
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00	1120	342	6.48	63.6	4.94	47.8	25.3	46.3	292	121	23	26.5	21.5	16.4	59.8	11.9	265	50.3	27.2	33
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00	506	165	2.36	27.6	0.1	19.7	10.7	17.8	121	52.1	9.59	11.1	7.84	6.04	22.5	4.44	128	22.7	11.7	13.9
Polyaromatic Hydrocarbons (PAHs)																																
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42	120	60	12	60	12	15.8	12	80	120	12	120	12	12	12	56	12	60	68	12	60
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93	629	299	8	40	8	48.8	32.1	889	80	10.6	80	8	45.9	10.1	60	20.8	66.5	60.2	119	71.2
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86	160	80	16	80	16	50.2	39.4	187	160	23.1	160	16	46.4	28	156	40.8	80	92.7	43.5	80
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56	224	122	30.2	70	33.7	472	174	839	644	320	233	88.2	443	373	1660	284	113	100	31.3	70
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81	496	155	21.7	75	34	524	180	674	595	157	199	90.4	470	334	1690	269	120	91.5	15	75
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77	808	253	42.5	75	57.5	948	374	1320	1100	734	386	215	924	706	3190	585	217	129	36.7	107
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77	256	77.7	16	70	14	309	125	474	330	215	140	65.9	260	204	961	187	70	70	14	70
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07	407	153	24	120	24	505	201	565	487	312	0.24	93.7	458	328	1320	276	120	120	24	120
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79	519	161	34.7	50	39.5	580	218	795	843	511	314	145	759	569	2760	417	146	93.8	60.1	67.2
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23	0.23	0.115	0.023	0.115	0.023	122	44.9	135	0.23	70.6	0.23	0.023	113	62.5	326	61.5	0.115	0.115	0.023	0.115
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37	378	134	0.018	90	0.018	449	167	550	443	287	180	88.1	399	293	1130	257	90	90	0.018	90
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23	522	300	60.6	0.085	84.3	463	294	1610	941	454	530	128	385	387	1400	374	264	301	96.1	131
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09	180	93.8	10	50	10	18.1	14.7	127	0.1	10	0.1	20.8	34.1	10	72.7	17.8	50	84.7	102	65.8
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51	669	359	13.7	45	9	37.3	61.7	113	90	22.8	90	25.8	16.3	9	172	19.4	154	249	318	247
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56	473	287	70.5	75	27.1	218	163	818	326	132	215	106	201	99.2	613	232	238	412	484	263
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00																				
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00	6.4	2.77	0.347	0.59	0.352	5.33	2.41	10.8	6.67	3.85	2.38	1.21	5.12	3.9	17.7	3.42	1.53	1.94	1.37	1.15
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00	78.6	88.4	87.2	88.4	88.5	91.1	93.4	92.6	75.1	92.2	77.9	78.4	80.1	80.4	82	79.9	94.2	104	79.3	88
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00	88.8	85.2	87.9	84.6	93.6	94.5	93.5	93.5	82.6	102	84.8	82.4	83.7	84.4	86.2	83.3	91.9	102	84.3	84.9
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00	82.1	98.9	77.8	77.4	97.1	101	94.3	96.6	81.7	112	74.9	82	83.3	88.2	87.4	85.2	92.6	98.9	90.4	84.5
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00	77	89.7	45.2	73.1	101	96.7	76.6	79	78.7	98.4	74.2	83.4	83.9	91.1	90.1	83.6	90.7	101	82.8	83.6
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00	73.2	87.5	29.6	71.1	98.7	95	72.3	70	74.7	93	72.8	84.4	85.8	90.7	89.6	77.2	90.2	109	71.3	77.4
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00	1630	444	39.9	88.3	8.05	161	129	356	741	387	69.6	70.8	133	95.1	283	186	467	80.9	46.3	83.4
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00	2310	599	21.4	123	52.2	111	62.5	152	598	253	59	62.4	82.1	59.9	273	42.4	478	105	82.9	89.9
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00																				
Metals - (Solid)																																
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00			13100	52100	312000	178000	33400	49900	67700	154000	83600	141000	128000	55000	97100	46500	93000	69600	208000	8480	16700	19700
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00			1710	7220	4750	3410	729	4150	3610	4790	4180	24800	8150	10300	10800	6340	5630	7670	14800	793	326	496
Metals - (Liquid)																																
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00			216000	-	29500	-	-	126000	-	125000	168000	-	124000	-	183000	-	135000	-	149000	212000	9810	-
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00			34300	-	5890	-	-	17300	-	14600	19200	-	8440	-	31700	-	14600	-	36900	106000	3070	-
Phenols																																
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55	1.91	-	0.14	-	-	0.878	-	0.283	0.27	-	0.216	-	1.13	-	0.618	-	0.296	0.0664	0.0578	-
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93	9.45	10	9.21	9.33	7.39	10.3	11	11.1	11.2	11.8	11.6	11.3	10.9	11	10.3	10.9	11.7	9.79	8.49	8.26
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55	1.26	-	0.191	-	-	0.381	-	0.199	0.419	-	0.38	-	0.465	-	0.36	-	0.258	0.164	0.16	-
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55	3.78	-	0.573	-	-	1.14	-	0.597	1.26	-	1.14	-	1.4	-	1.08	-	0.774	0.492	0.48	-
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55	2.16	-	0.0478	-	-	0.595	-	0.407	1.03	-	1.03	-	0.891	-	0.647	-	0.323	0.184	0.0935	-
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00	1	1	1	1.47	1	1	23	2.98	2.74	4.62	1.51	2.01	1	1	1	1	1	1	2.26	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00	12	12	12	12	122	12	12	12	12	12	12	12	12	12	12	12	12	12	73.7	18.4
Asbestos																																
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	0.001	-	-	-	-	-
Date of Analysis	TM048	No units		430	0	0					0.00		05/06/2018	-	05/06/2018	-	-	05/06/2018	-	05/06/2018	05/06/2018	-	05/06/2018	-	05/06/2018	-	05/06/2018	-	31/05/2018	31/05/2018	31/05/2018	-
Analysed By	TM048	No units		430	0	0					0.00		Marcin Magdziarek	-	Marcin Magdziarek	-	-	Andrzej Ferfecki	-	Marcin Magdziarek	Lucy Caroe	-	Andrzej Ferfecki	-	Marcin Magdziarek	-	Lucy Caroe	-	Andrzej Ferfecki	Andrzej Ferfecki	James Richards	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	0.001	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00		-	-	-	-	-	-	-	None	None	-	-	-	-	-	None	-	-	-	-	-
Analysts Comments	TM304	No units		83	0	0					0.00		-	-	-	-	-	-	-	N/C	N/C	-	-	-	-	-	N/C	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	0.001	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	-	Not Detected	-	Detected	Detected	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Fibrous Tremolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Fibrous Actinolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	-	Trace	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Detected	Trace	Not Detected	-
Comments	TM048	No units		430	0	0			0.00	0.00	0.00		0	-	0	-	-	0	-	Bundle of fibres in soi	Soil containing ACM debris	-	0	-	0	-	Fibre bundles in soi	-	0	0	0	-
Volatile Organic Compounds (VOCs)																																
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00		112	110	108	106	105	106	115	111	118	108	108	109	114	111	108	109	104	102	98.7	104
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00		91.8	95.8	99.9	98.5	99.1	98.8	98.2	97.6	95.9	96.7	97.2	98.3	98.8	99.8	97.3	98.1	97.7	101	100	101
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00		86.8	93.5	95.7	96.8	94.1	98.5	98.1	91.9	96.9	99.3	92.3	96.2	97.7	101	93.1	98.9	95.1	96.9	87.9	96.6
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00		0.615	0.539	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.144	0.13	0.149	0.13	0.15	0.13
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances	40ATP01 3.003.00 23/05/2018	40ATP02 0.500.50 23/05/2018	40ATP02 1.001.00 23/05/2018	40ATP02 2.002.00 23/05/2018	40ATP02 3.003.00 23/05/2018	40ATP03 0.500.50 23/05/2018	40ATP03 1.001.00 23/05/2018	40ATP03 2.202.20 23/05/2018	40ATP04 0.500.50 23/05/2018	40ATP04 1.001.00 23/05/2018	40ATP04 1.501.50 23/05/2018	40ATP05 0.500.50 23/05/2018	40ATP06 0.500.50 23/05/2018	40ATP06 0.900.90 23/05/2018	40ATP07 1.001.00 23/05/2018	40ATP07 1.501.50 23/05/2018	40ATP07 2.002.00 23/05/2018	40ATP08 0.500.50 23/05/2018	40ATP08 1.001.00 23/05/2018
Carbon																															
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00	10.4	6.53	2.17	4.19	1.69	1.41	13.4	12	14.5	1.56	6.72	5.55	7.26	4.41	51.4	8.69	22.1	10.4	4.71
Metals (Solids)																															
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51	6.6	8.78	5.28	10	4.98	9.06	4.13	26	26.3	5.49	6.11	11.4	12.3	5.53	6.59	10.6	11.5	6.96	6.14
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30	0.978	0.348	0.158	0.298	0.442	0.508	0.306	1.92	9.23	2.08	0.319	0.377	0.02	0.221	0.225	0.269	1.57	1.03	0.615
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14	160	8.93	10.1	9.33	104	43.8	14.9	103	876	96.7	7.64	14.1	19.8	142	24.1	18.2	14	340	87.1
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00	18.2	23.2	52.6	30	13.7	20.6	12.4	133	131	25.3	27.3	23.1	28.3	15.9	59.3	13.7	26.3	22.1	17.2
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26	104	30.8	17.3	21.6	14.7	22.4	19.2	96	351	90	30.8	19.6	19.6	27.1	26.2	20.3	285	110	70.6
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53	1.02	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.07	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05	9.78	18.9	12.9	27.9	6.76	18.9	10.7	30.9	35.2	11.8	18.9	24.9	34.4	11.6	33.8	16.4	25.5	17.5	20.3
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77	3.86	1.2	1	1.04	5.98	3.55	1.7	2.27	10.5	1.5	1	1	1.17	5.66	2.16	1.47	2.38	6.32	4.49
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00	173	30.1	21.4	29.7	184	77.1	45.3	67.8	652	68.3	17	32.2	26.4	222	67.1	52	106	331	184
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49	436	100	49	72.9	79.9	146	60.2	326	1950	563	66.8	72.4	69.3	193	92.2	74.7	1260	468	268
TPH Criteria Working Group (TPH CWG)																															
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00																			
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00																			
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00																			
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00																			
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00	0.0516	0.078	0.0661	0.0677	0.04	0.04	0.04	0.0426	0.0644	0.04	0.0762	0.0513	0.0921	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00	1	0.636	1.06	0.603	0.04	0.04	0.04	0.04	0.04	0.04	0.287	0.122	1.21	0.04	0.04	0.04	0.0406	0.04	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00	29.2	12.1	12.6	4.74	0.04	0.04	0.04	0.04	0.04	0.04	1.67	0.166	13.4	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00	198	47	0.1	4.51	1.23	0.424	0.614	5.45	3.11	0.1	4.29	342	1330	2.14	1.53	0.868	3.54	3.76	1.58
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00	64.3	26.3	0.1	7.12	5.87	1.41	4.66	9.46	8.02	0.1	8.45	313	940	17.2	14.9	4.68	40.9	15.7	14.5
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00	269	55.1	0.1	21.5	62.3	0.1	38.8	40.2	26.9	0.1	27.1	282	1230	262	45.4	19.1	182	88	142
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00	65.9	8.17	0.1	1.38	15	0.1	7.78	15.7	2.93	0.1	3.61	44.5	175	127	15.6	5.23	56.3	49.3	41
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00	0.0417	0.163	0.211	0.238	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00	0.04	0.0644	0.047	0.0444	0.04	0.04	0.04	0.04	0.0441	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00	0.711	0.485	0.803	0.496	0.04	0.04	0.04	0.04	0.0746	0.0414	0.196	0.0923	0.809	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00	19.4	8.1	8.41	3.16	0.04	0.04	0.04	0.04	0.04	0.04	1.11	0.111	8.91	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00	131	35.4	2.24	14.3	0.1	0.77	1.21	9.39	7.49	0.1	2.5	62	239	0.719	0.1	0.415	2.62	0.979	0.768
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00	39.5	18.1	0.1	5.38	3.11	2.12	4.3	16.6	22.3	1.34	5.85	78.3	276	6.66	3.69	2.36	19.2	6.63	6.66
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00	116	39.7	0.1	17.3	20.2	6.94	21.3	60.4	68.8	9.86	18.3	98.6	315	219	57.9	16.6	125	67.8	89.7
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00	61.4	15.8	0.1	3.36	8.37	1.46	7.17	31.6	18.9	2.39	7.66	28.2	72.1	226	61.3	8.73	95.1	68.2	54.2
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00	24.2	6.09	0.1	0.831	2.8	0.449	2.19	13.3	6.49	0.1	3	8.14	15.8	99	27	3.53	42.4	32.7	23.3
Polyaromatic Hydrocarbons (PAHs)																															
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42	165	71.2	18.6	32.8	12	12	12	15.6	77.1	21.4	12	12	146	60	60	12	60	208	60
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93	92.6	98.9	15.5	30.4	9.02	8	8	37.3	95.8	16.2	8	8	294	40	40	8	40	5530	40
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86	139	47.4	16	16	21.5	16	19.9	112	326	42.1	16	45.2	193	80	80	16	80	1700	80
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56	296	81.6	14	44	150	14	66.1	381	744	127	18.6	21.5	14	321	70	31.9	380	6080	389
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81	337	89.4	15	39.6	146	15	49.8	314	555	112	15	18.6	15	422	75	35.8	405	6210	387
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77	548	148	15	58.8	296	31.6	111	483	861	149	37.5	34.7	18.1	641	75	62.9	888	10600	660
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77	210	49.7	14	21.2	83.2	14	39	162	349	66.9	14	14	14	242	70	17.1	298	3670	237
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07	382	92.1	24	29	159	24	54.1	250	359	89.2	24	24	24	360	120	46.7	465	4610	439
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79	396	122	16.4	58.6	166	19.4	86.8	322	842	126	21	28.9	15.3	386	50	39.8	566	7430	427
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23	0.115	0.023	0.023	0.023	27.1	0.023	0.023	80.8	118	0.023	0.023	0.023	0.023	0.115	0.115	0.023	0.115	1500	0.115
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37	323	86.7	0.018	27.5	99.5	0.018	46.1	206	385	85.2	0.018	0.018	0.018	370	90	35.8	455	3890	341
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23	738	208	33.8	92.1	280	28.3	159	708	1590	260	25.9	47.1	32	413	0.085	41.6	512	8220	390
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09	162	100	16.5	33.1	10	10	10	63.5	227	27.8	10	53.7	300	50	50	10	50	9160	50
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51	5540	892	2270	1360	18.3	30.3	48.5	179	496	24.3	33.4	39.3	186	45	45	26.2	112	180	47.2
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56	535	162	35.7	61.2	127	30.8	158	445	1350	135	39.9	126	171	152	75	58.8	280	9380	157
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00																			
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00	10.6	2.42	2.43	1.97	1.85	0.167	0.986	4.29	9.44	1.5	0.199	0.46	1.4	3.69	0.59	0.429	4.89	85.2	3.87
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00	97.4	87	88	88.5	103	94.9	81.9	101	96.3	106	95.3	91.1	78.4	93.6	69	94.7	79	94.2	98.4
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00	90.3	89.1	87.4	92.2	97.4	90.3	86.8	97.9	95.3	101	93	94.2	127	96.6	76.7	94.8	81.8	95.4	93.7
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00	93.3	95.3	93.8	99.2	95	89.5	92.1	96.7	99.9	102	88.7	92.8	90.3	92.9	62.5	95.4	74.8	97.7	92.3
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00	78.1	79.4	78.2	88.1	89.6	83.6	72	95.9	92.5	96.1	86.8	82.6	78.1	91.5	54.9	92.9	61.7	103	114
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00	66	62.3	53.2	74.1	83.8	73.8	58	86.9	83.8	89	88.9	72.5	70.7	92.3	43.5	92.2	62	104	88.9
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00	598	137	0.1	34.5	84.4	1.84	51.9	70.8	40.9	0.1	43.4	981	3670	408	77.5	29.9	283	157	199
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00	347	109	2.24	40.4	31.7	11.3	34	118	118	13.6	34.3	267	902	452	123	28.1	242	144	151
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00																			
Metals - (Solid)																															
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00			121000	30200	9900	24400	70300	25900	24100	25900	131000	21800	15300	21700	21000	84200	24700	23000	125000	85200	53400
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00			9280	1300	484	907	13200	4090	2160	2350	21700	3050	208	598	475	12400	2310	2000	4860	14400	9650
Metals - (Liquid)																															
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00			161000	-	64500	-	259000	-	144000	165000	-	277000	17000	49000	-	191000	-	68700	-	186000	-
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00			15000	-	3910	-	54200	-	47700	18700	-	45200	1700	2860	-	23700	-	11400	-	13200	-
Phenols																															
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																															
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55	0.115	-	0.0534	-	0.116	-	0.15	0.135	-	0.0718	0.221	0.0951	-	0.135	-	0.0606	-	0.091	-
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93	9.24	10.1	9.28	8.84	11.6	8.88	10.8	10	10.2	9.49	8.24	9.43	8.86	8.97	8.18	9.54	10.1	10.2	10.7
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55	0.279	-	0.202	-	0.29	-	0.288	0.405	-	0.155	0.177	0.27	-	0.263	-	0.0945	-	0.217	-
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55	0.837	-	0.606	-	0.87	-	0.864	1.22	-	0.465	0.531	0.81	-	0.789	-	0.284	-	0.651	-
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55	0.235	-	0.211	-	0.438	-	0.404	0.275	-	0.134	0.151	0.349	-	0.24	-	0.0806	-	0.202	-
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00	26.5	10.8	33.3	23.7	1	1	1	1.96	1.31	1.56	1	1	1	1	1	1	197	9.23	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00	29	87.9	191	293	12	12	12	12	12	12	12	12	39.9	12	12	12	12	12	12
Asbestos																															
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		0.001	-	-	-	0.001	-	-	0.0011	-	-	-	-	-	0.001	-	-	-	0.0045	-
Date of Analysis	TM048	No units		430	0	0					0.00		31/05/2018	-	31/05/2018	-	31/05/2018	-	31/05/2018	31/05/2018	-	31/05/2018	31/05/2018	31/05/2018	-	04/06/2018	-	04/06/2018	-	04/06/2018	-
Analysed By	TM048	No units		430	0	0					0.00		Andrzej Ferfecki	-	James Richards	-	James Richards	-	James Richards	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	Renata Bozhkov	Renata Bozhkov	-	Lucy Caroe	-	Lucy Caroe	-	Marcin Magdziarek	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		0.001	-	-	-	0.0014	-	-	0.001	-	-	-	-	-	0.001	-	-	-	0.001	-
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00		None	-	-	-	PCOM showed signs of Amphibole fibres.	-	-	None	-	-	-	-	-	None	-	-	-	None	-
Analysts Comments	TM304	No units		83	0	0					0.00		N/C	-	-	-	N/C	-	-	N/C	-	-	-	-	-	N/A	-	-	-	N/A	-
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		0.0013	-	-	-	0.0016	-	-	0.0011	-	-	-	-	-	0.001	-	-	-	0.0045	-
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00		Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00		Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Comments	TM048	No units		430	0	0			0.00	0.00	0.00		loose fibres in soi	-	0	-	Fibre bundles in soi	-	0	Loose fibres in soil	-	0	0	0	-	Fibre bundles in soi	-	0	-	Loose fibres in soi	-
Volatile Organic Compounds (VOCs)																															
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00		104	101	102	105	103	103	99.1	99	79	99.9	108	102	104	105	116	104	106	104	106
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00		99.9	98.6	99.5	99.4	99.2	100	98.5	98.9	96.7	101	100	98.6	94.8	95.7	97	97.4	94.5	96.9	97.4
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00		92.9	90.2	95.7	92.1	94.9	97	85.9	88.9	80	97.5	95	90.4	84.2	90.3	81.3	93.3	82.7	92.1	90.1
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00		0.09	0.09	0.166	0.265	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00		0.912	0.13	2.5	2.49	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																															
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<u>Glan Lyn Commercial Soils Data</u>

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances	40ATP08 1.701.70 23/05/2018	40ATP09 1.001.00 23/05/2018	40ATP09 1.401.40 23/05/2018	40ATP09 1.601.60 24/05/2018	40ATP10 0.300.30 24/05/2018	40ATP11 0.500.50 24/05/2018	40ATP11 1.001.00 24/05/2018	40ATP11 1.501.50 24/05/2018	40ATP12 0.500.50 24/05/2018	40ATP12 0.800.80 24/05/2018	40ATP14 0.500.50 24/05/2018	40ATP14 1.001.00 24/05/2018	40ATP14 1.701.70 24/05/2018	40ATP14 2.502.50 24/05/2018	40ATP15 0.500.50 24/05/2018	40ATP15 0.700.70 24/05/2018	40ATP15 1.001.00 24/05/2018	40ATP01V 3.603.60 23/05/2018
Carbon																														
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00	3.57	6.93	7.95	3.88	4.47	3.45	3.22	0.909	2.98	1.34	4.88	18.4	27.1	1.43	2.57	2.93	3.52	29.3
Metals (Solids)																														
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51	8.11	7.58	10.3	12.6	5.86	9.89	9.43	8.09	4.81	13.8	11.1	20.2	25.8	8.01	9.84	10.4	9.37	11.1
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30	0.711	0.818	2.39	0.412	0.178	0.179	0.201	0.177	0.199	0.646	0.403	0.586	0.543	1.77	1.32	0.456	0.381	0.0557
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14	33.1	38.7	9	354	0.9	283	171	39.1	46.4	21.3	323	53.5	18.8	34.7	37.2	12.4	35.1	17.2
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00	26.2	32.5	15.1	34.1	39.9	150	26.7	8.76	17.4	19	25.4	49.1	43.1	72.9	34	23.2	29.2	20.7
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26	111	64.8	37	40.4	28.8	29	27.8	13	15.2	30.2	35	52.6	60.9	126	109	31.6	23.1	15.4
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05	15.3	19.2	38.2	24.1	20.5	16.8	15	10.5	12.7	15.3	23.6	24.4	33.4	12.6	17.3	16.2	33	28.8
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77	3.61	3.01	10	5.06	2.87	4.59	5	2.45	4.53	1.09	4.91	2.6	3.19	2.55	1.99	1.14	1	1.97
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00	89.1	113	67.8	266	73.2	453	345	59.4	84.1	30.9	445	74.9	35.6	57.4	44.7	22.9	51.9	32.9
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49	488	763	270	358	109	120	144	43	84.4	114	108	212	213	622	425	96.1	143	81.6
TPH Criteria Working Group (TPH CWG)																														
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00																		
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00																		
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00																		
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00																		
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0442
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.104
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0631	0.04	0.122
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.0943	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.337	0.04	0.0884
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00	1.59	3.89	4.91	1.82	2.54	3.16	4.72	2.15	2.7	1.3	0.89	1.68	0.1	0.1	0.455	26.2	0.1	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00	14.6	25.1	34.6	6.55	7.48	4.55	6.36	4.76	13.5	4.17	1.34	3.59	0.1	4.48	7.92	73.8	0.1	0.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00	175	203	200	56.8	42	13.3	7.1	24.2	138	29.2	14.6	23	0.1	22.1	47.2	391	0.1	0.1
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00	44.9	69.7	51.4	18.7	12.2	1.47	1.02	7.36	38.3	18.6	7.62	9.09	0.1	7.75	16.7	149	0.1	0.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.51
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0492	0.04	0.231
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.0633	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.224	0.04	0.0598
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00	1.46	5.83	3.7	0.601	0.683	1.14	1.82	0.1	0.824	1.1	0.1	1.53	1.9	1.17	0.937	5.61	0.1	0.1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00	12.1	34.4	20.5	3.2	3.84	3.28	4.18	0.1	5.53	2.75	2.44	4.37	5.06	2.26	4.81	42.3	0.531	3.34
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00	119	216	108	42	31	14.7	12.1	3.64	75.4	26.7	20.3	36.6	19.3	14.9	37.8	312	13.7	146
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00	44.2	85.2	34	22.6	17.7	4.13	4.15	0.1	44.6	23.5	12.2	17.6	9.74	6.43	20.1	137	1.44	10.6
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00	16.9	37.1	12.4	8.96	7.18	1.32	1.52	0.1	18	10.1	5.16	7.71	3.67	2.5	8.64	51.4	0.273	1.05
Polyaromatic Hydrocarbons (PAHs)																														
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42	73.8	14.7	12	12	12	12	12	12	86.8	12	12	12	17.4	12	12	12	12	12
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93	437	70.3	57.7	8	32.3	15.4	13.1	8	14.1	20.2	8	11.1	13.8	24.7	113	76.5	8	8
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86	2070	119	67.3	21.5	49.4	18.8	16	16	548	16	19.1	34	75.6	31.3	113	65	16	16
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56	15900	1380	584	139	636	60.8	37	36.7	1150	35.2	125	135	294	152	132	122	14	14
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81	10500	1570	567	153	1020	48.6	27.6	42	735	26	98.8	111	189	122	101	99.6	15	15
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77	27000	2970	1130	222	1220	73.5	49	66.2	1170	45.9	181	169	365	188	157	190	15	15
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77	8650	818	333	77.9	457	25.8	14	21.1	343	14.8	47.9	57.2	114	66.7	57.1	56	14	14
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07	9800	1670	572	139	878	42.8	24	49.2	405	33.7	77.8	79.8	113	99.9	96.1	90.3	24	24
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79	19400	2030	821	152	662	78.7	44.3	46.9	1040	31.9	150	165	292	163	152	117	10	10
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23	3260	402	133	37.3	162	0.023	0.023	0.023	145	0.023	0.023	0.023	49.2	0.023	0.023	32.3	0.023	0.023
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37	10100	1460	519	144	887	38.2	21.8	44.1	425	27.2	71.7	80.6	103	102	87.7	86.3	0.018	0.018
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23	17900	1270	623	192	764	163	80.9	70.3	1910	85.5	131	276	478	306	356	265	0.017	0.017
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09	323	46	34	12.7	19.6	28.8	14.8	10	91.8	13.4	10	43.7	67.2	25.4	60.8	92.2	10	10
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51	99.9	73.9	42.2	63.1	36	42.3	24.8	16.4	29	13.6	24.5	52.2	103	50.9	52.2	60.6	9	41.4
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56	10200	722	360	100	290	143	76.2	41.5	851	66	113	178	328	218	974	290	15	15
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00																		
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00	169	16.4	6.65	1.62	7.89	0.901	0.454	0.497	10.3	0.486	1.16	1.64	3.03	1.82	2.74	1.87	0.118	0.118
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00	92.4	108	98.9	99.6	99	95.4	93.2	95.1	96.1	95.4	93.4	86.5	89.7	96.6	98.8	98.5	90.7	104
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00	72.8	106	94.8	96.2	95.2	91.2	96.3	92.3	97.1	92.4	98.3	81.3	90	94.7	94.6	96.2	88.4	102
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00	92.8	108	97	95.7	95.8	91.3	99.6	93.2	96.9	93	97.2	84.1	91	96	96.2	98.9	89.5	103
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00	96.3	108	97.7	94.3	94.7	86.3	99.6	90.6	100	90.7	94.5	77.9	91.1	98.5	98	98.1	88.4	95.2
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00	103	112	98.2	95.3	96.8	84.1	99.9	92.3	100	91.2	93.2	78.2	84.8	99.4	102	98.7	82.7	87.5
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00	236	301	291	83.9	64.3	22.5	19.2	38.5	192	53.2	24.4	37.4	0.1	34.3	72.3	640	0.1	0.1
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00	177	341	167	68.4	53.3	23.3	22.3	3.64	126	54	35	60	36	24.8	63.7	497	15.6	160
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00																		
Metals - (Solid)																														
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00			88800	80300	352000	53900	75800	42100	34100	21400	36400	20800	61400	18900	31400	28800	23300	19500	26700	29300
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00			4240	4550	5430	8310	3180	8410	8070	2750	6930	994	9180	1350	1480	3200	1960	1330	402	451
Metals - (Liquid)																														
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00			143000	-	124000	121000	109000	-	110000	66800	-	213000	-	45800	-	187000	-	162000	-	-
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00			26000	-	20200	28300	13800	-	18800	5130	-	12200	-	8780	-	25500	-	59300	-	-
Phenols																														
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																														
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55	0.207	-	0.463	0.278	0.0929	-	0.15	0.0668	-	0.322	-	0.223	-	0.436	-	0.116	-	-
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93	10	10.9	11.3	7.92	8.8	9.37	9.32	9.29	9.18	10	9.03	8.37	9.01	11.3	11.3	9.09	6.76	8.23
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55	0.247	-	0.384	0.293	0.302	-	0.372	0.0965	-	0.134	-	0.385	-	0.204	-	0.166	-	-
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55	0.741	-	1.15	0.879	0.906	-	1.12	0.29	-	0.402	-	1.16	-	0.612	-	0.498	-	-
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55	0.209	-	0.579	0.241	0.299	-	0.396	0.138	-	0.315	-	0.24	-	0.563	-	0.22	-	-
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00	1.34	3.72	1	1	1	1	1	1	1	1	1	1	6.12	1	1	1	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	25.7	398	424
Asbestos																														
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		0.0033	-	-	-	0.001	-	-	-	-	-	-	0.001	-	0.001	-	0.001	-	-
Date of Analysis	TM048	No units		430	0	0					0.00		04/06/2018	-	04/06/2018	04/06/2018	04/06/2018	-	04/06/2018	04/06/2018	-	04/06/2018	-	04/06/2018	-	04/06/2018	-	04/06/2018	-	-
Analysed By	TM048	No units		430	0	0					0.00		Marcin Magdziarek	-	Marcin Magdziarek	Andrzej Ferfecki	Marcin Magdziarek	-	Marcin Magdziarek	Renata Bozhkov	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	-	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		0.001	-	-	-	0.0011	-	-	-	-	-	-	0.001	-	0.001	-	0.001	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00		None	-	-	-	None	-	-	-	-	-	-	None	-	None	-	None	-	-
Analysts Comments	TM304	No units		83	0	0					0.00		N/C	-	-	-	N/C	-	-	-	-	-	-	N/C	-	N/A	-	N/A	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		0.0033	-	-	-	0.0016	-	-	-	-	-	-	0.001	-	0.001	-	0.001	-	-
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00		Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Detected	-	Not Detected	-	Detected	-	-
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Tremolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Actinolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Trace	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Comments	TM048	No units		430	0	0			0.00	0.00	0.00		Bundle of fibres in soi	-	0	0	Loose fibres in soi	-	0	0	-	0	-	Loose fibres in soil	-	soil containing material typical of asbestos cemen	-	Loose fibres in soil	-	-
Volatile Organic Compounds (VOCs)																														
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00		106	107	107	109	105	112	105	104	104	112	102	99.9	95.5	102	104	100	102	100
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00		97	96	97.4	95.9	97.9	99.3	99.5	97.9	98.7	97.5	96.9	94.9	92.3	97.8	97.9	97.6	100	97.2
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00		90.7	89.4	94.1	89.7	92	91.4	97.5	96.5	96.8	90	88.6	86.7	79	96.2	90.9	96.7	98.2	85.9
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.333
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																														
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40ATP02V	40ATP15	40ATP03V	40ATP04V	40ATP05V	40ATP06V	40ATP08V	40ATP10V	40ATP11V	40ATP12V	40ATP14V
	4.004.00	1.201.20	2.602.60	2.102.10	0.800.80	1.201.20	3.003.00	0.500.50	2.002.00	1.101.10	3.003.00
	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018
Carbon											
Soil Organic Matter (SOM)	2.34	1.76	3.36	61	11.3	1.54	4.5	2.24	6.83	1.11	2.12
Metals (Solids)											
Arsenic	5.56	10.5	9.33	5.02	20.7	12.1	10.2	12.7	14.4	6.34	7.57
Cadmium	0.744	0.02	0.271	0.119	0.981	0.171	0.153	0.221	0.423	0.125	0.217
Chromium	20.4	34.6	34.7	7.12	32.5	30	36.8	35.8	35.5	27.5	32.6
Copper	17.4	14	21.6	14.8	30.3	13.1	27.3	20.3	25.5	10.8	15.4
Lead	28.9	25.3	24.6	4.2	61.1	26.5	23.8	23.4	38.1	23.4	27.8
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	11.9	36.1	34.7	13.7	28	37.2	37	36.8	28.2	32.7	37.3
Selenium	3.34	1	1.02	2.27	1	1.06	1.14	1.11	1.28	1	1
Vanadium	46.6	54.4	56.6	13.9	51	59.8	59.9	61.1	55.1	51.8	55.4
Zinc	89.5	101	108	44.9	192	120	113	115	148	110	121
TPH Criteria Working Group (TPH CWG)											
Benzene											
Toluene											
Ethylbenzene											
sum of detected mpo xylene by GC											
Aliphatics >C5-C6	0.04	0.04	0.01	0.04	0.0524	0.04	0.04	0.04	0.04	0.01	0.04
Aliphatics >C6-C8	0.04	0.04	0.01	0.04	0.0823	0.04	0.04	0.04	0.04	0.01	0.04
Aliphatics >C8-C10	0.04	0.04	0.01	0.04	0.146	0.04	0.04	0.04	0.04	0.01	0.04
Aliphatics >C10-C12	0.04	0.04	0.01	0.04	0.198	0.04	0.04	0.04	0.04	0.01	0.04
Aliphatics >C12-C16	0.1	0.1	0.1	2.56	3.68	1.45	0.1	8.02	0.1	0.1	0.1
Aliphatics >C16-C21	0.1	0.1	0.1	8.12	0.1	4.7	0.1	5.29	0.1	0.1	0.1
Aliphatics >C21-C35	0.1	0.1	0.1	467	6.89	41.6	2.86	7.28	3.43	0.1	0.1
Aliphatics >C35-C44	0.1	0.1	0.1	3.36	0.1	13.9	0.1	0.79	0.1	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04
Aromatics >EC7-EC8	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04
Aromatics >EC8-EC10	0.04	0.04	0.01	0.04	0.0972	0.04	0.04	0.04	0.04	0.01	0.04
Aromatics >EC10-EC12	0.04	0.04	0.01	0.04	0.133	0.04	0.04	0.04	0.04	0.01	0.04
Aromatics >EC12-EC16	1.59	0.1	0.1	2.37	1.97	1.3	0.1	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	7.59	0.1	0.1	12.9	4.5	3.67	0.1	0.1	1.02	0.1	0.771
Aromatics >EC21-EC35	6.57	0.1	3.89	2870	94.3	25.4	6.58	10.7	29	2.19	7.53
Aromatics >EC35-EC44	0.1	0.1	0.1	79.3	13.3	14.2	1.08	5.84	2.77	0.1	1.51
Aromatics >EC40-EC44	0.1	0.1	0.1	12.2	4.05	5.67	0.1	2.09	0.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	12	12	12	12	12	12	12	12	12	12	12
Acenaphthene	37.8	8	8	8	8	54.1	8	8	8	8	8
Anthracene	103	16	16	16	16	16	16	16	16	16	16
Benz(a)anthracene	98.5	14	37.6	14	98.8	45.1	14	14	35.7	14	14
Benzo(a)pyrene	73.7	15	36.1	15	96.8	50.4	15	15	32.9	15	15
Benzo(b)fluoranthene	120	15	41.3	15	161	75.9	15	15	77.5	15	15
Benzo(k)fluoranthene	40.5	14	19.8	14	55.8	24.7	14	14	14	14	14
Benzo(g,h,i)perylene	61.1	24	24	24	72.7	41.8	24	24	24	24	24
Chrysene	105	10	29	10	122	50.9	10	10	40.2	10	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	191	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	56.2	0.018	0.018	260	75.3	38.3	0.018	0.018	0.018	0.018	0.018
Fluoranthene	285	0.017	46.6	0.017	247	63.6	0.017	0.017	81.2	0.017	0.017
Fluorene	36	10	10	10	10	21.4	10	10	10	10	10
Naphthalene	39.9	9	9	9	9	42.9	9	9	9	9	9
Phenanthrene	345	15	15	15	106	60.1	15	15	41.6	15	15
Pyrene											
PAH, Total Detected USEPA 16	1.62	0.118	0.254	0.45	1.23	0.632	0.118	0.118	0.372	0.118	0.118
Naphthalene-d8 % recovery**	99.5	103	98.9	98.4	95.6	90.7	91.9	86.4	92.9	91.9	83.3
Acenaphthene-d10 % recovery**	94.5	98.1	98.6	95.1	97.4	89.6	92	86	93.1	94.8	85.2
Phenanthrene-d10 % recovery**	94.3	96.6	102	94.5	101	98	90.6	84.9	94.9	97.6	86.5
Chrysene-d12 % recovery**	92.5	88.5	96.9	99.5	99.1	102	90.5	82.6	96.2	97.7	86.9
Perylene-d12 % recovery**	94.4	86.4	91.7	94.5	94.2	102	91.2	88.3	96.2	104	88.1
Total Aliphatics >C12-C44	0.1	0.1	0.1	481	10.6	61.7	2.86	21.4	3.43	0.1	0.1
Total Aromatics >EC12-EC44	15.8	0.1	3.89	2970	114	44.6	7.66	16.5	32.8	2.19	9.81
Total Aliphatics & Aromatics >C5-C44											
Metals - (Solid)											
Iron	19300	24900	31300	12200	22200	41800	32000	31000	28400	21200	30400
Manganese	3600	381	772	274	270	862	215	503	262	670	513
Metals - (Liquid)											
Calcium	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-
Phenols											
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.054	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-	-	-	-	-
pH	10.5	7.73	7.37	7.94	7.66	9.8	7.02	7.19	7.09	9.18	7.78
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	-	-	-	-	-	-	-	-	-	-	-
Sulphate, Total potentia	-	-	-	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	197	405	145	293	256	272	261	218	33.2	151
Asbestos											
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-	-	-	-
Analysed By	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	-	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	-	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	-	-	-
Comments	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	106	109	121	103	94.4	105	108	104	106	107	104
Toluene-d8**	99.4	99.1	98.3	93.7	93.8	99.3	97.1	98.5	96.6	92.9	98.8
4-Bromofluorobenzene**	92.1	101	99.4	77.9	74.7	96.1	94.1	95.7	92.8	83.1	92.6
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-

Determinand	40ATP15V	40AD11	40AD11	40AD12	40AD12	40AD15	40AD15	40AD15	40AD21	40AD21	40AD21	40AD21	40AD22	40AD22
	1.301.30	0.500.50	2.602.60	0.500.50	1.001.00	0.800.80	1.301.30	2.002.00	0.500.50	1.001.00	2.002.00	3.003.00	0.400.40	0.900.90
	24/05/2019	28/06/2018	28/06/2018	19/06/2018	19/06/2018	19/06/2018	19/06/2018	19/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018
Carbon														
Soil Organic Matter (SOM)	8.98	2.48	1.55	1.47	1.47	2.12	5.1	7.62	8.46	1.54	3.74	1.78	4.71	7.46
Metals (Solids)														
Arsenic	13.6	8.79	17.3	7.04	7.35	276	182	6.87	2.68	11.8	8.58	36.2	24	18.2
Cadmium	0.642	0.634	1.7	0.884	0.477	1.2	1.17	1.03	0.519	0.27	0.502	1.25	1.98	3.75
Chromium	26.6	123	166	47.2	47.7	337	190	9	5.74	46.8	18.1	9	9.02	19.6
Copper	24	15.1	54.4	13.4	10.1	315	243	83.3	8.39	14	23.1	17.9	40.4	29
Lead	103	52.8	157	75.6	24.8	151	99.2	75.6	46.1	15.5	33.6	60.7	187	78.5
Mercury	0.14	0.14	0.14	0.14	0.14	0.148	0.147	1.4	0.14	1.4	0.14	1.4	1.4	2.57
Nickel	15.3	12.9	17.6	10.2	5.86	12	13.1	18.5	6.2	12.5	15.9	43.3	48.2	34
Selenium	1.83	3.28	3.88	1.72	5.89	3.54	2.73	10	2.71	10	3.58	10	10	10
Vanadium	60.5	307	111	44.5	81.5	110	81.3	43.6	32.8	132	63.3	189	145	56.5
Zinc	277	121	291	141	1950	3690	1700	304	193	45.6	80.6	136	435	229
TPH Criteria Working Group (TPH CWG)														
Benzene														
Toluene														
Ethylbenzene														
sum of detected mpo xylene by GC														
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.121	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.0559	0.04	0.04	0.04	0.403	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.0724	0.04	0.04	0.04	2.84	0.04	0.04	0.04
Aliphatics >C12-C16	1.43	0.351	0.1	0.1	1.18	0.363	12.9	2.34	1.68	1.15	92.4	0.1	3.5	3.42
Aliphatics >C16-C21	16.1	4.24	0.807	1.15	9.11	6.64	31	5.99	15.2	6.31	94.8	0.1	15	10.2
Aliphatics >C21-C35	54.1	12.2	10.3	8.85	54.6	57.3	107	16.3	261	18.1	38.3	7.02	57.5	33.2
Aliphatics >C35-C44	12.8	3.62	2	0.1	18.8	22.8	33.5	3.99	205	5.45	11	1	18.6	8.91
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.0516	0.04	0.04	0.04	0.04	0.04	0.04	0.0542
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.0516	0.04	0.04	0.04	0.269	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.0483	0.04	0.04	0.04	1.89	0.04	0.04	0.04
Aromatics >EC12-EC16	5.06	0.712	0.1	0.552	0.908	0.812	4.34	0.1	1.86	0.256	11.2	0.1	0.1	1.25
Aromatics >EC16-EC21	44.1	5.3	2.48	3.03	3.91	4.73	15	4.11	6.56	3.3	21.3	0.362	3.86	4.51
Aromatics >EC21-EC35	103	22.1	14	14.2	32	46.7	51.1	34.2	239	16.9	25.6	5.76	29.5	18.1
Aromatics >EC35-EC44	27.3	11.7	6.2	7.64	20.5	37.4	24.1	30.6	272	8.55	13.8	1.03	17	7.85
Aromatics >EC40-EC44	8.94	5.33	2.27	3.2	8.96	15.7	9.25	12.8	120	3.28	6.29	0.1	6.52	3.05
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	279	60	29.4	26.3	13.8	12	12	12	120	12	12	12	17.3	12
Acenaphthene	41.6	40	8	8.75	11.7	8	8	8	80	8	8	8	8	21.1
Anthracene	663	143	34.2	54.5	37.3	22.2	22.2	16	160	35.3	16	16	30	19.4
Benz(a)anthracene	1560	320	198	166	197	66	90.5	37	140	131	45.6	14	106	38.9
Benzo(a)pyrene	1200	247	140	117	215	65.5	92.9	39.4	150	112	43.6	15	119	38.7
Benzo(b)fluoranthene	2050	421	275	223	381	124	114	54.2	169	156	67.9	22.7	141	60.8
Benzo(k)fluoranthene	774	221	89.7	78.1	125	45.1	46	22.6	140	66.8	24	14	69.9	17.7
Benzo(g,h,i)perylene	884	189	98.7	105	198	62.9	84.9	50.2	0.24	87.1	32.2	24	162	43.1
Chrysene	1500	343	202	171	193	82.7	97.3	37.5	103	127	44.6	15.5	113	49.5
Dibenzo(a,h)anthracene	240	0.115	31.5	29.8	46	0.023	0.023	0.023	0.23	0.023	0.023	0.023	26.6	0.023
Indeno(1,2,3-cd)pyrene	852	171	111	102	142	41	96.5	40.5	182	103	31.5	0.018	166	34.4
Fluoranthene	3030	677	374	425	363	131	172	66.8	181	252	67	23	175	89
Fluorene	190	50	13.9	23.1	10	10	12.1	10.5	0.1	14.7	10	10	10	22.6
Naphthalene	467	103	26.7	78.4	55.4	62.3	113	16.2	90	39	21.1	32	55.9	95.5
Phenanthrene	1610	344	170	241	155	81.2	98.6	73.3	150	135	48	34.4	118	166
Pyrene	2.41	0.541	0.228	0.282	0.35	0.131	0.179	0.0713	0.179	0.19	0.0578	0.0236	0.166	0.0728
PAH, Total Detected USEPA 16	17.8	3.72	2.02	2.13	2.48	0.915	1.22	0.52	1.18	1.45	0.483	0.151	1.46	0.77
Naphthalene-d8 % recovery**	106	104	91.9	92.8	103	99.9	93.5	88.4	82	85.5	98.5	91.4	87.2	83.6
Acenaphthene-d10 % recovery**	111	106	89.7	86.2	111	96.3	98.7	92.4	83.5	88.5	94	90.6	92.8	83.8
Phenanthrene-d10 % recovery**	113	114	88.4	90.8	121	99.7	97.1	98.4	86.5	91.5	91.6	91.3	95.2	83.5
Chrysene-d12 % recovery**	87	87.3	84	80.1	101	81.7	78.6	79	71.8	76.5	94.4	78.1	71.8	62.8
Perylene-d12 % recovery**	84.4	85.4	82.3	79.6	102	78.8	76.7	78.3	70	75.3	97	74	70.4	54.4
Total Aliphatics >C12-C44	84.5	20.4	13.1	10	83.7	87.1	184	28.7	483	31	237	8.03	94.5	55.7
Total Aromatics >EC12-EC44	179	39.8	22.7	25.5	57.3	89.7	94.5	68.9	519	29	71.9	7.15	50.3	31.7
Total Aliphatics & Aromatics >C5-C44	264	60.2	35.8	35.5	141	177	279	97.5	1000	60.1	314	15.2	145	87.4
Metals - (Solid)														
Iron	55700	38800	32800	26500	32100	71300	45500	76300	30900	56200	20400	443000	340000	95100
Manganese	3510	7490	5790	2800	7500	6130	4770	1940	3660	6170	3480	4530	9240	3180
Metals - (Liquid)														
Calcium	76000	-	65600	101000	-	27900	-	-	-	-	85900	-	113000	-
Magnesium	12300	-	8920	12000	-	7930	-	-	-	-	18500	-	13900	-
Phenols														
Phenol	0.01	0.0113	0.01	0.0111	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.0111	0.01	0.01	0.018	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE														
pH														
Sulphate, Total														
Sulphur, Total														
Sulphate, Total potentia														
Sulphate, acid soluble (total)														
Cyanide, Total														
Exchangeable Ammonia as N														
Asbestos														
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	14/06/2018	-	14/06/2018	13/06/2018	-	13/06/2018	-	-	-	-	27/06/2018	-	27/06/2018	-
Analysed By	Andrzej Ferfecki	-	Andrzej Ferfecki	James Richards	-	James Richards	-	-	-	-	James Richards	-	James Richards	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)														
Analysts Comments														
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Detected	-
Comments	0	-	0	0	-	0	-	-	-	-	0	-	0	-
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	104	101	105	110	106	106	107	112	103	104	103	106	106	105
Toluene-d8**	96.9	96.2	98.2	97.4	98.3	97.5	94.2	98.6	98	99	91.2	96	95.9	96.4
4-Bromofluorobenzene**	95.4	80	100	92.5	97.4	96	97.5	89.5	99.1	98.8	73.8	87.6	88.6	80.6
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.502
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.23
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.42
Naphthalene	0.13	0.13	0.13	0.934	0.425	0.13	0.13	0.13	0.13	0.13	0.161	0.13	0.13	27.7
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	4.15
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40AD22	40AD22	40AD24	40AD24	40AD24	40AD11V	40AD12V	40AD22V	40AD24V	40AE16	40AE16	40AE16	40AE16
	2.002.00	2.502.50	0.500.50	1.001.00	2.002.00	0.000.00	1.501.50	3.003.00	2.402.40	0.400.40	1.001.00	1.501.50	2.002.00
	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	28/06/2018	19/06/2018	05/06/2018	05/06/2018	20/06/2018	20/06/2018	20/06/2018	20/06/2018
Carbon													
Soil Organic Matter (SOM)	1.84	4.09	9.36	1.67	8.45	5.4	1.81	1.17	4.43	2.29	5.91	8.1	4.6
Metals (Solids)													
Arsenic	22.6	9.27	9.5	12.9	18.3	11.2	17.6	15.3	7.55	9.81	10.7	11.8	7.16
Cadmium	1.48	0.622	0.415	0.332	0.21	0.273	6.42	0.0366	1.49	0.376	0.723	0.263	2.53
Chromium	9	18.3	14.4	32.3	38.4	42	31.2	25.4	37.8	17.8	14.8	6.82	472
Copper	22.8	16.6	28.6	14	28.4	37.4	29.4	11.7	112	19.9	27.8	14.8	19.5
Lead	75.8	59	32.5	53.7	44.7	14.4	89.5	28.6	187	26.1	59.1	16.7	124
Mercury	1.4	1.4	0.14	1.4	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	1.4
Nickel	27.9	13.6	41.8	33.6	26.9	43.5	45.2	37	105	13.9	24.1	16.4	14.5
Selenium	10	10	1.94	10	1	2.05	10	1	10	3.95	3.3	1	11.1
Vanadium	116	63.9	40.2	59.7	54.2	62.9	57.4	51.8	92.8	53.9	39.2	15.8	381
Zinc	336	139	91.5	129	148	107	403	105	616	103	209	58.9	252
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.0512	0.04	0.04	0.04	0.04	0.049	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.139	0.04	0.0533	0.04	0.04	0.0887	0.04	0.04	0.04	0.0833	0.04	15.9	0.04
Aliphatics >C10-C12	0.168	0.04	0.287	0.078	0.04	0.0734	0.04	0.04	0.04	0.942	0.04	23	0.0842
Aliphatics >C12-C16	4.69	19.7	2.74	6.16	0.441	0.1	0.1	0.1	4.53	92.6	40.1	20.2	3.74
Aliphatics >C16-C21	13.8	34.4	7.37	10.9	0.1	0.1	0.1	0.1	20.2	136	68.9	30.4	47.7
Aliphatics >C21-C35	20.3	133	19.7	8.96	1.9	0.1	0.1	0.1	113	42.8	48.5	51.2	52.6
Aliphatics >C35-C44	2.66	72.9	2.75	1.58	5.9	0.1	0.1	0.1	53.7	11.6	11	10.3	12.9
Aromatics >EC5-EC7	0.04	0.129	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.0952	0.04	0.052	0.04	0.04	0.0597	0.04	0.04	0.04	0.0655	0.04	13.5	0.04
Aromatics >EC10-EC12	0.112	0.04	0.192	0.052	0.04	0.049	0.04	0.04	0.04	0.628	0.04	15.3	0.0557
Aromatics >EC12-EC16	0.1	4.21	2.71	1.24	0.637	0.1	0.1	0.1	1.95	9.17	6.39	6.85	1.8
Aromatics >EC16-EC21	4.14	22.7	3.98	3.49	3.67	0.1	1.13	0.1	10.3	49.8	25.9	33.8	21.4
Aromatics >EC21-EC35	9.19	167	24.4	8.48	68.7	7.17	3.23	0.1	112	35.8	37.4	71.5	138
Aromatics >EC35-EC44	1.88	117	7.14	5.55	9.39	5.01	6.87	0.1	113	18	17.2	32.4	39.8
Aromatics >EC40-EC44	0.1	49.7	2.23	2.21	1.32	2.35	3.75	0.1	46.9	7	6.41	7.52	13.8
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	12	60	45.2	18.3	12	12	12	12	60	12	33.1	12	22.5
Acenaphthene	8	40	16.6	8	31.6	8	8	8	40	18.9	28.1	15.3	96.9
Anthracene	16	80	16	16	16	16	16	16	186	16	96.6	16	178
Benz(a)anthracene	14	70	14	19.9	30.7	14	14	14	271	49.8	226	27	1420
Benzo(a)pyrene	15	75	15	15	32.4	15	15	15	243	45.5	203	17.9	1880
Benzo(b)fluoranthene	24.2	75	15	24.2	51.9	15	15	15	406	78.8	317	15	2150
Benzo(k)fluoranthene	14	70	14	14	14	14	14	14	172	29.3	121	14	694
Benzo(g,h,i)perylene	24	120	24	24	24	24	24	24	284	55.1	122	24	1480
Chrysene	17.5	50	10	16.8	36.3	10	10	10	261	56	181	35.9	1380
Dibenzo(a,h)anthracene	0.023	0.115	0.023	0.023	0.023	0.023	0.023	0.023	0.115	0.023	39.5	0.023	282
Indeno(1,2,3-cd)pyrene	0.018	90	0.018	0.018	41.1	0.018	0.018	0.018	250	45.5	118	0.018	1660
Fluoranthene	33	0.085	30.1	46.4	62.2	0.017	0.017	0.017	678	122	390	99.3	2190
Fluorene	10	50	38	41	10	10	10	10	50	10	50	28.7	48.3
Naphthalene	94.2	163	1450	187	9	9	9	9	157	166	551	6970	215
Phenanthrene	44.2	75	55.9	129	37	15	15	15	368	31.7	282	123	768
Pyrene	0.0324	0.075	0.0299	0.0597	0.0504	0.015	0.015	0.015	0.547	0.107	0.338	0.0677	2.3
PAH, Total Detected USEPA 16	0.245	0.59	1.67	0.542	0.374	0.118	0.118	0.118	3.82	0.806	3.1	7.39	16.8
Naphthalene-d8 % recovery**	85.9	98.5	91.6	83	100	88.6	89.9	85.2	93.7	94.9	92.4	91	87.8
Acenaphthene-d10 % recovery**	89.9	95.5	93.7	87.3	93.3	85.7	90.6	87.9	93.8	89.6	88	95.9	91.7
Phenanthrene-d10 % recovery**	90.6	88.4	96.2	93.2	95.9	91.2	95.1	93.3	99.4	86.6	89.3	84.4	98.3
Chrysene-d12 % recovery**	71.7	99.4	77.5	76.3	96.2	79.4	88.5	77.9	87.4	71.8	70	43.6	85.8
Perylene-d12 % recovery**	70.6	99.9	73.2	76.2	101	84.2	91.5	76.4	89.4	72.3	68.9	25	85.1
Total Aliphatics >C12-C44	41.5	260	32.6	27.6	8.23	0.1	0.1	0.1	191	283	169	112	117
Total Aromatics >EC12-EC44	15.2	311	38.2	18.8	82.4	12.2	11.2	0.1	237	113	86.9	145	201
Total Aliphatics & Aromatics >C5-C44	57.3	571	71.3	46.5	90.6	12.5	11.2	0.1	428	397	255	324	318
Metals - (Solid)													
Iron	385000	60600	19700	50300	22700	32600	49300	27900	47100	33700	23300	14500	166000
Manganese	10600	3310	409	1300	182	547	390	291	3690	3010	3050	499	30900
Metals - (Liquid)													
Calcium	218000	-	145000	-	-	159000	174000	-	118000	-	-	-	-
Magnesium	8150	-	9440	-	-	17900	29800	-	19300	-	-	-	-
Phenols													
Phenol	0.01	0.0108	0.0109	0.0113	0.088	0.0113	0.0112	0.179	0.011	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.0109	0.158	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.113	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.283	0.088	0.035	0.035	0.19	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potentia													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Date of Analysis	13/06/2018	-	14/06/2018	-	-	-	-	-	-	-	-	-	-
Analysed By	Andrzej Ferfecki	-	Andrzej Ferfecki	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Comments	0	-	0	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	106	105	105	105	109	105	105	108	110	106	103	108	108
Toluene-d8**	97.3	96.6	99.3	98.1	98.4	98.2	99.4	100	96.3	98.9	97.7	98.5	98
4-Bromofluorobenzene**	93.2	91.7	97.2	89.4	97.5	90.8	93	102	92.9	90	96.8	100	97.4
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.572	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.126	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.212	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.23	0.16	0.13	0.928	0.13	0.13	0.13	1.25	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.572	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Determinand	40AE25	40AE25	40AE25	40AE25	40AE26	40AE26	40AE27	40AE27	40AE27	40AE16V	40AE25V
	0.500.50	1.001.00	1.401.40	2.002.00	0.5	1.5	0.5	1	1.5	2.802.80	2.802.80
	05/06/2018	05/06/2018	05/06/2018	05/06/2018	30/05/2018	30/05/2018	30/05/2018	30/05/2018	30/05/2018	20/06/2018	05/06/2018
Carbon											
Soil Organic Matter (SOM)	6.1	8.15	5.28	2.97	3.59	4.47	3.33	4.6	1.03	1.53	0.965
Metals (Solids)											
Arsenic	6.92	14.8	7.72	4.65	7.84	7.41	8.01	10.4	17.4	12.8	10.3
Cadmium	1.04	1.68	0.404	1.09	2.26	1.49	1.02	0.988	0.323	0.0661	0.208
Chromium	255	141	8.46	323	281	176	250	61.8	28	30.4	26.6
Copper	18.5	33	21.8	25.5	27.2	18.7	52	25.7	10.5	14.5	10.5
Lead	98.4	284	20.8	63.5	265	217	86.7	93.6	23.3	27.5	28.8
Mercury	1.4	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	9.53	17.6	24.8	9.42	19.6	11.1	14.4	16.6	38.5	38.2	27.3
Selenium	10	10	1.13	7.33	10	5.77	6.77	4.28	1	1	1
Vanadium	233	185	20.8	318	303	279	333	133	53.6	55	52.2
Zinc	296	681	53	256	640	784	201	313	109	104	105
TPH Criteria Working Group (TPH CWG)											
Benzene											
Toluene											
Ethylbenzene											
sum of detected mpo xylene by GC											
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0409	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	3.31	0.04	0.04
Aliphatics >C10-C12	0.0464	0.0912	0.04	0.04	0.228	0.04	0.04	0.04	3.58	0.04	0.04
Aliphatics >C12-C16	5.37	1.77	6.02	11	5.57	4.44	16.4	21.6	0.1	0.1	0.606
Aliphatics >C16-C21	24.2	9.4	16.4	29.9	21.2	18	44	47.1	0.1	0.1	1.45
Aliphatics >C21-C35	84.1	30.7	57	157	473	132	209	235	7.21	0.1	9.2
Aliphatics >C35-C44	20.8	7.89	9.83	46.5	214	55.7	63	89.8	2.56	0.1	1.47
Aromatics >EC5-EC7	0.04	0.184	0.826	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.0424	0.0565	0.04	0.04	0.04	0.04	0.04	2.93	0.04	0.04
Aromatics >EC10-EC12	0.04	0.0608	0.04	0.04	0.151	0.04	0.04	0.04	2.39	0.04	0.04
Aromatics >EC12-EC16	2.7	1.95	1.42	0.1	3.64	1.65	0.1	1.86	0.1	0.1	0.1
Aromatics >EC16-EC21	14.8	7.63	6.04	5.94	15	10.3	5.01	14.9	0.1	0.1	0.1
Aromatics >EC21-EC35	93.5	24.8	21.4	40	135	80.1	38.1	208	0.884	1.73	3.92
Aromatics >EC35-EC44	48.8	7.4	2.84	7.11	77.5	43.4	8.85	94.8	0.1	0.675	1.17
Aromatics >EC40-EC44	20.3	2.6	0.283	1.27	30.1	17.6	2.33	38.6	0.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	52.7	41.9	12	45.1	22.2	60	28.7	28	12	12	12
Acenaphthene	49.8	23.1	8	129	178	40	107	25.9	8	8	8
Anthracene	139	89.6	71.7	461	127	80	457	55.6	16	16	16
Benz(a)anthracene	732	241	14	1520	284	405	933	445	14	14	18.5
Benzo(a)pyrene	1100	1950	15	1270	306	439	757	490	15	15	15
Benzo(b)fluoranthene	1350	2180	18.6	1930	433	499	1090	703	15	15	27.6
Benzo(k)fluoranthene	477	814	14	835	173	237	399	295	14	14	14
Benzo(g,h,i)perylene	1200	1490	24	1040	260	376	456	364	24	24	24
Chrysene	793	488	21.2	1380	320	468	951	534	10	10	22.3
Dibenzo(a,h)anthracene	191	257	0.023	225	57.1	0.115	108	77.3	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	1280	1630	0.018	952	275	326	465	362	0.018	0.018	0.018
Fluoranthene	1110	376	30.6	3110	640	754	2110	673	0.017	0.017	36.1
Fluorene	51.9	43	10	87	144	50	131	30.9	10	10	10
Naphthalene	239	958	182	226	203	213	123	87.6	414	9	9
Phenanthrene	540	177	75.3	2780	540	353	1330	294	15	15	27.1
Pyrene	1.12	0.608	0.0301	2.88	0.595	0.833	1.9	0.676	0.015	0.015	0.0339
PAH, Total Detected USEPA 16	10.4	11.4	0.43	18.9	4.56	4.91	11.3	5.14	0.414	0.118	0.166
Naphthalene-d8 % recovery**	87.5	32.2	95.1	90.9	88.8	104	89.5	89.1	87.9	78	79.4
Acenaphthene-d10 % recovery**	96.3	31.1	92.8	98.1	92	93.1	84.5	92.6	79.8	78.4	74.5
Phenanthrene-d10 % recovery**	103	29.5	86.9	108	93.6	99.9	95.3	99.1	82	82.9	76.2
Chrysene-d12 % recovery**	83.2	25.3	46.1	108	77.5	95.3	106	109	75.8	72.6	79.5
Perylene-d12 % recovery**	81.8	23.6	26.8	102	74.4	86.9	96.5	102	78.3	70.5	71.7
Total Aliphatics >C12-C44	135	49.7	89.3	245	714	210	332	393	9.77	0.1	12.7
Total Aromatics >EC12-EC44	160	41.7	31.7	53	231	135	52	320	0.884	2.41	5.09
Total Aliphatics & Aromatics >C5-C44	294	91.8	122	298	945	346	384	713	22.9	2.41	17.8
Metals - (Solid)											
Iron	105000	211000	22100	106000	107000	111000	113000	75000	33600	27900	30300
Manganese	13400	14500	375	21700	15300	15300	20000	9610	448	351	1660
Metals - (Liquid)											
Calcium	89100	-	111000	-	-	138000	100000	154000	171000	-	51500
Magnesium	11300	-	24400	-	-	16700	14000	10200	30500	-	8920
Phenols											
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.0105	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.023	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE											
pH											
Sulphate, Total											
Sulphur, Total											
Sulphate, Total potentia											
Sulphate, acid soluble (total)											
Cyanide, Total											
Exchangeable Ammonia as N											
Asbestos											
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	27/06/2018	-	28/06/2018	-	-	04/07/2018	03/07/2018	28/06/2018	27/06/2018	-	27/06/2018
Analysed By	Andrzej Ferfecki	-	Andrzej Ferfecki	-	-	Lucy Caroe	James Richards	Andrzej Ferfecki	Andrzej Ferfecki	-	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)											
Analysts Comments											
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Trace	-	Not Detected
Comments	0	-	0	-	-	0	0	0	0	-	0
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	109	109	110	105	103	113	112	109	106	106	109
Toluene-d8**	98.4	97.5	100	98.6	94.1	98.5	98.3	96.3	95.2	90.2	98.5
4-Bromofluorobenzene**	91.6	87.2	92.3	89.6	93.7	87.6	83.7	88.6	85.3	74.7	90.6
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	1.28	1.87	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	1.12	1.56	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	1.18	1.77	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	0.74	1.09	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	1.23	1.28	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	11.5	15.6	-
Water Total M(ar)	-	-	-	-	-	-	-	-	12.6	16.7	-

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40AE26V 2.5 30/05/2018	40AE27V 2.3 30/05/2018	40AF10 0.400.40 19/06/2018	40AF10 0.800.80 19/06/2018	40AF10 1.201.20 19/06/2018	40AF10 1.401.40 19/06/2018	40AF12 0.500.50 28/06/2018	40AF12 1.001.00 28/06/2018	40AF12 2.302.30 28/06/2018	40AF13 0.800.80 19/06/2018	40AF14 0.300.30 19/06/2018	40AF14 0.700.70 19/06/2018
Carbon												
Soil Organic Matter (SOM)	1.32	2.19	1.47	1.12	1.26	3.55	2.26	14.2	2.91	10.8	17.6	7.34
Metals (Solids)												
Arsenic	14.3	9.95	9.83	9.69	6.15	7.04	24.9	14.7	8.66	13.8	10.2	9.09
Cadmium	0.298	0.935	0.269	0.277	0.191	0.2	0.02	0.2	0.679	5.38	6.58	1.13
Chromium	39.1	23.7	40.9	41.3	20.7	229	66.7	9	16.5	514	415	100
Copper	12.1	15	9.72	15.4	12.4	26.2	12.2	22.1	11.5	14.5	14	25.1
Lead	31.7	31.1	22.7	19.9	8	86.2	37	231	60.4	559	512	113
Mercury	0.14	1.4	0.14	0.14	0.14	1.4	0.14	1.4	0.14	1.4	1.4	0.14
Nickel	35.3	21.1	12.5	18.4	13.9	17.4	12.4	20.5	13.3	18.6	21.5	20.6
Selenium	1.15	10	4.91	4.1	5.11	10	3	10	1.09	10.1	10	2.7
Vanadium	72.9	67.4	112	253	39.5	140	143	84.9	26.6	392	345	101
Zinc	132	87.9	110	64.5	43.7	207	121	449	229	1730	2130	418
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.0978	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.429	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.0585	0.04	0.04	0.04	0.158	0.04	0.04	0.04	0.04	0.04	0.062	0.04
Aliphatics >C10-C12	0.14	0.04	0.04	0.0425	0.16	0.04	0.04	0.0441	0.04	0.04	0.122	0.04
Aliphatics >C12-C16	0.791	5.11	1.11	2.9	2.15	4.1	12.2	15.3	1.53	4.12	3.33	0.412
Aliphatics >C16-C21	3.02	15.4	2.28	6.34	6.04	29.6	37.9	52.5	4.82	23.7	23.2	3.5
Aliphatics >C21-C35	12.4	49	12	20.5	30	287	78.9	141	27.6	83.7	77.7	18.1
Aliphatics >C35-C44	4.25	15.3	12.7	3.7	10.6	318	23	50.6	11.2	10	8.67	4.5
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.108	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.0505	0.04	0.04	0.04	0.328	0.04	0.04	0.04	0.04	0.04	0.0573	0.04
Aromatics >EC10-EC12	0.0931	0.04	0.04	0.04	0.107	0.04	0.04	0.04	0.04	0.04	0.0807	0.04
Aromatics >EC12-EC16	0.1	1.87	1.21	3.01	0.1	3.99	2.87	5.2	1.67	4.78	4.38	1.12
Aromatics >EC16-EC21	1.34	6.27	2.72	3.75	0.1	22.1	12.7	19.7	5.19	21.9	20.9	3.31
Aromatics >EC21-EC35	8.67	22.7	13.6	9.37	5.72	598	36.7	57.5	28.1	43.6	37.2	14.2
Aromatics >EC35-EC44	6.1	18	24.2	0.1	0.848	754	21.1	57.8	16.1	8.85	5.53	7.37
Aromatics >EC40-EC44	2.76	8.33	12.2	0.1	0.1	324	8.6	28.4	6.78	3.2	2	2.69
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	12	12	12	12	12	60	12	12	12	23.1	14.3	12
Acenaphthene	19.9	8	8	8	8	96.8	36.7	796	8	37.5	32.9	8
Anthracene	38.1	16	16	16	19.3	80	28.9	218	25.2	194	161	23.1
Benz(a)anthracene	105	63.9	35.3	38.6	86.7	288	39.5	65.8	36.1	171	173	30.6
Benzo(a)pyrene	101	71.4	28	35.5	79.2	298	30.2	41.7	31.2	79	58.9	15
Benzo(b)fluoranthene	133	140	49.3	47.4	148	433	61.6	88.4	66.7	262	190	41.6
Benzo(k)fluoranthene	45.8	36.7	20.7	16	56.6	165	22.1	25.8	20.3	88	42.9	17.8
Benzo(g,h,i)perylene	72.9	73.7	33.1	31.3	84.2	256	32	41.4	31.9	60.3	43.3	24
Chrysene	111	82.8	41.8	48.1	112	336	64.5	97.4	61.1	279	184	40.8
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.115	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	64.8	89.2	26	28.9	64.4	214	27.8	28.9	0.018	34.7	0.018	0.018
Fluoranthene	219	153	78.5	74	182	473	114	430	99	994	959	105
Fluorene	21.1	10	10	10	21.1	53.9	33.5	527	10	104	95.1	12.7
Naphthalene	32	34.5	89	53.1	72.9	124	75.1	250	58.6	300	253	40.8
Phenanthrene	139	112	86.6	66.2	159	307	144	1080	152	1200	995	131
Pyrene	0.206	0.14	0.063	0.0608	0.157	0.389	0.112	0.367	0.0844	0.805	0.81	0.0928
PAH, Total Detected USEPA 16	1.31	0.998	0.551	0.5	1.24	3.43	0.822	4.05	0.666	4.64	4.01	0.536
Naphthalene-d8 % recovery**	81.7	89.8	95.7	89.1	99.6	110	102	98.3	103	98	105	90.2
Acenaphthene-d10 % recovery**	85	91.2	86.9	87	95	106	100	100	108	102	109	78.1
Phenanthrene-d10 % recovery**	87.5	91.1	90.1	85.4	102	100	105	94.9	114	97.2	103	88.9
Chrysene-d12 % recovery**	77	81.5	77.9	78.9	91.8	93.4	87.3	69.8	102	49.1	58.4	70.1
Perylene-d12 % recovery**	77	85	77.3	75.2	90.7	91.2	78.3	58.6	92.4	27.8	30.6	57.7
Total Aliphatics >C12-C44	20.4	84.9	28.1	33.4	48.9	638	152	259	45.1	122	113	26.5
Total Aromatics >EC12-EC44	16.1	48.9	41.7	16.1	6.57	1380	73.4	140	51.1	79.1	67.9	26
Total Aliphatics & Aromatics >C5-C44	36.9	134	69.8	49.6	56.8	2020	226	399	96.2	201	181	52.6
Metals - (Solid)												
Iron	44100	78800	24500	31800	22100	88100	38900	207000	20000	187000	204000	61600
Manganese	1540	4250	5060	6500	3940	7300	6170	5310	1360	18100	16900	4490
Metals - (Liquid)												
Calcium	153000	-	67300	77900	-	-	101000	8570	-	-	-	-
Magnesium	74400	-	6450	15100	-	-	9670	3700	-	-	-	-
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0167	0.018
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE												
pH												
Sulphate, Total												
Sulphur, Total												
Sulphate, Total potentia												
Sulphate, acid soluble (total)												
Cyanide, Total												
Exchangeable Ammonia as N												
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	0.001	-	-	-	-	-
Date of Analysis	28/06/2018	-	28/06/2018	10/07/2018	-	-	-	10/07/2018	-	-	-	-
Analysed By	Marcin Magdziarek	-	Lucy Caroe	Lucy Caroe	-	-	-	Lucy Caroe	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	0.001	-	-	-	-	-
Additional Asbestos Components (Using TM048)												
Analysts Comments												
Asbestos Quantification - Total - %	-	-	-	-	-	-	0.001	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-
Comments	0	-	0	0	-	-	-	0	-	-	-	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	106	101	110	104	104	108	104	113	110	98.3	105	106
Toluene-d8**	99.4	95.7	96.3	92.9	95.1	97.7	99.2	94.8	99.8	94.9	101	96
4-Bromofluorobenzene**	94.4	85.5	82.4	102	108	91.1	91.4	110	92.3	110	80.4	102
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.175	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.509	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.181	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.865	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Determinand	40AF14 1.201.20 19/06/2018	40AF16 0.600.60 20/06/2018	40AF16 1.601.60 20/06/2018	40AF16 2.002.00 20/06/2018	40AF19 1.001.00 03/07/2018	40AF19 2.002.00 03/07/2018	40AF26 0.7 30/05/2018	40AF26 1.3 30/05/2018	40AFG18 1.001.00 03/07/2018	40AFG18 2.002.00 03/07/2018	40AFG18V 2.902.90 03/07/2018	40AF10V 2.202.20 19/06/2018
Carbon												
Soil Organic Matter (SOM)	1.29	3.17	4.1	5.69	2.59	2.69	19.1	2.64	9.02	3.72	8.19	12.7
Metals (Solids)												
Arsenic	8.58	9.31	10.5	13	5.47	1.79	11.5	17.5	14	12.5	14.2	20
Cadmium	1.28	0.666	2.95	0.742	0.02	0.199	1.22	0.0848	0.2	0.02	0.732	0.575
Chromium	3.59	9.81	13.8	13.1	81.5	16.4	43	12	28.7	29.5	41.3	37.7
Copper	6.84	21.4	24.9	35	1.4	6.1	23.9	24.3	30.8	13.3	34.7	29.6
Lead	93.5	56.1	154	78.3	6.39	12.9	131	23	48.8	26.4	54.3	50.9
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14
Nickel	8.85	18.1	29.3	28	32.9	4.35	13.4	41.5	37.8	34.4	34.7	29.3
Selenium	1	1	1.32	1	1.34	4.84	4.16	1	10	1	1.85	1
Vanadium	13.2	24.4	28.7	50.4	184	64.7	275	35.2	108	50.3	61.3	63.4
Zinc	90.9	341	201	416	65.5	84.8	285	101	176	90.9	188	166
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.0663	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.0477	0.0413	0.04	0.716	0.04	0.04	0.04	0.04	0.04	0.04	0.0504
Aliphatics >C10-C12	0.0516	0.0758	0.0588	0.04	0.762	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	2.58	9.6	3.18	5.53	5.01	0.736	4.6	0.1	2.01	0.1	0.1	0.29
Aliphatics >C16-C21	5.22	16.1	6.02	18.5	7.83	5.52	24.6	0.893	8.93	1.58	0.1	1.01
Aliphatics >C21-C35	10.9	25.5	10.8	38	8.87	66.7	124	15.1	79.2	1.81	6.17	16.7
Aliphatics >C35-C44	3.19	6.29	1.65	7.27	1.24	35.9	38.9	2.02	14	0.1	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.052	0.066	0.04	6.37	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.0509	0.04	0.04	0.508	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.752	2.72	1.5	2.05	4.25	0.1	1.57	0.713	2.23	0.1	0.16	0.1
Aromatics >EC16-EC21	1.98	5.57	3.87	9.5	6.03	3.82	11.3	1.8	7.62	0.1	1.2	1.22
Aromatics >EC21-EC35	5.83	12.8	11.8	30.8	4.86	64.2	87.1	7.6	44.4	7.87	47.4	117
Aromatics >EC35-EC44	1.41	2.81	1.44	17.3	1.28	65.1	42	1.72	18.3	1.26	6.57	12.5
Aromatics >EC40-EC44	0.1	0.1	0.1	7.13	0.1	28.4	16	0.1	6.84	0.1	1.68	3.58
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	12	12	12	24	12	32	13.9	12	12	12	12	12
Acenaphthene	8	8	8	20.7	49.9	39.8	32.7	8	8	8	8	8
Anthracene	16	18.1	16	95	36.5	73.9	56.4	16	38.5	16	16	16
Benz(a)anthracene	14	42	19.7	266	14	682	474	18.8	90.4	14	14	45.5
Benzo(a)pyrene	15	38.7	23.9	208	15	976	551	15	94	15	15	48.1
Benzo(b)fluoranthene	15	88.5	35	329	15	1230	1260	26.5	142	15	36.8	105
Benzo(k)fluoranthene	14	23.9	14	125	14	427	414	14	58	14	14	28
Benzo(g,h,i)perylene	24	47.4	25.3	149	24	759	685	24	84.2	24	24	51
Chrysene	10	47	27.8	253	10	754	675	23.2	114	10	26.9	75.7
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.046	0.023	131	87	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	51.1	0.018	124	0.018	732	602	0.018	61.5	0.018	0.018	64.5
Fluoranthene	0.017	86.5	41.6	781	49.3	1050	802	47.5	210	0.017	43.4	112
Fluorene	10	17.4	10	0.02	59.5	20.4	27.9	10	11.9	10	10	10
Naphthalene	9	105	32.9	72.5	169	34.4	76.9	11.8	40.6	9	9	17
Phenanthrene	27.3	147	101	324	105	356	330	21.3	158	15	15	71.2
Pyrene	0.015	0.0695	0.0445	0.701	0.0365	1.07	0.811	0.0455	0.197	0.015	0.0348	0.0862
PAH, Total Detected USEPA 16	0.118	0.782	0.352	3.45	0.506	8.37	6.9	0.195	1.3	0.118	0.142	0.704
Naphthalene-d8 % recovery**	93	92.7	87.1	90.8	89.3	89.9	85.5	88.7	94.1	86.4	94.8	102
Acenaphthene-d10 % recovery**	97.9	100	92.3	86.2	91.1	93.1	88.3	86.4	92	84.1	97.7	95.2
Phenanthrene-d10 % recovery**	102	98.3	92	97.6	97.1	98.6	94.6	95.3	101	97.7	100	99.3
Chrysene-d12 % recovery**	95.2	86.2	76.2	90.1	89.8	113	84.8	92.7	90.3	93.4	94.4	102
Perylene-d12 % recovery**	99.6	75.7	74.2	86.6	87.7	107	75	93.2	81.9	94.1	100	106
Total Aliphatics >C12-C44	21.9	57.4	21.7	69.4	22.9	109	192	18	104	3.39	6.17	18
Total Aromatics >EC12-EC44	9.97	23.9	18.6	59.6	16.4	133	142	11.8	72.5	9.14	55.3	131
Total Aliphatics & Aromatics >C5-C44	31.9	81.5	40.4	129	47.8	242	334	29.9	177	12.5	61.5	149
Metals - (Solid)												
Iron	23600	21700	23900	63300	44900	28600	243000	30600	123000	29300	25900	23500
Manganese	1200	632	803	2130	3520	5250	14300	580	3810	305	498	313
Metals - (Liquid)												
Calcium	-	-	-	-	163000	-	178000	64000	-	-	31300	-
Magnesium	-	-	-	-	23000	-	18200	12500	-	-	4230	-
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.15	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.16	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE												
pH												
Sulphate, Total												
Sulphur, Total												
Sulphate, Total potentia												
Sulphate, acid soluble (total)												
Cyanide, Total												
Exchangeable Ammonia as N												
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	04/07/2018	-	03/07/2018	04/07/2018	-	-	04/07/2018	-
Analysed By	-	-	-	-	Renata Bozhkov	-	Renata Bozhkov	Barbara Urbanek-Walsh	-	-	Marcin Magdziarek	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)												
Analysts Comments												
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-
Amosite (Brown) Asbestos	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-
Fibrous Anthophyllite	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-
Fibrous Tremolite	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-
Fibrous Actinolite	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-
Non-Asbestos Fibre	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-
Comments	-	-	-	-	0	-	0	0	-	-	0	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	112	110	106	106	117	101	115	105	112	106	118	105
Toluene-d8**	98.3	101	98.4	88.2	97.1	96.7	98.6	97.8	100	99.2	98	94.4
4-Bromofluorobenzene**	94.9	83.6	98.1	90.7	84.7	92.2	82	93.4	100	99.2	84.6	110
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40AF12V 1.701.70 28/06/2018	40AF13V 1.501.50 19/06/2018	40AF14V 1.901.90 19/06/2018	40AF16V 2.302.30 20/06/2018	40AF19V 4.604.60 03/07/2018	40AG12 1.001.00 28/06/2018	40AG15 0.700.70 28/06/2018	40AG15 1.701.70 28/06/2018	40AG16 0.500.50 28/06/2018	40AG16 2.002.00 28/06/2018	40AG17 0.500.50 28/06/2018	40AG17 3.303.30 28/06/2018
Carbon												
Soil Organic Matter (SOM)	1.42	2.31	1.76	51	3.62	3.03	2.71	7.46	3.65	2.22	1.79	3.34
Metals (Solids)												
Arsenic	15	11.5	12.8	9.93	15.3	7.27	5.48	13	9.92	5.96	6.16	11.5
Cadmium	0.148	0.198	0.146	0.02	0.2	0.0465	0.0283	0.0736	0.0259	0.182	0.02	0.2
Chromium	35.3	39.6	35.1	3.77	73.1	10.3	6.13	4.54	7.94	4.66	4.27	9
Copper	13.7	14.1	16	11.7	34.4	22.6	10.4	22.6	22.5	17	16.4	19.4
Lead	25.9	31.4	26.7	8.28	54.5	19.5	15.1	24	33.1	17.7	14.7	31.1
Mercury	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4
Nickel	41.9	37.7	43	23	22.7	23.8	11.6	18.2	28.5	14.5	13.8	16.7
Selenium	1	1.54	1	1.56	10	1	1	1	1	1	1	31.7
Vanadium	61.5	68.3	62.3	21.1	74.7	20.4	15.9	16.3	27.5	13.7	19	79.3
Zinc	118	105	122	35.7	208	73.7	59.4	77	93.9	49.4	39.9	71.4
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	0.1	0.1	0.1	1.17	5.2	9.72	0.875	2.48	0.1	0.1	0.1	0.393
Aliphatics >C16-C21	0.1	0.1	0.1	4.29	29.8	68.4	3.53	4.18	0.843	3.86	9.7	3.47
Aliphatics >C21-C35	0.1	0.1	0.1	20	217	92.6	18.1	11.8	7.45	3.54	5.58	9.4
Aliphatics >C35-C44	0.1	0.1	0.1	0.456	33.3	3.05	3.37	2.09	1.44	0.584	0.1	0.82
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.1	0.1	0.211	1.72	3.79	0.717	0.561	1.87	0.1	0.487	0.645	0.124
Aromatics >EC16-EC21	0.652	0.1	0.469	6.55	17.5	6.88	4.72	5.29	0.1	1.74	2.12	0.988
Aromatics >EC21-EC35	2.14	1.45	3.89	162	81.4	19.2	15.4	10.1	0.1	4.86	6.09	4.43
Aromatics >EC35-EC44	0.534	0.1	5.09	14.6	27.8	0.777	0.867	1.13	0.1	5.99	5.47	0.754
Aromatics >EC40-EC44	0.1	0.1	2.89	3.69	11	0.1	0.1	0.1	0.1	3.23	2.91	0.1
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	12	12	12	12	16.8	12	12	12	12	12	12	12
Acenaphthene	8	8	8	8	21.1	8	25.7	8	8	8	8	8
Anthracene	16	16	16	16	82.8	16	16	30.8	16	16	16	16
Benz(a)anthracene	14	14	14	14	134	18.6	17.4	41.6	14	14	14	18.5
Benzo(a)pyrene	15	15	15	15	97.2	15	15	15	15	15	15	15
Benzo(b)fluoranthene	15	15	15	15	229	36.8	21.4	53.2	22.2	17.1	15	38.1
Benzo(k)fluoranthene	14	14	14	14	79.9	14	14	18.2	14	14	14	14
Benzo(g,h,i)perylene	24	24	24	24	98.1	24	24	24	24	24	24	24
Chrysene	10	10	10	10	192	46.6	34.3	88.7	24.2	19.8	15.4	29.8
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	25.1	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	0.018	73.3	0.018	0.018	0.018	0.018	0.018	0.018	21.9
Fluoranthene	0.017	0.017	0.017	0.017	368	40.2	65	144	27.2	24.6	24.6	38.7
Fluorene	10	10	10	10	59.5	10	12.5	18.1	10	10	10	10
Naphthalene	9	9	9	9	131	34.1	14.4	117	36.6	14.7	9	11.7
Phenanthrene	15	15	15	15	424	99.8	67.5	364	52.4	37.3	21.2	52.4
Pyrene	0.015	0.015	0.015	0.015	0.307	0.0375	0.054	0.0945	0.0208	0.0197	0.0213	0.0332
PAH, Total Detected USEPA 16	0.118	0.118	0.118	0.118	2.34	0.314	0.312	0.97	0.183	0.133	0.118	0.244
Naphthalene-d8 % recovery**	96.9	81.6	82.7	96.5	103	87.3	96.9	101	103	105	103	98.9
Acenaphthene-d10 % recovery**	100	89.2	87.2	94.5	106	84.3	82.3	104	96.1	89	97.7	95.6
Phenanthrene-d10 % recovery**	103	96.9	92.4	107	102	83.7	93.7	106	98.2	101	93.9	94.9
Chrysene-d12 % recovery**	104	95.7	90.9	103	78.1	74.8	83.6	78.6	88.5	83.8	83.9	84.9
Perylene-d12 % recovery**	99.3	93.8	94.3	102	73.1	66	86.5	73	81.4	87.7	88.5	82.1
Total Aliphatics >C12-C44	0.1	0.1	0.1	25.9	286	174	25.9	20.5	9.74	7.99	15.3	14.1
Total Aromatics >EC12-EC44	3.32	1.45	9.66	185	131	27.5	21.5	18.4	0.1	13.1	14.3	6.29
Total Aliphatics & Aromatics >C5-C44	3.32	1.45	9.66	211	416	201	47.4	38.9	9.74	21.1	29.6	20.4
Metals - (Solid)												
Iron	39100	26000	38900	23500	106000	22200	16500	19500	22100	23300	30500	78700
Manganese	492	225	637	336	6600	412	1120	771	994	500	667	6600
Metals - (Liquid)												
Calcium	118000	-	-	18400	-	82400	163000	-	176000	-	257000	-
Magnesium	14700	-	-	2380	-	15700	30200	-	27400	-	20100	-
Phenols												
Phenol	0.01	0.01	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0107	0.01
Cresols	0.01	0.01	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE												
pH												
Sulphate, Total												
Sulphur, Total												
Sulphate, Total potentia												
Sulphate, acid soluble (total)												
Cyanide, Total												
Exchangeable Ammonia as N												
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	10/07/2018	-	-	13/06/2018	-	13/06/2018	18/06/2018	-	18/06/2018	-	-	-
Analysed By	Andrzej Ferfecki	-	-	Andrzej Ferfecki	-	Andrzej Ferfecki	James Richards	-	James Richards	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)												
Analysts Comments												
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Fibrous Anthophyllite	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Fibrous Tremolite	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Fibrous Actinolite	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Non-Asbestos Fibre	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-
Comments	0	-	-	0	-	0	0	-	0	-	-	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	105	108	105	104	108	105	110	108	108	110	109	106
Toluene-d8**	94.9	94.3	98.7	97.2	98.2	97.8	96.1	92.7	95.5	92	99.7	97.8
4-Bromofluorobenzene**	106	108	96.9	90	93.7	95.3	90.4	74	89.9	75.2	95.5	93.1
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Determinand	40AG19 0.500.50 03/07/2018	40AG19 1.501.50 03/07/2018	40AG19 2.002.00 03/07/2018	40AG22 0.400.40 05/06/2018	40AG22 1.001.00 05/06/2018	40AG22 2.002.00 05/06/2018	40AG22 3.003.00 05/06/2018	40AG25 0.500.50 05/06/2018	40AG25 1.201.20 05/06/2018	40AG25 2.002.00 05/06/2018	40AG25 3.003.00 05/06/2018	40AG26 0.5 30/05/2018
Carbon												
Soil Organic Matter (SOM)	5.05	1.38	6.05	22.2	4.17	4.05	4.86	48.6	8.33	8.33	1.67	4.67
Metals (Solids)												
Arsenic	14	7.79	14.2	15.6	17.5	12.4	4.48	5.59	1.85	6.65	4.15	6.61
Cadmium	0.2	0.02	1.34	1.39	0.02	1.98	0.553	0.296	0.345	0.315	0.371	1.25
Chromium	9	1.23	9	9	10.5	9	41.2	17.9	92	12.6	259	77.3
Copper	28.1	20.1	17.7	18.2	32.9	46	15.4	31.4	9.14	25.2	9.65	42.9
Lead	185	22.9	47.8	35.3	22.9	92.5	54.9	39.8	16.8	31.1	23.2	118
Mercury	1.4	0.14	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	33.9	24.3	34	34.3	46.9	20.5	10.9	27.1	6.33	23.5	5.74	16.1
Selenium	10	7.85	10	10	1.09	10	3.46	1.59	6.91	1.8	11.4	3.39
Vanadium	55.5	57.7	112	104	45	35.3	43	98.2	125	37.2	1560	106
Zinc	399	66.7	171	114	62.9	355	163	66.4	74.7	100	71.4	499
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.01	0.04	0.04	0.04	0.0638	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.01	0.04	0.04	0.04	0.226	0.04	0.04	0.04	0.04	0.176	0.04
Aliphatics >C12-C16	0.363	0.366	0.154	0.926	2.64	13.5	0.561	2.33	2.6	2.39	40.2	1.66
Aliphatics >C16-C21	3.3	4.66	2.7	4.26	17.6	14.7	8.48	9.7	13.9	6.2	59.7	10.7
Aliphatics >C21-C35	24.3	13.6	19.4	15.4	127	156	46.8	61.3	60.8	21.4	62.1	86.8
Aliphatics >C35-C44	3.91	1.78	2.48	2.23	49	41.1	6.79	20.9	13.9	7.01	26.9	37.3
Aromatics >EC5-EC7	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.01	0.04	0.04	0.04	0.0467	0.04	0.04	0.04	0.057	0.04	0.04
Aromatics >EC10-EC12	0.04	0.01	0.04	0.04	0.04	0.15	0.04	0.04	0.04	0.04	0.118	0.04
Aromatics >EC12-EC16	0.588	0.1	0.507	1.42	0.1	3.86	1.61	0.875	1.09	0.1	7.57	0.63
Aromatics >EC16-EC21	4.02	0.915	3.32	11.8	3.49	6.46	9.06	3.87	4.77	0.1	26.4	4.05
Aromatics >EC21-EC35	24.5	5.37	14.1	23.3	17.2	41.4	38.4	26.7	26.7	0.978	55.5	46
Aromatics >EC35-EC44	10.4	0.698	4.99	7.21	14.7	16.5	20.3	13.9	10.9	0.1	35.8	49
Aromatics >EC40-EC44	4.06	0.1	1.85	2.9	6.61	4.27	8.11	5.29	3.9	0.1	15.1	23.3
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	15.1	12	12	12	12	12	31.3	12	12	12	12	60
Acenaphthene	8	8	18.2	9.15	8	8	30.8	8	30	12.4	21.4	40
Anthracene	32.5	16	16	60.1	16	16	68.6	16	32.7	16	32	80
Benz(a)anthracene	124	26.1	37.7	64.2	14	24	225	27.2	137	34.3	198	294
Benzo(a)pyrene	107	25.5	26.4	35.7	15	17.3	252	22.4	151	30.3	250	291
Benzo(b)fluoranthene	255	39.6	44.6	63.6	15	38	310	48.5	234	57.9	343	462
Benzo(k)fluoranthene	73	18.7	19	16.8	14	14	135	14	83.5	20.3	135	164
Benzo(g,h,i)perylene	117	26.9	28.3	28.4	24	24	205	24	122	27.5	207	284
Chrysene	161	37.9	41.1	73.8	10	31.2	256	56.4	188	56.9	241	355
Dibenzo(a,h)anthracene	29	0.023	0.023	0.023	0.023	0.023	45	0.023	0.023	0.023	36.2	0.115
Indeno(1,2,3-cd)pyrene	131	0.018	24.9	22.3	0.018	0.018	179	0.018	139	26.2	171	279
Fluoranthene	202	53.2	56.3	99.4	0.017	63.3	407	50.8	198	55.3	322	539
Fluorene	12	10	15.2	62.5	10	10	41.4	16.3	33.3	14.5	27.2	50
Naphthalene	49.4	20.9	39.9	40.9	12.5	16.3	74.7	30.4	57.9	42.8	34.6	45
Phenanthrene	144	69.9	62.6	347	39.5	67.3	274	87.7	191	73.3	199	267
Pyrene	0.182	0.0453	0.0626	0.105	0.015	0.051	0.375	0.0474	0.204	0.048	0.319	0.494
PAH, Total Detected USEPA 16	1.63	0.364	0.477	1.03	0.118	0.308	2.91	0.387	1.8	0.5	2.54	3.43
Naphthalene-d8 % recovery**	99.3	105	98.9	89.8	88.1	82.7	91.6	68.3	94.9	72.4	90.2	104
Acenaphthene-d10 % recovery**	94.7	104	92.8	89.3	89	83.4	94.4	72.5	95.1	77.7	89.2	91.6
Phenanthrene-d10 % recovery**	94.3	109	90.1	84.3	87.9	84.8	94.9	60.9	96.6	74.1	92.8	99.4
Chrysene-d12 % recovery**	82.3	102	88.6	50.6	71	77.4	80.1	45.1	95.9	70	93.7	97
Perylene-d12 % recovery**	74.2	95.2	81.3	38.4	65.9	72.4	75.1	32.2	91.4	66	87	83
Total Aliphatics >C12-C44	31.9	20.5	24.7	22.8	196	225	62.6	94.2	91.3	37	189	136
Total Aromatics >EC12-EC44	39.4	6.98	22.9	43.7	35.4	68.2	69.3	45.3	43.5	0.978	125	99.7
Total Aliphatics & Aromatics >C5-C44	71.3	27.4	47.7	66.5	232	294	132	140	135	38.1	314	236
Metals - (Solid)												
Iron	172000	53700	374000	298000	41500	43100	24400	22900	38000	22400	88100	53700
Manganese	3680	1530	3750	2430	622	2490	4560	1220	11800	1680	32800	5360
Metals - (Liquid)												
Calcium	207000	-	-	-	-	-	-	-	-	136000	-	149000
Magnesium	27900	-	-	-	-	-	-	-	-	15900	-	10900
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE												
pH												
Sulphate, Total												
Sulphur, Total												
Sulphate, Total potentia												
Sulphate, acid soluble (total)												
Cyanide, Total												
Exchangeable Ammonia as N												
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-	-	02/07/2018	-	29/06/2018
Analysed By	-	-	-	-	-	-	-	-	-	Lucy Caroe	-	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)												
Analysts Comments												
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	-	Detected	-	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
Comments	-	-	-	-	-	-	-	-	-	Soil containing material typical of AIE	-	0
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	109	115	118	116	116	112	102	104	109	111	111	110
Toluene-d8**	99.6	98.5	96	96.3	98.7	92.9	97.9	96.8	98.6	98.7	97.9	98.2
4-Bromofluorobenzene**	94.1	92.3	83.7	94	87.3	104	96.4	96.7	102	90.6	92.3	86.1
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	0.9	2.33	0.71
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	5.64	7.21	8.28
Water Total M(ar)	-	-	-	-	-	-	-	-	-	6.49	9.38	8.93

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances	40AG27 0.4 30/05/2018	40AG27 1 30/05/2018	40AG27 2.5 30/05/2018	40AG15V 3.203.20 28/06/2018	40AG16V 0.900.90 28/06/2018	40AG17V 1.001.00 28/06/2018	40AG19V 3.503.50 03/07/2018	40AG22V 3.203.20 05/06/2018	40AG25V 3.103.10 05/06/2018	40AG27V 3.3 30/05/2018	40AH10 0.400.40 22/06/2018	40AH10 1.001.00 22/06/2018	40AH10 2.002.00 22/06/2018	40AH14 0.500.50 28/06/2018	40AH14 1.001.00 28/06/2018	40AH16 0.500.50 03/07/2018	40AH19 0.500.50 03/07/2018	40AH19 1.001.00 03/07/2018	40AH19 1.601.60 03/07/2018	40AH21 1.001.00 07/06/2018	40AH26 0.5 30/05/2018	40AH26 1.2 30/05/2018
Carbon																																		
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00	0.821	11.7	11.2	7.91	4.03	7.31	4.22	3.52	2.98	2.55	0.683	4.69	7.34	0.679	9.81	4.59	1.22	0.931	9.36	1.76	49.7	3.59
Metals (Solids)																																		
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51	0.6	7.45	17.6	18.1	11	16.2	10.6	11	12.8	6	7.58	8.16	17.6	13.1	23.5	15.8	5.39	5.44	10.2	4	6.32	6.56
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30	0.0516	3.09	0.415	0.0501	0.02	0.31	0.259	0.382	0.399	5.74	0.802	0.218	1.24	0.101	1.61	0.2	0.02	0.02	0.547	1.2	0.441	0.869
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14	29.4	6.84	36.4	35.6	38.7	32.1	32.2	34.9	32	185	268	41.1	77	5.24	15.1	88.2	26.4	21.3	84.3	197	101	49.6
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00	1.4	15.8	28.7	28.2	28.2	32.8	23.5	25	16.8	21.7	18.8	14.2	37	14.1	45	57.6	1.4	1.4	25.1	19.9	26.2	18
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26	0.7	354	43	37.6	23	39	27	37	26.4	58.7	27.4	11.6	360	24.7	631	106	23.2	30.9	50.6	77.9	52.3	85.8
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	14	0.14	0.335	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05	0.986	10.3	28	29.5	40.9	28.2	36.5	31.6	31.7	16.8	9.45	15.3	29.9	21.7	22.9	42.1	4.34	4.65	24.8	11.3	16.1	13.8
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77	2.75	2.02	1	1	1	1	1	1.22	1.15	10.5	13.8	4.01	10	1	1	10	5.96	5.71	3.5	6.65	5.26	3.65
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00	29.6	39.7	57.9	55.1	58.1	49.4	50.8	54.5	51.1	283	430	83	90.4	19.4	27.9	95.5	32	23	203	207	157	96.2
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49	38.9	1730	151	132	112	136	109	129	132	126	55.5	64.7	2070	97.2	2450	434	282	368	190	209	84.9	343
TPH Criteria Working Group (TPH CWG)																																		
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00																						
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00																						
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00																						
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00																						
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.325	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.66	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00	0.25	3	1.04	0.1	0.1	1.14	0.1	0.1	0.19	0.364	0.307	0.102	5.3	0.1	1.71	3.34	0.1	0.297	0.1	2.09	0.1	3.49
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00	2.8	13.6	1.54	0.1	0.1	1.45	0.1	0.1	0.1	6.04	1.75	0.894	23.3	0.1	10.8	8.8	2.2	0.921	1.06	13.6	5.28	18.8
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00	91.6	115	12.7	4.84	0.902	9.11	0.1	1.25	2.28	49.4	16.4	9.39	81.3	1.96	75.6	39.5	15.3	9.26	28.6	158	44.2	186
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00	147	56.9	0.385	0.1	0.1	0.1	0.1	0.1	3.32	24.2	6.86	5.91	21.7	0.1	16.2	4.31	1.47	0.782	3.38	80.2	12.1	81.7
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.217	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.44	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00	0.1	0.1	3.78	0.175	0.295	0.1	0.1	0.1	0.1	0.1	0.1	0.208	1.17	0.1	3.19	2.63	0.244	0.174	2	1.53	0.939	1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00	1.77	3.73	2.74	0.724	0.1	1.21	1.26	0.1	0.1	3.67	2.9	1.87	11.1	1.67	9	6.34	1.25	0.652	6.84	7.62	3.67	8.41
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00	84.9	66.6	84.9	40.5	9.09	46.3	9.09	0.112	2.58	89.3	31.7	16	40.1	0.1	62.6	36.1	9.62	7.02	63.4	119	24.1	105
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00	232	81.9	8.52	5.36	3.58	4.73	9.74	0.549	5.57	31	13.1	12.8	14.2	0.1	32.3	10.8	2.96	1.29	17.7	139	11.1	77.6
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00	120	39.6	2.48	1.34	1.67	0.1	4.87	0.1	2.83	10.1	4.79	5.77	4.78	0.1	12.7	4.03	0.994	0.1	6.81	60	4.27	32.3
Polyaromatic Hydrocarbons (PAHs)																																		
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42	12	60	12	12	12	12	12	12	12	12	12	12	14.7	12	12	12	12	12	67.4	60	12	16.6
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93	8	40	596	8	8	8	8	8	8	47.2	9.44	12.1	8	8	13.5	8	8	8	18.8	122	16.1	14.7
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86	16	80	31.5	16	16	16	16	16	16	166	32.6	45.2	57	16	47.2	16	16	16	119	88.7	28.8	41.1
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56	42.2	70	28.2	14	14	14	14	14	14	1530	428	133	158	14	97.4	73.4	31	16.6	428	380	192	202
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81	34.4	75	29	15	15	15	15	15	15	2090	551	159	135	15	107	78.4	49.3	19.8	367	375	243	266
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77	50.8	155	43.8	34.5	15	15	15	15	15	2670	747	262	262	15	249	92.8	53.2	30.3	663	534	305	373
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77	19.9	70	14	14	14	14	14	14	14	1060	302	80.1	78.5	14	82.1	40.4	27.5	14	206	185	125	139
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07	31.9	120	24	24	24	24	24	24	24	1950	501	141	114	24	128	116	56.4	33	270	321	184	232
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79	39.1	104	44.3	21.9	10	10	10	10	10	1460	475	163	218	10	165	90.9	36.5	25.2	442	387	209	253
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23	0.023	0.115	0.023	0.023	0.023	0.023	0.023	0.023	0.023	357	86.5	0.023	29	0.023	30.9	0.023	0.023	0.023	67.4	0.115	39.4	57.5
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37	23.7	90	0.018	0.018	0.018	0.018	0.018	0.018	0.018	1620	441	160	119	0.018	145	77.9	36.3	0.018	301	331	188	239
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23	69.1	123	108	39.1	0.017	0.017	0.017	0.017	0.017	2080	575	324	441	0.017	186	107	45.1	32.6	757	677	267	354
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09	10	50	376	10	10	10	10	10	10	15.1	10	19.7	19.3	10	30.9	10	10	10	75	66.9	19.5	11.8
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51	9	45	308	9	9	9	9	9	9	40.8	14.9	83.8	94.5	9	107	26.3	9	9	268	80.4	49.7	37.7
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56	27.6	75	237	28.2	15	15	15	15	15	612	140	301	241	15	255	67.3	26.1	22.4	451	319	155	150
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00	0.0622	0.112	0.0788	0.0305	0.015	0.015	0.015	0.015	0.015	2.27	0.611	0.275	0.381	0.015	0.164	0.125	0.0525	0.0366	0.592	0.593	0.294	0.406
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00	0.401	0.59	1.88	0.154	0.118	0.118	0.118	0.118	0.118	18	4.92	2.16	2.36	0.118	1.81	0.895	0.414	0.216	5.09	4.46	2.31	2.79
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00	90.7	88.9	102	95.7	91.3	85.1	90.3	91.1	92.3	85.9	93	90.6	88.3	94.8	88	89.6	93.3	89.6	103	90.9	78.8	93.1
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00	92.8	85.6	97	89.8	93	82.8	86.5	87.9	85.5	86.7	84.8	97	83.5	92.1	87.4	83.1	87.7	86.4	93.2	83.6	75.3	93.1
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00	96.7	85.8	93.8	91.9	92.8	94.2	85.6	91.7	88.3	96.6	96.1	97.6	84.5	92.8	86.3	81.8	99.4	93.9	96	93.1	58.3	89.1
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00	101	61.4	92.8	90	88.4	88.2	81.6	98	94.8	82.5	90.4	80.9	68.6	89.3	75.3	80.3	94.2	90.5	98.6	89.5	38.7	75.7
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00	97.6	57.2	92.6	93.3	89.6	89.5	91.5	107	89	86.2	89.9	78.4	62.5	94	70.3	79	94.5	91.1	97.8	84.3	30.6	77.8
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00	242	188	15.7	4.84	0.902	11.7	0.1	1.25	5.8	80	25.3	16.3	132	1.96	104	56	18.9	11.3	33	253	61.5	290
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00	318	152	100	46.7	13	52.2	20.1	0.661	8.15	124	47.7	30.9	66.6	1.67	107	55.8	14.1	9.14	90	268	39.8	192
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00	560	340	116	51.6	13.9	63.9	20.1	1.91	13.9	204	74.6	47.2	198	3.63	211	112	33	20.4	123	521	101	482
Metals - (Solid)																																		
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00			9440	52900	23300	25700	24400	25600	31400	31100	35300	99800	139000	30900	145000	24400	50900	133000	20500	18400	61200	115000	72900	62300
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00			3950	2530	239	161	280	210	580	506	1280	15900	24100	4500	4970	823	971	9040	7170	4310	7260	15800	13500	6790
Metals - (Liquid)																																		
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00			136000	-	96400	115000	-	224000	-	-	118000	152000	-	-	-	-	-	-	181000	-	216000	189000	-	184000
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00			14800	-	7360	17100	-	31100	-	-	9720	23300	-	-	-	-	-	-	26300	-	31800	25200	-	30200
Phenols																																		
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0163	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00	0.01	0.01	0.0114	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.375	0.01	0.01	0.01	0.01	0.01	0.011	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.114	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.505	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																		
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55																						
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93																						
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00																							
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55																						
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55																						
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55																						
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00																						
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00																						
Asbestos																																		
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		430	0	0					0.00		04/07/2018	-	10/07/2018	10/07/2018	-	10/07/2018	-	-	-	-	-	-	-	-	-	-	04/07/2018	-	04/07/2018	04/07/2018	-	04/07/2018
Analysed By	TM048	No units		430	0	0					0.00		Renata Bozhkov	-	Andrzej Ferfecki	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	-	-	-	-	-	-	-	-	-	-	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	Marcin Magdziarek	-	Marcin Magdziarek
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00																							
Analysts Comments	TM304	No units		83	0	0					0.00																							
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00		Not Detected	-	Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Comments	TM048	No units		430	0	0			0.00	0.00	0.00		0	-	0	0	-	0	-	-	-	-	-	-	-	-	-	-	0	-	0	0	-	0
Volatile Organic Compounds (VOCs)																																		
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00		114	115	107	104	104	108	105	107	111	109	109	111	119	98	110	105	111	110	109	116	110	110
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00		97	98.5	94.2	94.2	94.9	94.8	90.9	98.2	98.3	97.3	97.8	96.1	95.7	94	93.2	96	95.6	99.8	97.4	98	98.7	106
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00		82.5	90.2	103	104	110	109	78.4	89.5	86.8	94.8	99.8	90.1	85	109	114	98.7	80.4	91.8	92.9	87	94.4	84.1
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																		
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00		-	-	-	-	-	-	-	-	-	-	-	6.31	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00		-	-	-	-	-	-	-	-	-	-	-	2.55	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00		-	-	-	-	-	-	-	-	-	-	-	5.83	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00		-	-	-	-	-	-	-	-	-	-	-	0.98	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00		-	-	-	-	-	-	-	-	-	-	-	3.19	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00		-	-	-	-	-	-	-	-	-	-	-	58.2	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00		-	-	-	-	-	-	-	-	-	-	-	59.6	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40AH27	40AH27	40AH10V	40AH14V	40AH16V	40AH19V	40AH21V	40AI11	40AI11	40AI11	40AI13	40AI13	40AI13	40AI15	40AI15	40AI16	40AI17	40AI18	40AI19	40AI19	40AI19	40AI25	40AI25
	0.5	1	3.303.30	1.301.30	1.001.00	3.803.80	1.401.40	0.500.50	1.201.20	1.801.80	0.500.50	1.001.00	1.501.50	1.501.50	2.702.70	0.500.50	1.001.00	2.002.00	0.500.50	1.301.30	2.002.00	0.500.50	0.900.90
	30/05/2018	30/05/2018	22/06/2018	28/06/2018	03/07/2018	03/07/2018	07/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018	03/07/2018	03/07/2018	03/07/2018	07/06/2018	07/06/2018
Carbon																							
Soil Organic Matter (SOM)	4.64	23.4	5.09	1.29	6.05	3.41	3.45	0.379	1.13	2.05	0.35	0.945	5.41	4.12	2.93	1.74	2.88	0.607	0.728	0.374	2.84	6.98	4.17
Metals (Solids)																							
Arsenic	4.87	14.8	12.7	10	12.4	7.96	7.3	2.4	4.39	7.36	6	4.7	10.8	9.79	9.16	7.24	9.79	7.17	3.95	2.85	14.7	7.48	7.3
Cadmium	0.706	0.255	0.02	0.02	0.22	0.254	0.12	0.02	0.02	0.2	0.2	0.02	0.146	0.164	0.282	0.0692	0.02	0.02	0.02	0.02	1.31	0.444	0.658
Chromium	40.5	31.6	39.4	26.7	34.5	38.5	95.5	4.04	44.4	442	423	118	6.69	11	12.8	6.19	16	0.9	2.13	1.52	26.8	11	85.1
Copper	11.7	28.4	31.8	10.1	31.5	21.2	8.35	14	4.45	14	14	7.01	20.2	14.7	15.8	9	22.6	7.81	1.4	1.4	38.4	21.2	22.8
Lead	56.4	27.5	22.2	25.6	37.4	23.8	135	0.7	35.7	90.4	13.1	33.7	88.5	30.1	47	9.67	25.2	5.81	12.2	7.44	378	33.5	59.7
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	8.93	30.4	42.7	34.3	30.2	41.4	11.2	0.777	3.62	9.12	3.88	3.43	17.1	17	15.1	9.88	19.8	6.83	4.29	2	73.3	23.9	18
Selenium	2.85	1.71	1	1	1	1.29	2.76	9.41	4.83	10	10	2.42	1	1.3	1.01	1	1.38	4.73	6.23	8.26	1.32	1.26	4.74
Vanadium	57	48.1	57.2	50.4	52.3	57.7	86.1	14.5	49	297	261	81.3	25.9	31.2	54.1	15.2	34.2	21.3	23.3	15.6	480	34.1	165
Zinc	310	91.6	102	108	137	91.4	989	23.4	214	424	196	332	337	177	267	46	76.1	104	153	113	551	86	260
TPH Criteria Working Group (TPH CWG)																							
Benzene																							
Toluene																							
Ethylbenzene																							
sum of detected mpo xylene by GC																							
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.0416	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0723	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	2.28	1.99	0.228	0.1	0.1	0.1	1.69	1.7	2.56	15	8	8.45	3.5	9.75	0.67	0.851	2.94	0.633	0.1	0.507	2.06	1.34	1.45
Aliphatics >C16-C21	12.4	4.54	0.131	0.1	0.1	0.1	18.1	7.34	8.19	49.4	30.3	34.9	11.7	30.8	4.02	2.16	8.51	0.951	0.488	2.61	11.8	2.73	14.4
Aliphatics >C21-C35	118	58.7	0.915	0.369	7.97	0.1	181	18.8	24.4	247	154	170	46	40.8	24.9	11.5	28.1	5.02	3.33	9.33	123	12.5	94.7
Aliphatics >C35-C44	42.9	1.18	0.1	0.1	0.1	0.1	123	6.83	6.6	34.8	17.2	26.1	12.2	7.98	4.97	2.46	6.28	0.1	0.1	0.1	40.3	1.82	64.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0482	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.719	1.97	0.1	0.1	0.1	0.1	0.225	0.1	0.1	4.1	1.48	1.92	0.791	1.15	1.13	0.1	0.841	9.51	0.1	0.1	1.3	1.38	0.664
Aromatics >EC16-EC21	4.85	7.84	0.1	0.1	1.75	0.1	7.23	1.26	1.64	13.8	8.15	8.05	6.83	11.9	6.34	1.02	6.16	44.3	0.1	0.648	6.55	4.25	10.1
Aromatics >EC21-EC35	46.1	225	1.91	1.51	26.2	3.71	158	9.65	9.57	59.7	43.9	40.1	44.8	32.8	40.1	7.6	46.2	101	1.49	4.25	70.7	13.9	104
Aromatics >EC35-EC44	35.1	33.8	0.1	0.1	9.83	1.01	167	12.4	6.72	19.5	9.85	14.1	18	8.21	18.3	0.737	31	35.7	0.1	1.07	44.7	4.48	92.1
Aromatics >EC40-EC44	15.3	9.55	0.1	0.1	2.89	0.1	73.8	5.96	2.58	7.36	3.56	5.52	6.35	2.56	8.11	0.1	13.5	15.1	0.1	0.1	18.2	1.4	41.7
Polyaromatic Hydrocarbons (PAHs)																							
Acenaphthylene	12	12	12	12	12	12	12	12	12	12	12	12	16.3	12	12	12	12	12	12	12	60	12	24
Acenaphthene	9.02	8	8	8	8	8	8	8	8	8	8	8	39.9	13	8	8	14.6	8	8	8	40	8	16
Anthracene	25	16	16	16	16	16	35.4	16	16	16	16	16	84.8	28.9	26.8	16	19.7	16	16	16	80	16	56.7
Benz(a)anthracene	145	14	14	14	14	14	181	14	49.9	46.1	33	48.7	795	180	223	26.5	51.6	14	14	14	436	41.3	706
Benzo(a)pyrene	138	15	15	15	15	15	194	15	41.9	40.8	27.3	39.3	1120	216	281	23.8	60.6	15	15	15	480	33.9	904
Benzo(b)fluoranthene	216	39.1	15	15	15	15	335	15	83.3	110	60.9	85.9	1300	340	401	36.7	104	15	17.7	15	671	58.7	1120
Benzo(k)fluoranthene	68.6	14	14	14	14	14	120	14	28.1	33.2	17.8	30.8	517	117	152	14	34.4	14	14	14	255	24	379
Benzo(g,h,i)perylene	137	24	24	24	24	24	223	24	46.8	51.6	31.2	41.7	835	175	225	24	61	24	24	24	458	27.5	754
Chrysene	169	26.7	10	10	10	10	176	10	52.7	79.9	58.1	77.3	741	220	233	27.3	65.7	10	10	14.6	572	53.9	771
Dibenzo(a,h)anthracene	31.4	0.023	0.023	0.023	0.023	0.023	59.4	0.023	0.023	0.023	0.023	0.023	193	45	55.8	0.023	0.023	0.023	0.023	0.023	0.115	0.023	125
Indeno(1,2,3-cd)pyrene	128	0.018	0.018	0.018	0.018	0.018	188	0.018	44.7	47	30.2	38.7	688	175	244	21.6	44	0.018	0.018	0.018	487	25.9	739
Fluoranthene	236	0.017	0.017	0.017	0.017	0.017	289	0.017	132	113	71.6	115	1030	253	296	50.8	91.8	0.017	0.017	0.017	595	64.2	1130
Fluorene	10	10	10	10	10	10	11.9	10	10	10	10	10	28.2	17.6	11.7	10	15.9	10	10	10	50	14.1	0.02
Naphthalene	24.5	9	9	9	9	9	53.6	9	9	17.1	9	16.4	42.9	40.3	37.3	29.5	22.7	9	9	9	45	12.1	0.018
Phenanthrene	117	15	15	15	15	15	130	15	73.3	66.9	38.4	44.9	346	114	81.1	49.8	89.4	15	15	15	198	69.6	345
Pyrene	0.265	0.015	0.015	0.015	0.015	0.015	0.275	0.015	0.11	0.1	0.0658	0.114	1.07	0.257	0.284	0.0425	0.0775	0.015	0.015	0.0175	0.495	0.0466	1.25
PAH, Total Detected USEPA 16	1.71	0.118	0.118	0.118	0.118	0.118	2.27	0.118	0.663	0.706	0.434	0.652	8.86	2.19	2.55	0.309	0.753	0.118	0.118	0.118	4.65	0.472	8.28
Naphthalene-d8 % recovery**	99.8	94	91.8	90.3	89.2	92.5	91.2	98.1	98.4	93.6	89.6	96.5	98.6	90.7	90.6	95	98	90.1	92.8	90.1	98.1	85.6	87.9
Acenaphthene-d10 % recovery**	98	94.2	90.7	87.8	88.3	91.2	96.6	93.6	92.2	81.2	80.2	90.4	94	85.6	76	96	101	85.9	91.3	84.2	94	83	91.4
Phenanthrene-d10 % recovery**	101	96	90.8	95.1	99.5	88.1	96.1	89.9	85.6	96.4	90.4	92.9	90.5	90.5	87.7	99.8	106	96.1	101	93.8	97.9	79.8	92.9
Chrysene-d12 % recovery**	91.1	85	86.3	92.9	97.9	79.8	84.7	84.3	82.3	83.3	87.7	79.3	84.5	77.6	85.4	89.9	83.6	92.1	96	89.6	99.5	84.5	80.2
Perylene-d12 % recovery**	90	88	89.1	93.5	101	81.8	74.8	91.7	83.3	81.4	89.2	79.7	80.5	75.5	80.1	90.5	81.2	92.2	97.7	88.2	102	85.4	80
Total Aliphatics >C12-C44	176	66.4	1.27	0.369	7.97	0.1	323	34.6	41.7	347	210	240	73.4	89.3	34.6	17	45.9	6.61	3.82	12.4	177	18.4	175
Total Aromatics >EC12-EC44	86.8	268	1.91	1.51	37.7	4.72	333	23.3	17.9	97.2	63.4	64.2	70.3	54.1	65.9	9.36	84.2	190	1.49	5.97	123	24	207
Total Aliphatics & Aromatics >C5-C44	262	335	3.18	1.87	45.7	4.72	656	57.9	59.6	444	273	304	144	144	100	26.3	130	197	5.31	18.4	300	42.3	381
Metals - (Solid)																							
Iron	48300	21600	21500	39900	30100	30100	59200	4700	30400	166000	139000	70000	35400	26500	18400	12000	29100	38500	36000	19200	33200	25900	58200
Manganese	4670	396	368	737	308	440	8080	5540	6200	21700	17400	8300	1100	2140	1950	414	1720	3790	3950	6350	1580	1120	8750
Metals - (Liquid)																							
Calcium	73600	58200	117000	216000	74800	-	147000	-	-	42800	-	73100	130000	-	-	-	-	-	-	-	-	157000	-
Magnesium	7090	7180	13100	11800	16100	-	25900	-	-	12500	-	8220	19200	-	-	-	-	-	-	-	-	22700	-
Phenols																							
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.0119	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.107	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.068	0.015	0.015	0.138	0.015	0.0486	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.245	0.035	0.035	0.035	0.035	0.035
Inorganics																							
Soluble Sulphate 2:1 extract as SO4 BRE																							
pH																							
Sulphate, Total																							
Sulphur, Total																							
Sulphate, Total potentia																							
Sulphate, acid soluble (total)																							
Cyanide, Total																							
Exchangeable Ammonia as N																							
Asbestos																							
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	-	10/07/2018	-	-	15/06/2018	-	-	-	-	-	-	-	-	-	-	-	02/07/2018	-
Analysed By	Renata Bozhkov	Renata Bozhkov	Marcin Magdziarek	Marcin Magdziarek	Marcin Magdziarek	-	Lucy Caroe	-	-	James Richards	-	-	-	-	-	-	-	-	-	-	-	Marcin Magdziarek	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																							
Analysts Comments																							
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	Trace	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-
Comments	0	0	Bundle of fibres in soi	0	0	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	Loose fibre in soi	-
Volatile Organic Compounds (VOCs)																							
Dibromofluoromethane**	116	117	110	118	116	104	105	105	105	106	115	106	112	114	110	114	107	99.3	107	105	108	111	106
Toluene-d8**	96.9	97.6	99.7	96.9	92.7	95	94.8	95.5	95.5	96.5	94.2	99.8	99.1	94.4	89.5	99.7	96	93.1	95	99	98.2	98.1	99.2
4-Bromofluorobenzene**	79.1	83.3	82	84.1	79.1	109	110	109	91.5	88.1	94	86.1	91.3	89.8	70.9	88.1	98	109	94.8	91.2	88.9	88.8	94
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	2.06	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																							
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.78	0.96	0.76
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.41	8.79	11.7
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.1	9.67	12.3

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances	40AI26	40AI26	40AI27	40AI27	40AI11V	40AI15V	40AI16V	40AI19V	40AI25V	40AI26V	40AJ10	40AJ10	40AJ10	40AJ12	40AJ12	40AJ12	40AJ14	40AJ14	40AJ23	40AJ23
													0.5	1.2	0.7	1.5	4.954.95	0.400.40	1.001.00	4.304.30	1.001.00	2.6	0.500.50	1.001.00	1.501.50	0.500.50	1.001.00	2.002.00	0.500.50	1.001.00	0.700.70	1.601.60
													30/05/2018	30/05/2018	30/05/2018	30/05/2018	27/06/2018	28/06/2018	28/06/2018	03/07/2018	07/06/2018	30/05/2018	22/06/2018	22/06/2018	22/06/2018	27/06/2018	27/06/2018	27/06/2018	28/06/2018	28/06/2018	07/06/2018	07/06/2018
Carbon																																
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00	7.24	6.33	4.91	76.5	6.12	1.69	4.22	2.31	6.86	1.93	2.78	2.65	1.83	2.9	3.34	2.19	7.21	1.7	4.14	2.07
Metals (Solids)																																
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51	7.03	8.11	5.46	45.8	14.6	11.5	10.4	9.26	12.8	8.32	5.36	7.15	7.34	16.7	7.95	29.8	8.73	11.7	4.12	9.28
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30	0.276	0.887	0.812	0.02	0.02	0.02	0.02	0.286	0.65	0.565	0.431	0.847	0.279	0.509	0.02	0.02	0.0817	0.28	0.205	0.418
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14	119	68.2	79.4	7.25	39.2	35.2	34	34.6	42.5	65.4	51.3	33.8	30.4	100	64.6	24.3	14.2	10.8	6.02	22.7
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00	24.1	23.7	16.5	13.4	29.9	16.5	16.3	23.7	28.8	20.6	7.74	16.1	33	64.9	26.5	37.4	29.3	33	6.8	24.3
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26	21.2	121	66.6	3.55	26.6	25.9	27.6	25.6	41.6	32.6	23.4	57.6	38.1	74.2	40.9	40.1	21.4	37.3	8.03	25.8
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05	19.8	15.6	10.4	11.8	33.4	40.4	33.1	36.8	28.5	16.6	8.07	11.8	7.91	18.9	20.4	14.3	23.8	24.5	7.16	24.9
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77	4.09	3.55	3.24	2.61	1	1	1	1.15	1.37	5.31	5.16	6.03	3.32	1.65	4.43	2.98	10	1.3	1	1.38
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00	88.1	107	111	18.9	60.9	57.7	59.8	54.7	54.1	94.3	119	77.1	63.2	94	116	50.4	30.1	40.2	13.7	40.9
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49	67.3	305	204	38.8	110	109	107	116	148	336	101	206	179	331	202	197	91.8	128	27.7	104
TPH Criteria Working Group (TPH CWG)																																
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00																				
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00																				
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00																				
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00																				
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00	0.04	0.04	0.04	0.112	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.0982	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00	0.04	0.04	0.04	0.364	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0805	0.04	0.04	0.04	0.977	0.0836
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00	0.04	0.04	0.0851	0.524	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.23	0.04	0.04	0.04	2.78	0.602
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00	0.04	0.04	0.571	0.139	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.57	0.04	0.0655	0.04	4.61	2.06
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00	1.16	1.97	10.3	0.1	0.676	0.308	0.254	0.428	1.04	0.1	2.36	2.45	0.854	0.616	13.3	2.38	4.93	21.2	256	30
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00	3.35	17.1	27.9	0.1	0.1	0.1	0.479	0.1	2.2	2.67	13	8.73	9.06	7.35	30.8	8.57	9.92	69.7	626	44.4
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00	15.4	160	345	136	2.28	1.18	3.83	0.218	13.6	19.5	35.3	44.1	46.3	65.1	137	89.7	222	253	1800	112
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00	5.84	41.5	237	0.1	0.1	0.1	0.1	0.21	1.33	4.46	6.2	15.6	13.8	24.9	57.1	16.4	20.1	107	830	53.2
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00	0.04	0.04	0.0672	0.35	0.04	0.04	0.0428	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.158	0.04	0.04	0.04	1.85	0.415
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00	0.04	0.04	0.381	0.0918	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.381	0.04	0.0429	0.04	3.08	1.37
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00	1.74	0.194	13.4	3.2	0.18	0.1	0.383	0.1	0.1	0.542	0.1	1.08	2.2	1.37	3.97	0.732	7.02	9.68	282	14.7
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00	4.65	4.56	34.6	8.17	0.1	0.1	0.901	0.1	0.1	3.33	0.1	5.23	5.71	9.27	15.4	4.2	17.9	63.4	790	34.4
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00	12.3	51.8	561	944	10.3	2.98	12.4	4.6	37.3	30.8	3.73	42.5	17.9	103	99.1	31.9	74.4	335	2240	99
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00	5.42	34.6	453	24.4	0.1	0.1	1.14	0.711	10.9	16.5	0.1	24.9	9.66	22.2	72	16.9	17.1	157	880	46.7
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00	2.27	14.2	198	3.51	0.1	0.1	0.1	0.1	3.54	6.17	0.1	9.82	4.22	23.1	30.9	7.56	6.78	67.3	372	19.3
Polyaromatic Hydrocarbons (PAHs)																																
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42	12	12	60	12	12	12	12	12	12	12	12	12	40.9	35.4	12	12	12	60	372	60
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93	8	12.8	2660	178	8	8	8	8	8	11.9	8.75	12.8	45.2	61.2	60.2	10.6	94.8	40	2420	128
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86	16	21	622	182	16	16	16	16	16	32.6	23.3	36.9	163	224	60.1	20.4	20.6	80	1670	115
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56	14	97.6	274	216	14	14	14	14	46	253	169	248	616	585	239	75.7	51.3	94.2	2050	161
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81	15	90.1	187	158	15	15	15	15	43.7	285	252	327	593	590	295	85.6	50.1	117	1200	101
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77	15	134	406	273	15	15	15	15	96	494	393	498	851	989	491	127	81.5	102	937	103
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77	14	63.7	126	126	14	14	14	14	28.9	154	134	160	303	300	159	43.3	26.3	70	195	70
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07	24	102	158	145	24	24	24	24	24	315	286	313	453	503	303	73	48.4	229	688	120
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79	10	106	276	256	10	10	10	10	72.7	233	187	253	631	634	292	91.8	83.6	146	4740	264
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23	0.023	0.023	0.115	0.023	0.023	0.023	0.023	0.023	0.023	58.6	49.1	64.2	129	126	59	0.023	0.023	0.115	267	0.115
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37	0.018	93.4	118	88	0.018	0.018	0.018	0.018	36.7	224	253	217	392	412	310	65.3	34.9	90	328	90
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23	19.8	168	1390	700	0.017	0.017	0.017	0.017	62.6	370	231	360	1200	1130	532	152	104	0.085	1470	184
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09	10	14.2	1700	242	10	10	10	10	10	10	10	10	45.2	73.7	42.2	10	17.6	50	2810	202
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51	27.3	24.5	3720	537	9	9	9	9	9	21.4	23	51	89.3	154	74.9	22.3	42.1	45	408	69.5
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56	27.3	93.7	3760	1030	15	15	15	15	34.3	143	112	171	631	744	237	86	159	75	9540	446
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00	0.015	0.173	1.02	0.628	0.015	0.015	0.015	0.015	0.0484	0.36	0.245	0.371	0.981	0.898	0.496	0.152	0.108	0.184	4.65	0.358
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00	0.118	1.19	16.4	4.76	0.118	0.118	0.118	0.118	0.469	2.96	2.37	3.08	7.16	7.45	3.65	1.01	0.922	0.872	33.7	2.13
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00	107	90.8	90.9	92.7	95.7	89.3	84.7	80.2	90.4	80.8	89.9	81.8	105	105	89.2	98.6	99.1	88.5	86.3	92.9
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00	99.8	92	93.5	95.4	98.5	91.5	87	84.5	87.6	84.4	97.6	83.9	99.9	107	85.5	94.6	93.1	85.6	91.9	90.1
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00	98.2	92.3	89.3	96	96.1	83.1	96.8	89.3	94.4	94.5	115	94.9	97.9	111	85.6	92.2	89.3	85.6	95.8	90.3
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00	82.7	72.9	74.9	70.8	91.8	87.9	94.6	72.2	97.1	78.2	99	80.4	94.4	88	82.7	90.5	90.3	76.5	76.3	85.6
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00	80.6	68.9	73.6	72.3	93.5	89.7	94.8	70.5	94.6	78.6	96.1	79.2	90.1	87.5	85.2	88.5	83.5	76.7	71.3	83.3
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00	25.8	220	620	136	2.95	1.49	4.56	0.857	18.2	26.6	56.9	70.9	70	98	238	117	257	451	3510	240
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00	24.1	91.2	1060	980	10.5	2.98	14.8	5.31	48.2	51.2	3.73	73.7	35.4	136	190	53.7	116	565	4200	195
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00	49.9	312	1680	1120	13.4	4.47	19.4	6.17	66.4	77.8	60.6	145	105	234	430	171	373	1020	7720	439
Metals - (Solid)																																
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00			27900	83600	93000	17400	25500	32100	36300	25500	24100	37600	34300	35900	15400	56500	60800	45500	14300	23600	6300	29300
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00			6080	8240	8230	236	260	485	292	425	628	8310	7540	4540	6260	5380	8840	7200	530	1230	418	1460
Metals - (Liquid)																																
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00			180000	-	130000	171000	-	63100	248000	-	48500	128000	-	112000	-	-	-	-	-	-	172000	-
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00			51700	-	23400	12000	-	5110	7370	-	8760	17500	-	31400	-	-	-	-	-	-	32600	-
Phenols																																
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0165	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0465	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55																				
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93																				
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00																					
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55																				
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55																				
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55																				
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00																				
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00																				
Asbestos																																
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		430	0	0					0.00		04/07/2018	-	04/07/2018	04/07/2018	-	15/06/2018	18/06/2018	-	-	-	-	05/07/2018	-	-	-	-	-	-	-	-
Analysed By	TM048	No units		430	0	0					0.00		Lucy Caroe	-	Lucy Caroe	Marcin Magdziarek	-	Renata Bozhkov	Christian Hallam	-	-	-	-	Barbara Urbanek-Walsh	-	-	-	-	-	-	Lucy Caroe	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00																					
Analysts Comments	TM304	No units		83	0	0					0.00																					
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00		Detected	-	Not Detected	Not Detected	-	Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Detected	-
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Fibrous Tremolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Fibrous Actinolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-
Comments	TM048	No units		430	0	0			0.00	0.00	0.00		Soil containing ACM debris	-	0	0	-	Loose fibres in soi	0	-	-	-	-	0	-	-	-	-	-	-	Soil containing material typical of asbestos rop	-
Volatile Organic Compounds (VOCs)																																
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00		108	107	109	104	102	119	99.2	110	110	109	112	110	105	110	106	110	108	107	107	108
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00		96.6	97.6	97.6	98.2	94.5	83.3	96.9	93.1	100	97.7	94.5	90.5	98.9	98.7	99.8	88.6	97.4	100	98.4	97
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00		86.3	81.7	85.1	100	88	71.2	98.7	81	90.7	93.2	90.7	77.5	104	99.3	88.8	81.2	96	104	94.8	90.2
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00		0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00		0.07	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04	0.185	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00		0.13	0.13	0.13	0.13	0.13	0.13	2.6	0.13	0.13	0.13	0.13	1.1	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00		0.4	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	0.5	0.5
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	0.5	0.5
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	0.5	0.5
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	0.5	0.5
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	2.69	-	-	-	-	1.39	1.31
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	51.7	-	-	-	-	9.11	10
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	53	-	-	-	-	10.4	11.2

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances	40AJ23	40AJ26	40AJ27	40AJ27	40AJK16	40AJK16V	40AJ10V	40AJ12V	40AJ14V	40AJ23V	40AJ26V	40AK11	40AK11	40AK11	40AK13	40AK13	40AK13	40AK15	40AK27	40AK27
													2.002.00	1.5	0.7	1.5	0.500.50	1.501.50	2.702.70	2.602.60	1.201.20	2.202.20	2.8	0.500.50	1.001.00	2.002.00	0.500.50	1.001.00	2.002.00	0.500.50	0.5	1
													07/06/2018	30/05/2018	30/05/2018	30/05/2018	28/06/2018	28/06/2018	22/06/2018	27/06/2018	28/06/2018	07/06/2018	30/05/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	30/05/2018	30/05/2018
Carbon																																
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00	1.71	3.9	1.81	4.19	8.07	12.7	1.09	57.6	6.76	1.18	1.18	2.17	1.1	1.93	3	3.4	2.74	0.45	54	12.1
Metals (Solids)																																
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51	5.18	6.98	6.22	7.36	16.6	12.7	10.1	11.2	15.6	10.4	7.04	7.67	8.03	6.89	9.02	8.06	11.4	1.35	7.81	6.75
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30	0.187	0.805	1.74	0.228	0.362	0.174	0.02	0.02	0.638	0.187	0.575	0.704	1.7	2.02	0.985	0.821	0.515	0.542	3.37	0.7
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14	12.9	138	144	15.3	34.6	38.7	33	8.88	32.5	28.2	72.5	106	141	434	65.3	72	73.2	397	0.9	72.1
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00	19.5	53.6	16.6	16.3	25.9	26.2	12.6	12.7	27.7	12	14.7	19.5	25.4	36.1	24.7	18.7	16.9	1.4	19.3	14.8
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26	25.3	56.2	115	31.6	35.8	39.1	29.9	5.23	44.4	25	28.2	73.4	82.4	91.5	64.7	69.6	38.4	11.9	138	57.8
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53	0.14	0.14	1.38	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05	16.7	13.1	14	13.4	34.2	36	39.4	21.5	28.2	37.6	9.07	12	16.7	14.1	22.3	12.9	19.4	1.04	43.4	15.9
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77	1.21	3.94	4.21	2.54	1	1	1	2.34	1.29	1	5.11	6.94	10	18.1	7.98	4.36	1.95	7.99	1	2.49
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00	21.7	161	133	38.3	55.1	54.6	60.2	20.7	51.2	50.1	132	127	193	702	109	125	70.9	274	16.8	59.6
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49	80.7	258	613	126	150	123	114	20.6	154	105	106	249	283	120	325	362	129	34.9	727	207
TPH Criteria Working Group (TPH CWG)																																
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00																				
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00																				
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00																				
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00																				
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00	0.04	0.04	0.04	0.248	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00	0.04	0.04	0.04	3.9	0.04	0.0584	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00	0.04	0.04	0.106	10.1	0.04	0.0917	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00	0.04	0.04	0.141	16.1	0.04	0.04	0.04	0.04	0.0512	0.04	0.04	0.04	0.0857	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00	0.149	0.816	16	816	0.1	4.47	0.1	0.1	0.1	0.1	4.79	3.9	13.5	8.2	23.1	16.7	1.82	0.1	0.1	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00	19.7	12.9	106	1100	0.1	4.91	0.1	0.1	0.1	0.1	19.7	11.9	31.5	51.6	59.2	45	5.6	0.653	3.55	4.57
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00	61.6	251	431	3580	7.38	20.9	0.1	71.5	4.89	0.1	116	71.4	114	1000	239	218	22.8	11.6	84.2	56.4
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00	8.15	85.3	128	1380	0.1	0.1	0.1	0.835	0.1	0.1	39.2	21.4	40.5	948	94.5	108	5.58	0.78	5.13	19.4
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00	0.04	0.04	0.148	6.7	0.04	0.0605	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00	0.04	0.04	0.095	10.7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0578	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00	0.1	3.06	16.1	507	0.1	9.01	0.1	1.16	1.16	0.1	0.1	0.738	4.06	2.92	31.7	6.45	0.683	0.1	0.1	0.527
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00	0.1	49.4	75.1	1360	0.1	13.4	0.1	7.51	2.23	0.1	2.1	4.35	15.9	22.9	0.1	26.3	3.39	0.1	2.38	2.59
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00	9.46	162	226	4070	35.3	74.4	0.314	330	35.6	2.44	17.3	30.3	59.7	245	147	181	17.2	2.3	26	33.7
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00	8	59.6	79.5	1250	6	16.7	0.1	45	6.65	0.1	4.22	18.2	39.5	261	101	145	7.63	0.1	7.85	32.5
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00	3.39	22.5	33	532	1.62	4.59	0.1	14.1	1.43	0.1	1.13	7.69	17.3	129	41.8	60.8	2.9	0.1	2.51	14.5
Polyaromatic Hydrocarbons (PAHs)																																
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42	12	60	43.9	1040	12	12	12	12	12	12	12	21.3	12	12	19.9	24	12	12	12	12
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93	8	124	263	6190	8	54.2	8	8	8	8	8.94	9.2	46.8	71	55.3	189	27.6	8	8	8
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86	16	607	506	3990	16	105	16	16	16	16	76.4	131	166	653	155	183	51.6	16	16	28.7
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56	16.7	2520	986	7500	14	77.9	14	14	14	14	301	379	396	1420	577	445	137	14	19.1	148
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81	15	1650	624	5080	15	107	15	15	15	15	207	259	323	1270	546	383	106	15	15	158
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77	26.9	2500	890	2800	25.8	226	15	15	15	15	341	416	467	1960	902	615	196	17	28.6	232
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77	14	806	322	862	14	68.5	14	14	14	14	135	135	157	803	343	229	59.3	14	14	84.9
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07	24	1000	433	2340	24	129	24	24	24	24	189	193	239	1200	546	376	86.2	24	24	165
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79	20	2390	1130	12600	10	163	10	10	10	10	284	332	331	1450	557	445	124	13.7	30.7	188
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23	0.023	256	142	1070	0.023	0.023	0.023	0.023	0.023	0.023	43.7	52.1	52.7	198	96.1	75	28.6	0.023	0.023	33.7
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37	20.8	1060	387	1060	0.018	103	0.018	0.018	0.018	0.018	157	155	197	957	472	275	78.5	0.018	0.018	151
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23	30.5	5910	1860	6090	28.4	381	0.017	0.017	0.017	0.017	776	723	1090	1990	1210	1060	311	0.017	80.4	221
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09	10	185	294	6540	10	95.3	10	10	10	10	10	15.4	35.6	24.2	10	96.7	17.9	10	10	13.6
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51	9	45	215	828	31.5	24.7	9	9	9	9	41.6	25.1	41.4	22.6	71.1	134	28.6	9	31.9	29.2
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56	24.7	2440	2400	5300	15	729	15	15	15	15	332	283	906	593	802	806	127	15	74.7	155
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00	0.0287	4.95	2.15	18.3	0.015	0.256	0.015	0.015	0.015	0.015	0.752	0.626	0.914	5	1.2	1	0.293	0.015	0.0605	0.208
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00	0.168	26.4	12.6	81.6	0.118	2.52	0.118	0.118	0.118	0.118	3.64	3.76	5.36	17.6	7.55	6.31	1.67	0.118	0.326	1.82
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00	97.7	92.6	91.9	110	85.7	104	105	99.2	83.1	85.4	83.3	93.4	86	88.1	91.7	87.2	88.9	91.2	91.9	90.5
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00	91.2	89.5	99.9	115	86.3	102	98.9	99.7	83.8	86.1	85.7	101	92.5	96.2	93.5	93.1	96.6	90.7	85.2	94.9
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00	94.8	96.4	97.7	105	85.9	99.5	106	102	90.4	89.8	99.5	115	104	103	103	102	107	91.4	69.6	95
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00	82.8	95.9	85.8	99.8	82.1	97	93.4	92.3	89.1	79.8	82.1	97.5	87	71.8	88.7	91.7	81.1	88.2	31.6	72.4
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00	82.6	89.4	84.6	112	84	93.2	96	92.4	96	79.1	85.4	100	92.1	73.3	89	86.9	81.2	83	16.6	71.3
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00	89.6	350	681	6880	7.38	30.3	0.1	72.3	4.89	0.1	180	109	199	2010	416	388	35.7	13.1	92.8	80.3
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00	17.5	274	397	7180	41.3	113	0.314	383	45.6	2.44	23.6	53.6	119	532	280	359	28.9	2.3	36.2	69.3
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00	107	624	1080	14100	48.7	144	0.314	456	50.6	2.44	204	162	318	2540	696	746	64.7	15.4	129	150
Metals - (Solid)																																
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00			13700	59100	83500	19800	24900	20100	44200	19100	22200	35700	63400	69200	78600	158000	83400	59000	39500	151000	239000	50700
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00			1170	8110	9720	2870	207	291	492	411	367	379	12400	14200	11000	37600	17600	8990	2920	28300	3230	5520
Metals - (Liquid)																																
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00			141000	-	139000	-	73900	259000	-	92500	-	-	164000	-	168000	-	208000	-	205000	40500	-	198000
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00			17700	-	21000	-	15700	41500	-	16800	-	-	23200	-	17100	-	26500	-	24100	2370	-	15700
Phenols																																
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00	0.0826	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.048	0.01	0.0116	0.0113
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00	0.0103	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0109	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.0113
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00	0.0207	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00	0.114	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.048	0.035	0.035	0.035
Inorganics																																
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55																				
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93																				
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00																					
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55																				
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55																				
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55																				
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00																				
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00																				
Asbestos																																
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		430	0	0					0.00		02/07/2018	-	02/07/2018	-	02/07/2018	-	-	-	-	-	04/07/2018	-	04/07/2018	-	04/07/2018	-	04/07/2018	04/07/2018	-	02/07/2018
Analysed By	TM048	No units		430	0	0					0.00		Marcin Magdziarek	-	James Richards	-	Lucy Caroe	-	-	-	-	-	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Lucy Caroe	-	Barbara Urbanek-Walsh	Renata Bozhkov	-	James Richards
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00																					
Analysts Comments	TM304	No units		83	0	0					0.00																					
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00		Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Detected	-	Not Detected
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Trace	-	Not Detected	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Comments	TM048	No units		430	0	0			0.00	0.00	0.00		Soil containing material typical of asbestos cemen	-	0	-	0	-	-	-	-	-	0	-	0	-	Loose fibres in soi	-	0	Loose fibres in soil	-	0
Volatile Organic Compounds (VOCs)																																
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00		107	114	111	110	107	94	108	105	103	109	111	108	110	104	109	109	107	113	110	103
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00		97.2	92	98.1	98.5	98.2	99.8	98.4	99	98.8	98.6	97.8	98.2	98.4	98.2	97.1	97.5	95.5	99.9	97.6	96.4
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00		93.9	80	88.5	87.7	88.1	103	91.5	95.9	103	99.7	81.9	87.8	85	81.6	88.1	85.2	85.9	81.6	86.2	87.9
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.56	0.15
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00		0.5	0.5	0.5	0.5	0.5	-	-	-	0.5	3.64	-	-	-	-	-	-	-	-	0.5	0.5
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00		0.5	0.5	0.5	0.5	0.5	-	-	-	0.5	1.91	-	-	-	-	-	-	-	-	0.5	0.5
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00		0.5	0.5	0.5	0.5	0.5	-	-	-	0.5	3.2	-	-	-	-	-	-	-	-	0.5	0.5
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00		0.5	0.5	0.5	0.5	0.5	-	-	-	0.5	0.59	-	-	-	-	-	-	-	-	0.5	0.5
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00		1.21	1.71	1.1	1.31	0.5	-	-	-	1.97	3.37	-	-	-	-	-	-	-	-	1.06	1.11
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00		8.96	6.14	9.67	12.8	8.44	-	-	-	39.8	45.7	-	-	-	-	-	-	-	-	11.3	10.6
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00		10.1	7.74	10.7	13.9	8.44	-	-	-	40.9	47.5	-	-	-	-	-	-	-	-	12.2	11.6

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40AK27 1.7 30/05/2018	40AK11V 2.902.90 22/06/2018	40AK15V 0.900.90 22/06/2018	40AL10 0.500.50 27/06/2018	40AL10 1.001.00 27/06/2018	40AL10 1.501.50 27/06/2018	40AL10 2.002.00 27/06/2018	40AL12 0.500.50 27/06/2018	40AL12 1.501.50 27/06/2018	40AL12 2.502.50 27/06/2018	40AL15 0.500.50 28/06/2018	40AL17 0.700.70 22/06/2018	40AL17 1.701.70 22/06/2018
Carbon													
Soil Organic Matter (SOM)	2.93	10.7	2.17	2.33	1.84	1.67	6.55	1.76	3.45	3.05	4.43	1.45	3.07
Metals (Solids)													
Arsenic	16.6	21	30.2	25.7	10.3	7.37	7.42	6.84	5.12	13.2	12.7	13.3	2.45
Cadmium	0.02	0.579	0.315	0.722	0.2	0.02	0.02	0.128	0.02	0.0366	1.64	1.87	0.449
Chromium	39.3	37	77.6	55.3	101	19.1	118	80.2	80.8	5.64	144	277	12.5
Copper	23.9	28.1	34.9	34	24.1	13.8	18.7	17.1	15.7	14.7	25.1	34.7	8.2
Lead	28.3	51.3	161	132	48.8	26.1	21.2	49.8	24.4	31.1	80.7	75.7	28.6
Mercury	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	1.4	1.4	0.14
Nickel	39.1	26	13.3	12.8	22	19.4	3.19	11.8	8.74	17	19	20.5	6.74
Selenium	1	1	6.21	3.92	10	1	9.2	2.56	3.89	1	10	10.5	2.79
Vanadium	69.6	60.5	128	111	164	37.8	397	108	127	21.7	216	632	38.3
Zinc	70.3	170	2160	2080	330	140	94.6	266	90.2	55.6	341	318	114
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.0598	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.0469	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.0511	0.0587	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	0.1	0.1	11.1	8.68	7.22	3.6	1.17	3.87	2.97	5.51	3.89	8.17	4.72
Aliphatics >C16-C21	0.1	0.1	38.9	29.9	22.5	9.76	8.32	16.9	15.8	11.8	9.81	19.8	19.1
Aliphatics >C21-C35	2.55	8.39	221	189	126	57.7	64.8	78.2	126	27.3	34.5	62.1	143
Aliphatics >C35-C44	0.1	0.1	62.7	56.6	59.6	21.7	27.9	24.6	24.1	6.48	12.1	18.3	41.5
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.0512	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.1	0.524	3.38	2.84	1.69	3.6	0.902	1.74	1.95	2.49	2.15	3.85	2.83
Aromatics >EC16-EC21	0.1	3.59	15.3	14.5	8.86	8.06	23.5	8.37	15.1	6.18	10	14.6	11.9
Aromatics >EC21-EC35	8.5	82.1	121	95.1	76.8	44.6	91.2	39.9	89.6	21.8	38.3	59.5	65.6
Aromatics >EC35-EC44	1.23	13	66.2	51.5	59.6	29.4	41.5	24.3	35.8	9.33	18.2	28.3	37.6
Aromatics >EC40-EC44	0.1	3.95	27.2	20.8	25.5	11.6	16.3	10.4	13.6	3.7	7.41	10.9	15.4
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	12	12	58.5	52.6	12	12	16.6	12	12	12	125	1620	18.8
Acenaphthene	8	8	28.9	34.3	17.9	30.1	123	25.3	34.2	8	42.3	192	12.1
Anthracene	16	16	140	171	51.2	39.7	1530	108	378	16	284	2970	129
Benz(a)anthracene	14	40.4	1190	626	182	107	6520	417	774	46.7	576	3390	648
Benzo(a)pyrene	15	44.1	1160	593	151	87.5	4820	329	566	48.5	490	2600	559
Benzo(b)fluoranthene	15	92.3	1660	826	239	171	7800	532	857	65.2	601	3800	574
Benzo(k)fluoranthene	14	38.4	706	318	92.4	55.9	2800	205	359	26.4	248	1210	292
Benzo(g,h,i)perylene	24	45.8	862	474	122	74.2	3070	277	421	49.8	402	1850	378
Chrysene	10	66.2	1070	555	167	142	6410	480	807	51.5	499	2220	679
Dibenzo(a,h)anthracene	0.023	0.023	202	109	30.4	0.023	764	58.2	92.8	0.023	98	469	84
Indeno(1,2,3-cd)pyrene	0.018	40	844	419	102	74.7	3070	274	429	38.7	339	1710	317
Fluoranthene	0.017	121	1760	962	381	234	10600	965	2270	84.5	1480	9940	1850
Fluorene	10	10	46.6	61.4	16.7	36.5	121	17	33.4	10	142	2670	19.7
Naphthalene	9	9	65	79	37.9	94.7	60.2	33	35.7	17.2	827	38100	35.9
Phenanthrene	15	63.5	511	514	211	184	4150	468	1940	62.6	893	11600	607
Pyrene	0.015	0.0944	1.53	0.945	0.322	0.178	13.3	1.2	1.9	0.0801	1.14	6.32	1.41
PAH, Total Detected USEPA 16	0.118	0.646	11.8	6.74	2.12	1.51	65.1	5.39	10.9	0.571	8.19	90.7	7.61
Naphthalene-d8 % recovery**	95.2	101	94.6	96.6	90.8	87.5	98	96.6	88	97.7	78.5	73.3	91.6
Acenaphthene-d10 % recovery**	91	105	97.6	101	96.4	74.5	87.4	92.2	89.5	90.7	75.6	85.9	94.5
Phenanthrene-d10 % recovery**	89.5	108	95.5	99.5	95.9	87.3	98.1	88.1	91.7	90.3	91.7	95.3	95.3
Chrysene-d12 % recovery**	85.5	87.4	77.1	86.2	82.7	76	107	92.5	87.7	88.1	76.1	76.9	85.1
Perylene-d12 % recovery**	85.2	88.9	72.2	83.1	80.1	75.5	112	96.2	90.3	86.9	77.3	79.3	83.2
Total Aliphatics >C12-C44	2.55	8.39	333	284	215	92.8	102	124	169	51	60.2	108	208
Total Aromatics >EC12-EC44	9.72	99.2	206	164	147	85.8	157	74.2	142	39.8	68.7	106	118
Total Aliphatics & Aromatics >C5-C44	12.3	108	539	448	362	179	259	198	312	90.9	129	215	326
Metals - (Solid)													
Iron	32400	22400	63200	51600	133000	25800	78900	47900	37200	18500	91900	130000	35400
Manganese	249	230	18000	11200	8250	1820	29900	6890	10400	619	10700	21800	3310
Metals - (Liquid)													
Calcium	243000	-	50500	205000	-	26600	-	-	-	-	-	-	-
Magnesium	19100	-	7960	16700	-	1760	-	-	-	-	-	-	-
Phenols													
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0182	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0182	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potentia													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	18/06/2018	-	18/06/2018	-	-	-	-	-	-	-	-	-	-
Analysed By	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-
Comments	Loose fibres in soil	-	0	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	107	106	108	110	112	109	106	111	119	102	105	107	111
Toluene-d8**	97.1	98.2	95.5	99.8	98.5	97.4	98	99.4	89.7	98.8	97.2	95.2	99
4-Bromofluorobenzene**	91.8	95.5	86	104	92.2	81.5	85.7	86.8	75.2	105	94.6	94	94.2
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	3.79	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	1.87	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	3.4	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	0.5	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	3.2	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	49.2	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	50.8	-	-

Determinand	40AL20 0.500.50 05/06/2018	40AL20 1.001.00 05/06/2018	40AL20 2.502.50 05/06/2018	40AL28 0.500.50 29/05/2018	40AL28 1 29/05/2018	40AL28 1.5 29/05/2018	40AL28 2.5 29/05/2018	40AL10V 2.802.80 27/06/2018	40AL12V 3.503.50 27/06/2018	40AL15V 1.001.00 28/06/2018	40AL17V 3.203.20 22/06/2018	40AL20V 3.503.50 05/06/2018
Carbon												
Soil Organic Matter (SOM)	1.57	3.69	1.98	4.72	>100	21.7	7.19	31.7	2.16	15.6	12.5	4.1
Metals (Solids)												
Arsenic	16	11	4.82	3.88	4.22	5.98	16.8	9.15	10.2	11.8	22.3	10.3
Cadmium	0.417	0.377	0.664	0.561	0.227	0.509	0.02	0.134	0.02	0.178	0.931	0.278
Chromium	18.5	16.6	180	81.2	21.8	291	37.8	13.8	35.8	32.6	36.3	35.4
Copper	30.5	24.8	16.8	10.2	63	21.7	25.4	15.6	16.2	24.8	31	17
Lead	23.3	29.5	25	15.6	20.4	23.9	38.4	15.8	23.7	37.9	67	24.3
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14
Nickel	41.4	34	8.62	7.24	8.01	15.2	31.2	23.7	38.5	31.5	27.8	29.6
Selenium	1.36	2.06	5.08	3.59	1.5	7.48	1	1	1	1	1.42	1
Vanadium	44	35.4	301	172	38.1	714	62.8	27.9	57.5	49.9	56.9	55.5
Zinc	104	106	80.1	73.6	35	76.7	130	69	105	134	176	103
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.0432	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.048	0.04	0.04	0.04	0.0728	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.048	0.04	0.04	0.04	0.0455	0.04
Aliphatics >C12-C16	1.32	5.8	2.28	0.1	3.94	10.2	0.1	0.1	0.1	0.213	0.1	0.1
Aliphatics >C16-C21	2.54	6.8	7.11	4.8	25.4	20.6	0.1	1.83	0.1	1.24	0.1	0.1
Aliphatics >C21-C35	8.97	6.89	48	42.4	363	93	8.22	41.6	2	16.7	2.02	1.02
Aliphatics >C35-C44	1.87	1.7	21.1	15.8	111	37	0.1	0.1	0.1	0.469	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0491	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.1	0.98	0.1	0.1	3.18	1.67	0.1	0.1	0.1	0.204	2.49	0.1
Aromatics >EC16-EC21	0.1	3.36	0.1	3.08	19	8.58	1	4.34	0.1	2.77	2.38	0.312
Aromatics >EC21-EC35	2.54	7.36	20.2	28.2	125	56.6	47.4	131	7.37	97	37.3	11.9
Aromatics >EC35-EC44	5.7	6.44	15.9	17.8	88.6	35.4	14	31.5	1.3	19.4	4.16	2
Aromatics >EC40-EC44	3.21	3.4	6.41	7.45	38.1	14.9	5.49	9.94	0.1	3.35	0.521	0.491
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	12	12	12	12	17.2	12	12	12	12	12	12	12
Acenaphthene	8	8	17.9	11.1	22.9	16.8	8	8	8	8	24	8
Anthracene	16	16	39.9	55.1	99.4	52	16	16	16	16	31.3	16
Benz(a)anthracene	26.8	38.4	292	243	288	554	23.7	14	14	14	146	14
Benzo(a)pyrene	23.2	35.9	371	266	224	587	24	15	15	15	150	15
Benzo(b)fluoranthene	33.2	61.6	399	338	403	841	52.9	77.3	15	61.4	215	15
Benzo(k)fluoranthene	14	18.6	156	123	172	286	14	14	14	14	77.8	14
Benzo(g,h,i)perylene	24	24	311	224	221	378	24	24	24	24	107	24
Chrysene	27.3	66.4	317	261	325	579	38.4	55.7	10	44	185	10
Dibenzo(a,h)anthracene	0.023	0.023	63.5	44.2	72.2	87.1	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	24	316	242	176	368	0.018	0.018	0.018	34.5	96.2	0.018
Fluoranthene	46.9	65.8	421	411	454	756	60.5	118	0.017	69.9	402	25.6
Fluorene	10	10	10	10	48.6	10	10	10	10	10	63.4	10
Naphthalene	9	28.7	20.4	24.7	91	69.1	9	9	9	9	9	9
Phenanthrene	28.6	121	161	178	385	239	34.2	15	15	30.7	197	15
Pyrene	0.0411	0.0515	0.494	0.441	0.434	0.838	0.046	0.0812	0.015	0.0524	0.335	0.015
PAH, Total Detected USEPA 16	0.227	0.512	3.38	2.86	3.43	5.65	0.28	0.332	0.118	0.293	2.03	0.118
Naphthalene-d8 % recovery**	91.9	92.3	91	91	83.4	87.4	89.9	102	82.1	88.5	92.6	90.1
Acenaphthene-d10 % recovery**	93.3	84.7	93.7	95	88.7	91.6	87.9	107	80.5	89.1	94.7	89.2
Phenanthrene-d10 % recovery**	93	81.4	94.9	98.3	89.2	92.7	91.7	112	80.1	89.5	95.9	85.5
Chrysene-d12 % recovery**	79.9	73.7	80.9	83.6	70.7	93.2	89.4	88.8	79.8	88.6	90.4	77.3
Perylene-d12 % recovery**	74.1	73.3	79.2	81.2	63.3	79.5	86.5	89.5	82	88.4	86.3	81.3
Total Aliphatics >C12-C44	14.7	21.2	78.4	63	503	161	8.22	43.5	2	18.6	2.02	1.02
Total Aromatics >EC12-EC44	8.24	18.1	36.2	49.1	236	102	62.4	167	8.67	119	46.3	14.2
Total Aliphatics & Aromatics >C5-C44	22.9	39.3	115	112	739	263	70.7	211	10.7	138	48.5	15.2
Metals - (Solid)												
Iron	33300	31500	85800	48400	19000	116000	32500	22500	29700	23300	20800	32700
Manganese	940	1990	12500	6410	1190	21700	285	170	394	185	272	374
Metals - (Liquid)												
Calcium	69400	113000	-	125000	-	-	160000	-	3490	-	-	265000
Magnesium	10500	23800	-	15900	-	-	13700	-	1470	-	-	26700
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0162	0.01	0.0105
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE												
pH												
Sulphate, Total												
Sulphur, Total												
Sulphate, Total potentia												
Sulphate, acid soluble (total)												
Cyanide, Total												
Exchangeable Ammonia as N												
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	0.001	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	02/07/2018	-	21/06/2018	-	-	18/06/2018
Analysed By	-	-	-	-	-	-	James Richards	-	Barbara Urbanek-Walsh	-	-	James Richards
Asbestos Quantification - PCOM Evaluation - %	-	-	-	0.001	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)												
Analysts Comments												
Asbestos Quantification - Total - %	-	-	-	0.001	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Comments	-	-	-	-	-	-	0	-	0	-	-	0
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	113	106	108	107	107	109	114	105	113	121	107	114
Toluene-d8**	95.1	97	98.7	99.1	94.5	97.6	99	97.7	99.7	99.7	95.3	96.2
4-Bromofluorobenzene**	87.7	92	87.5	90.6	84.1	86.1	88	86.1	94.6	95.6	92.6	91
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	1.02	0.71	0.77	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	6.42	9.43	8.64	-	-	-	-
Water Total M(ar)	-	-	-	-	-	7.37	10.1	9.34	-	-	-	-

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40AL28V	40AM27	40AM28	40AM28	40AM28	40AM27V	40AN11	40AN11	40AN11	40AN13	40AN13	40AN24	40AN24	40AN24	40AN24	40AN26	40AN26	40AN26	40AN26	40AN28
	3	1.001.00	0.5	1	2	1.8	0.500.50	1.001.00	1.501.50	0.500.50	1.101.10	0.500.50	1.001.00	1.701.70	2.302.30	0.500.50	1.001.00	1.701.70	2.302.30	0.5
	29/05/2018	30/05/2018	29/05/2018	29/05/2018	29/05/2018	30/05/2018	22/06/2018	22/06/2018	22/06/2018	14/06/2018	14/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	29/05/2018
Carbon																				
Soil Organic Matter (SOM)	18.4	3.57	3.57	1.59	18.8	6.02	7.81	10.7	4.86	6.59	1.78	1.39	1.1	1.42	2.71	1.76	5	3.03	4.57	4.86
Metals (Solids)																				
Arsenic	7.67	6.6	9.91	11	9.21	10.4	11.6	9.41	6.42	16.1	5.13	8.26	3.84	4.4	9.54	5.14	8.59	7.14	14.3	24.5
Cadmium	0.389	1.69	0.866	0.337	0.314	2.13	2.16	2.51	0.221	0.37	1.58	1.48	0.282	0.943	0.673	0.194	0.383	0.92	0.698	1.04
Chromium	12.1	44.7	64.2	88.4	17.7	34.1	117	216	0.9	40.8	23.9	31.8	33.5	19.5	44.7	11.1	9.15	80	162	342
Copper	28	19.9	88.5	18.5	16.8	38.8	32.6	29.5	15.9	32.2	27.4	43.3	6.56	14.1	24.9	8.61	12	32.3	73	117
Lead	31.2	47.6	72.8	20.8	20.5	149	135	102	11.3	33.3	78.7	113	12.2	59.9	42.4	11.7	16.2	67.6	71.3	252
Mercury	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.2
Nickel	18.3	14.2	18.2	10.9	21.3	26.3	25.1	30	19.3	36.4	12.6	20.3	4.99	11	25.7	17.6	33.4	17.9	24.8	26.6
Selenium	1.76	2.56	3.13	3.6	1.74	10	10	10	1	1.73	1.94	1.43	4.02	3.31	2.52	1	1	3.29	3.56	2.32
Vanadium	75.6	118	138	85.3	38	58.6	359	160	16.3	64.5	53.2	56.9	84.9	46	80.6	17.4	20.9	168	104	83.2
Zinc	140	204	219	105	105	614	468	409	40.7	122	268	298	50.1	86.5	131	48.2	103	202	270	491
TPH Criteria Working Group (TPH CWG)																				
Benzene																				
Toluene																				
Ethylbenzene																				
sum of detected mpo xylene by GC																				
Aliphatics >C5-C6	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.343	0.54	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1.16	2.7	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	0.398	5.39	3.89	2.36	0.1	6.17	3.19	2.89	8.28	0.847	20	19	43.5	107	35	1.81	3.06	3.43	3.28	0.73
Aliphatics >C16-C21	0.559	23.3	16	6.52	5.1	28.2	15	13.9	24	1.22	62.1	116	100	233	41.1	9.98	5.38	16.3	13.7	4.06
Aliphatics >C21-C35	20.7	189	107	57.2	37.1	104	71.6	74.9	31.9	2.02	216	577	86.5	257	50.6	60.6	21.5	118	88.3	26.7
Aliphatics >C35-C44	7.9	69.3	31.4	13.8	0.1	24.8	19.7	23.6	3.38	0.1	62.3	178	23	55.8	10	42.8	2.58	30.7	25.5	6.37
Aromatics >EC5-EC7	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.229	0.36	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.776	1.8	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.609	2.3	1.39	0.1	0.1	1.64	1.16	2.16	5.17	0.1	3.85	4.74	15.8	41.4	5.29	0.687	1.7	1.09	1.7	0.974
Aromatics >EC16-EC21	2.03	11.2	7.72	0.1	5.43	9.9	8.46	9.71	13.2	0.203	21.5	49.3	35.1	108	17.4	4.27	6.82	6.41	9.87	4.77
Aromatics >EC21-EC35	16.4	83.2	47.5	38.2	63.3	50	47.4	53.9	18.2	12.8	97.2	242	39.7	102	34.9	48	17.4	54.8	56.2	23.2
Aromatics >EC35-EC44	11	48.6	23	8.69	3.22	22.2	26.2	30	4.16	2.02	73.3	115	26.2	28.7	15.7	62.8	2.96	31	27.1	9.29
Aromatics >EC40-EC44	4.52	20.1	8.81	3.16	0.1	8.8	10.6	11.8	1.14	0.1	32.4	47.5	12.6	9.87	6.29	30.7	0.1	13.2	10.9	3.75
Polyaromatic Hydrocarbons (PAHs)																				
Acenaphthylene	40.5	69.9	25.4	12	60	17.6	13.8	17.4	12	12	60	60	12	12	12	12	12	60	48	32.1
Acenaphthene	8	51.7	36.1	8	159	14.5	13	26.1	8	8	40	40	20.9	35.7	8	8	8	40	85.6	76.4
Anthracene	85.9	170	74.8	16	80	55.1	43.6	76.8	16	16	149	80	37.4	30	20.9	17.2	16	80	223	243
Benz(a)anthracene	577	526	352	22.7	70	216	190	332	16.6	14	194	70	181	54.9	61.5	82.6	41.2	434	701	1040
Benzo(a)pyrene	803	606	351	15	75	255	202	365	15	15	188	99.6	105	46.3	63.4	95.9	34.2	446	708	932
Benzo(b)fluoranthene	861	862	572	29.5	75	358	347	576	23.9	15	305	109	135	86.8	105	173	79.3	828	860	1360
Benzo(k)fluoranthene	359	330	176	14	70	140	105	183	14	14	126	70	65.2	29.6	35.9	57.1	22.2	284	374	461
Benzo(g,h,i)perylene	673	537	291	24	120	234	177	286	24	24	231	155	63.5	128	67.3	106	42.7	353	505	571
Chrysene	534	500	434	27.4	50	232	197	325	23.1	10	249	75.4	190	61.4	67.8	108	93	512	610	1070
Dibenzo(a,h)anthracene	125	120	56.7	0.023	0.115	51.2	0.023	59.5	0.023	0.023	0.115	0.115	0.023	0.023	0.023	0.023	0.023	0.115	116	132
Indeno(1,2,3-cd)pyrene	638	521	280	0.018	90	207	194	304	0.018	0.018	169	98.7	49.5	50.8	49.8	110	28.3	386	532	610
Fluoranthene	1080	995	634	38.3	208	335	320	532	23.2	0.017	313	150	434	132	117	118	75.7	585	1330	1950
Fluorene	19	85.9	42.6	10	115	17.9	11.1	30.4	17.5	10	50	50	102	153	10	10	10	50	109	101
Naphthalene	30.3	211	89	16.3	45	65.3	78.1	129	32.7	9	45	45	20.8	22.5	17.9	26.2	31.1	45	266	163
Phenanthrene	287	618	338	39.2	496	196	196	302	67.5	15	184	87.9	236	296	84.1	105	168	258	848	884
Pyrene	1.07	0.898	0.604	0.0363	0.075	0.327	0.329	0.494	0.0225	0.015	0.308	0.195	0.434	0.166	0.107	0.115	0.0759	0.59	1.11	1.62
PAH, Total Detected USEPA 16	7.18	7.1	4.36	0.21	0.978	2.72	2.42	4.04	0.227	0.118	2.42	0.97	2.07	1.29	0.797	1.11	0.692	4.68	8.42	11.2
Naphthalene-d8 % recovery**	85.4	93.7	88.3	87.9	91.7	95.2	99.4	95.8	86.7	85.9	88.4	91.2	90.5	95.7	85.1	94	92	85.9	89.6	84.8
Acenaphthene-d10 % recovery**	85.2	94.1	88.8	86.4	93.9	94.3	100	97.9	86.4	90.4	94	95.3	92.3	104	88.4	91.5	92.6	86.3	89.8	84.9
Phenanthrene-d10 % recovery**	83.1	93	99.2	89.1	93	101	95.8	96.4	83.5	94.5	91.3	97.1	93	102	92.3	91.8	94.4	84.1	96	81.6
Chrysene-d12 % recovery**	68.7	79.4	96.6	84.2	76.5	87.2	84.9	85.3	84.1	78	81.2	80.4	82.2	109	82.5	96.2	77.1	86.1	96.4	82.2
Perylene-d12 % recovery**	63.6	86.1	88.3	78.4	75.8	82.2	80.4	84.2	84.2	80.2	80.9	81.1	79.3	113	82.8	96.4	71.6	82.9	92.2	75.3
Total Aliphatics >C12-C44	29.6	287	159	79.9	42.1	163	109	115	67.6	4.08	360	890	253	652	137	115	32.6	168	131	37.8
Total Aromatics >EC12-EC44	30	145	79.6	46.8	72	83.7	83.3	95.8	40.8	15	196	412	117	280	73.3	116	28.9	93.3	94.9	38.3
Total Aliphatics & Aromatics >C5-C44	59.6	433	238	127	114	246	193	211	108	19.1	556	1300	372	938	210	231	61.4	261	226	76.1
Metals - (Solid)																				
Iron	50000	57100	47300	30300	29200	95800	104000	93600	19300	29600	41700	26200	14400	24300	46700	16300	20400	63100	65800	69300
Manganese	2160	4790	4510	6890	1410	3840	11700	9050	426	243	3330	2980	4350	3350	4100	742	519	8260	8320	4990
Metals - (Liquid)																				
Calcium	-	165000	-	74400	-	138000	-	105000	-	-	-	-	-	115000	104000	-	-	94700	176000	-
Magnesium	-	35500	-	32600	-	31100	-	18500	-	-	-	-	-	12900	12800	-	-	12200	33200	-
Phenols																				
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.0658	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.16	0.147	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0114	0.0113	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0228	0.0226	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0658	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.194	0.181	0.035	0.035
Inorganics																				
Soluble Sulphate 2:1 extract as SO4 BRE																				
pH																				
Sulphate, Total																				
Sulphur, Total																				
Sulphate, Total potentia																				
Sulphate, acid soluble (total)																				
Cyanide, Total																				
Exchangeable Ammonia as N																				
Asbestos																				
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	18/06/2018	-	18/06/2018	-	18/06/2018	-	-	-	-	-	-	-	20/06/2018	21/06/2018	-	-	21/06/2018	21/06/2018	-
Analysed By	-	Andrzej Ferfecki	-	Marcin Magdziarek	-	Andrzej Ferfecki	-	-	-	-	-	-	-	Lucy Caroe	Barbara Urbanek-Walsh	-	-	Andrzej Ferfecki	Lucy Caroe	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																				
Analysts Comments																				
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Detected	-	-	Not Detected	Detected	-
Amosite (Brown) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-
Fibrous Tremolite	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-
Fibrous Actinolite	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-
Comments	-	0	-	Loose fibres in soi	-	0	-	-	-	-	-	-	-	0	Loose fibres in soil.	-	-	0	Soil containing material typical of asbestos cemen	-
Volatile Organic Compounds (VOCs)																				
Dibromofluoromethane**	114	107	121	105	110	109	106	104	108	112	109	112	109	111	101	105	105	107	105	104
Toluene-d8**	97.2	95.4	97.6	98	95.7	96.4	98.3	99.2	97.9	95.9	98.8	97.9	98.6	96.9	97.4	94.7	98.6	93.6	99.9	96.2
4-Bromofluorobenzene**	94.1	87.1	96.3	83.9	84.8	89	92.5	96.5	91.4	81	99.7	95.3	94.3	87.5	97.2	93	97	97.7	96.2	95.3
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																				
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	1.68	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	30.2	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	31.4	-	-	-	-	-	-	-	-	-	-	-

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40AN28	40AN11V	40AN13V	40AN20V	40AN26V	40AN28V	40AO14	40AO16	40AO16	40AO16	40AO16	40AO17	40AO17	40AO17	40AO17	40AO23	40AO23	40AO23	40AO25	40AO25	40AO25	40AO25
	1	2.202.20	1.001.00	0.800.80	2.602.60	1.2	0.500.50	0.500.50	1.001.00	2.002.00	3.003.00	0.500.50	1.001.00	2.002.00	3.003.00	0.500.50	1.001.00	1.301.30	0.500.50	1.001.00	2.002.00	2.802.80
	29/05/2018	22/06/2018	14/06/2018	14/06/2018	06/06/2018	29/05/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018
Carbon																						
Soil Organic Matter (SOM)	2.07	2.57	5.34	1.1	1.78	3.14	3.88	3.15	6.55	5.45	1.97	3.78	2.22	2.64	2.26	4.45	2.17	1.48	0.952	1.09	0.705	3.19
Metals (Solids)																						
Arsenic	11.5	8.1	13	9.36	13.5	15.9	7.01	6.29	12.1	9.59	10.1	40	7.66	4.39	4.75	7.04	5.34	6	6.22	6	3.35	10
Cadmium	0.02	0.353	0.381	0.239	0.294	0.767	0.353	1.89	1.1	0.938	0.859	0.875	1.46	0.435	1.62	1.5	1.33	0.796	0.88	0.743	0.447	0.85
Chromium	32.8	10.1	39.6	30.6	34.8	14.2	55.5	99.6	78.1	56.1	128	76.5	173	40.4	29.4	31.8	82.5	292	273	155	49.2	52.8
Copper	22.9	13	25.9	11.9	12.7	38.9	23.3	24.8	48.1	318	63	37.8	35.9	13	20.1	50.9	19.7	14	40.2	21.5	37.5	40.8
Lead	23.5	15.9	32.1	28	26.2	74.3	48.1	787	123	69.7	112	91.2	76.2	33.9	93.2	120	66	42.7	55	59.7	39.2	94
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.171	0.14	1.4	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14
Nickel	36.1	35	37.5	38.7	34.8	25.1	17.4	10.9	19.3	41.8	12.7	33.7	13.9	9.4	10.7	15.1	14	7.67	11.4	18.7	8.43	16.4
Selenium	1	1.24	1.32	1	1	2.59	2.2	5.95	3.21	2.59	3.58	16.1	10	2.17	3.16	3.24	2.74	10	10.4	10	4.13	2.67
Vanadium	52.7	25.6	59.5	51.8	58.2	50.7	99.7	185	242	116	156	117	305	56.5	77.1	55.6	108	486	537	297	141	105
Zinc	90.7	74.2	115	111	116	145	187	165	336	251	238	225	262	126	253	320	179	149	113	134	100	260
TPH Criteria Working Group (TPH CWG)																						
Benzene																						
Toluene																						
Ethylbenzene																						
sum of detected mpo xylene by GC																						
Aliphatics >C5-C6	0.04	0.0472	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.0779	0.04	0.04	0.04	0.04	0.04	0.0415	0.04	0.061	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	1.43	0.04	0.04	0.04	0.04	0.04	0.0501	0.04	1.14	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0515	0.04
Aliphatics >C10-C12	0.04	17.8	0.04	0.04	0.04	0.04	0.04	0.166	0.04	0.306	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.196	0.04
Aliphatics >C12-C16	0.1	997	0.1	0.1	0.1	1.03	6.54	1.79	7.62	5.97	4.1	5.36	5.04	4.02	4.14	4.7	2.4	87.9	1.19	7.85	5.17	3.1
Aliphatics >C16-C21	0.1	709	0.1	0.157	0.1	4.82	22.2	8.96	32.6	24.8	19	19.7	23.8	16.7	16.7	17.9	8.71	279	20.8	32.5	6.64	15.9
Aliphatics >C21-C35	1.49	176	7.22	1.02	7.71	85.7	115	52.7	171	149	126	93.4	238	93.5	62.8	79.5	34.7	859	166	199	10.3	82.8
Aliphatics >C35-C44	0.1	13.2	0.1	0.1	1.33	18.4	70.3	14.4	54.4	45.6	45.5	26.7	207	31.8	22.3	47.9	9.45	145	42	58.1	1.4	21.3
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.953	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.764	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	11.8	0.04	0.04	0.04	0.04	0.04	0.111	0.04	0.203	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.13	0.04
Aromatics >EC12-EC16	0.1	188	0.1	1.66	0.1	1.49	2.18	1.19	4	3.18	1.71	0.1	2.3	1.31	1.31	0.1	1.81	8.1	1.41	1.22	1.25	1.24
Aromatics >EC16-EC21	0.1	295	0.1	1.59	0.1	4.28	11.7	4.98	17.3	14.4	11.7	0.1	14.5	7.14	5.19	0.1	5.32	48.8	10.3	10.2	3.94	8.34
Aromatics >EC21-EC35	8.52	82	13	3.74	2.6	40.3	72.9	34.7	86.1	92.1	66.8	18.7	162	48.7	31.6	3.69	26.3	192	82.3	103	5.48	48.6
Aromatics >EC35-EC44	3.11	15.8	1.44	0.636	5.21	15.2	87.2	15.5	39	37.9	39.2	10	156	25	17.4	7.58	13.6	115	42	76	1.87	23.4
Aromatics >EC40-EC44	1.13	6.58	0.1	0.1	2.21	5.04	42.1	6.15	15.9	15.6	16	2.72	67.3	9.93	6.93	3.38	5.43	47.9	16.1	29.3	0.1	9.51
Polyaromatic Hydrocarbons (PAHs)																						
Acenaphthylene	12	12	12	12	12	12	13.8	12	14.6	12	31.3	60	60	24	12	12	19.7	60	12	60	12	22.1
Acenaphthene	8	8	8	8	8	12.3	22	13.2	79.4	22.7	28.7	40	47.7	53.8	11.3	8	23.2	40	19.3	55.5	19.8	41.6
Anthracene	16	16	16	16	16	22.7	80.7	53.3	290	81.3	104	80	141	87.8	34.9	28.2	110	80	50.8	112	28.8	140
Benz(a)anthracene	14	28.3	14	14	14	86.5	251	165	386	293	473	111	290	280	163	116	726	230	466	662	101	571
Benzo(a)pyrene	15	15	15	15	15	74.6	223	170	273	212	523	117	249	249	193	122	412	179	531	748	78.6	465
Benzo(b)fluoranthene	15	39.7	15	15	15	162	447	278	529	352	875	161	459	449	310	237	908	408	894	1270	183	666
Benzo(k)fluoranthene	14	14	14	14	14	58.9	173	89.6	192	99.8	286	70	153	142	95.3	102	442	137	312	369	50.4	253
Benzo(g,h,i)perylene	24	24	24	24	24	75	214	152	230	152	431	120	226	248	202	142	369	228	487	711	61.1	303
Chrysene	10	36.2	10	10	10	111	281	196	448	301	519	141	298	313	193	160	934	319	625	816	133	569
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	44.6	33.5	44	40.7	95	0.115	0.115	0.046	31.7	26.6	78.4	0.115	73.5	0.115	0.023	83.1
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	0.018	0.018	53.7	161	120	259	144	333	90	250	165	157	129	388	179	341	535	65.8	324
Fluoranthene	0.017	110	0.017	0.017	0.017	146	430	308	1280	498	781	228	677	522	302	183	1910	564	1000	1390	239	1020
Fluorene	10	10	10	10	10	19.5	17.9	12.9	50	21.7	30.7	50	50	30.3	10	10	13.9	50	10	50	19.5	53
Naphthalene	9	9	9	9	9	30.2	77.7	48.1	77.4	54	74.4	45	75.5	72.7	47.2	23.5	37.4	45	18.3	53.4	36.5	79.6
Phenanthrene	15	15	15	15	15	104	238	215	1560	367	329	130	512	424	172	124	762	207	349	621	152	573
Pyrene	0.015	0.0951	0.015	0.015	0.015	0.132	0.392	0.292	1.07	0.437	0.802	0.246	0.621	0.5	0.299	0.17	1.44	0.516	0.921	1.46	0.21	0.961
PAH, Total Detected USEPA 16	0.118	0.309	0.118	0.118	0.118	1.09	3.07	2.15	6.78	3.08	5.72	1.13	4	3.54	2.21	1.56	8.58	2.97	6.09	8.81	1.38	6.12
Naphthalene-d8 % recovery**	91.1	101	101	92.8	76.7	102	104	102	89.1	93.6	95.9	89.9	80.8	106	89.3	85.1	88.8	92.2	92.8	93.6	97.2	87.3
Acenaphthene-d10 % recovery**	89.4	104	87.6	88.8	77.6	93.9	94.6	91.5	92.3	95.7	83.9	82.3	83.9	91.7	89.6	86.6	89.5	93.1	94.6	91.5	93	91.2
Phenanthrene-d10 % recovery**	90	95	76.2	89.5	84.4	85.8	94.4	84.1	94.8	99.5	87.2	87.2	87.2	87.5	90.7	88.7	86.8	93.7	95.7	92.9	92.6	96.7
Chrysene-d12 % recovery**	86.6	90.6	98.2	91.4	85.4	97	100	86.9	79.8	107	94.3	77.1	71.4	96.8	82.6	85.3	91.4	84.5	86.5	84.1	96.7	105
Perylene-d12 % recovery**	88.1	97	99.7	94	81.3	98.9	103	87.7	74.2	93.3	96.4	76.5	70.7	100	81.8	85	91.6	86	88	78.6	95.3	93.3
Total Aliphatics >C12-C44	1.49	1890	7.22	1.18	9.04	110	214	77.9	266	225	195	145	473	146	106	150	55.3	1370	230	297	23.5	123
Total Aromatics >EC12-EC44	11.6	581	14.5	7.63	7.81	61.2	174	56.4	146	148	119	28.7	335	82.2	55.5	11.3	47.1	365	136	190	12.5	81.6
Total Aliphatics & Aromatics >C5-C44	13.1	2510	21.7	8.82	16.8	171	388	135	412	375	314	174	808	228	162	161	102	1740	366	488	36.4	205
Metals - (Solid)																						
Iron	37800	14700	26900	30300	34700	43300	53600	46200	59700	35100	55400	55100	70400	24300	36400	43700	22600	144000	148000	98900	37500	48300
Manganese	465	406	243	414	594	2420	4150	9740	6780	4160	8740	43500	12900	3390	4720	4710	6990	21900	28100	15900	6650	4780
Metals - (Liquid)																						
Calcium	140000	-	-	161000	-	198000	-	207000	-	100000	-	-	-	-	-	116000	-	163000	-	-	141000	-
Magnesium	13400	-	-	36300	-	36200	-	28600	-	16800	-	-	-	-	-	16200	-	22000	-	-	20700	-
Phenols																						
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.0112	0.01	0.01	0.0112
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0219	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																						
Soluble Sulphate 2:1 extract as SO4 BRE																						
pH																						
Sulphate, Total																						
Sulphur, Total																						
Sulphate, Total potentia																						
Sulphate, acid soluble (total)																						
Cyanide, Total																						
Exchangeable Ammonia as N																						
Asbestos																						
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	21/06/2018	-	-	18/06/2018	-	15/06/2018	-	15/06/2018	-	-	-	-	-	-	-	02/07/2018	-	02/07/2018	-	-	29/06/2018	-
Analysed By	Lucy Caroe	-	-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	-	-	-	-	-	-	James Richards	-	James Richards	-	-	Lucy Caroe	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																						
Analysts Comments																						
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Detected	-	Not Detected	-	-	Detected	-
Amosite (Brown) Asbestos	Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-
Comments	Soil containing material typical of AIE	-	-	0	-	0	-	0	-	-	-	-	-	-	-	Fibre bundles in soi	-	0	-	-	Loose fibres in soi	-
Volatile Organic Compounds (VOCs)																						
Dibromofluoromethane**	106	106	104	104	111	109	108	103	107	106	112	103	108	110	112	109	106	107	111	109	101	104
Toluene-d8**	95.5	95	97.2	98.2	96.8	95.7	93.2	95.5	97	98.3	98.6	96.1	88.1	94.7	97.2	96.7	97.2	98.3	95.6	98.4	88.2	99.4
4-Bromofluorobenzene**	92	93.2	95.1	93.6	94.1	91.4	92.2	94.4	93.4	94.7	92	96.6	80.5	90.6	99.8	88.1	89.7	90.4	85	95.5	70.1	98.2
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.147	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																						
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.56	1.08	1.22	1.14	1.13	1.09	1.12
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.24	8.91	8.99	8.46	9.77	9.61	9.79
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.75	9.9	10.1	9.5	10.8	10.6	10.8

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances	40AO28	40AO14V	40AO16V	40AO17V	40AO25V	40AO28V	40AP10	40AP10	40AP10	40AP10	40AP11	40AP11	40AP11	40AP11	40AP13	40AP13	40AP13	40AP15
													0.7	0.700.70	3.603.60	4.004.00	3.003.00	1	0.500.50	1.001.00	1.701.70	2.302.30	0.500.50	1.001.00	1.501.50	2.002.00	0.400.40	1.001.00	1.501.50	0.500.50
													30/05/2018	14/06/2018	14/06/2018	14/06/2018	06/06/2018	30/05/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018
Carbon																														
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00	7.29	4.38	64.1	10.8	6.4	5.86	3.43	3.29	2.12	3.72	3.78	1.79	1.17	1.18	1.07	3.83	2.57	12.3
Metals (Solids)																														
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51	15.5	12.9	5.55	20.9	13.5	9.9	14.8	10.1	11.9	9.67	9.21	8.34	9.62	14.1	8.3	11.2	8.85	10.4
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30	0.52	0.466	0.236	0.74	0.451	0.841	1.83	1.02	0.726	2.53	2.03	0.23	0.51	1.15	0.24	0.342	1.09	0.647
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14	39.9	30.4	15.6	33.8	32.5	48.1	137	66.5	56.1	115	71.5	96.7	127	16.5	3.83	8.37	77.4	54.9
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00	33	17.8	30.9	25.8	17.7	22	28.5	34	29.1	36.4	24.5	17.7	23.3	23.7	8.5	24.9	27.9	31.3
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26	38.8	29.6	7.14	50.3	38.1	98.1	208	97.8	90.3	110	150	38.5	49.4	95.5	14.4	16.6	67.8	57.2
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05	33.2	38	20.4	27.6	25.4	16.2	19.5	16.7	16.5	26.2	18	11.9	17.4	19.2	7.48	19.1	14.8	17
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77	1.48	1	2.58	1.29	1	3.28	10	3.15	2.65	10	10	4.03	6.25	2.38	1	1.41	3.4	2.83
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00	63.5	51.4	32.1	53.6	51.6	80.9	162	88.4	94.7	163	127	129	102	37.8	8.59	16.9	139	71.2
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49	128	117	62.4	154	135	281	296	297	251	467	512	191	265	252	22.3	58.2	470	233
TPH Criteria Working Group (TPH CWG)																														
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00																		
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00																		
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00																		
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00																		
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0459	0.04	0.01	0.04	0.0433	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0885	0.04	0.01	0.04	0.0682	0.04	0.0547	0.04	0.04	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00	0.04	0.04	0.04	0.049	0.04	0.0613	0.04	0.04	0.327	0.04	0.01	0.0515	0.0573	0.0699	0.137	0.0757	0.04	0.0941
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00	0.718	0.1	0.1	0.854	0.1	12	11.5	10.2	21.7	4.96	4.44	4.91	4.81	5.19	1.08	1.41	6.03	6.68
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00	0.712	0.1	0.1	0.1	0.1	23.5	32.5	31.1	50.1	18.7	17.4	18.8	17.5	14.2	2.52	2.73	35.3	28.9
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00	5.04	0.1	78.1	6	9.07	105	134	139	131	91.1	102	93	82.1	66.6	12.7	8.91	106	86.1
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00	0.1	0.1	0.1	0.1	0.1	41.1	32.2	39	28.7	25.1	29.7	23.9	23.9	22.1	3.5	1.19	20.1	12.7
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.065	0.04	0.01	0.04	0.0509	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00	0.04	0.04	0.04	0.04	0.04	0.0405	0.04	0.04	0.218	0.04	0.01	0.04	0.04	0.0466	0.0905	0.0509	0.04	0.0627
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00	0.267	0.1	0.1	0.277	0.1	4.1	3.47	0.298	30	1.46	1.95	2.49	1.6	1.02	1.8	2.54	1.15	2.96
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00	0.663	0.1	4.12	0.996	1.5	13.8	15.1	8.93	0.1	9.34	11.1	10.4	7.6	4.24	2.69	3.11	9.27	14.1
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00	19	11.6	344	30.2	38.4	78.6	65.5	74.4	86	49.4	58.4	43.3	33.5	21.6	10.3	5.05	39.6	54
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00	3.47	0.1	28.2	3.24	5.86	52.5	35.6	31.9	31.4	23	29.5	22.8	22.7	14.4	4.28	1.21	13.7	19.4
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00	0.1	0.1	9.41	0.1	2	21.6	15.1	11.9	13	9.28	11.9	9.58	10.2	6.2	1.5	0.17	4.91	7.29
Polyaromatic Hydrocarbons (PAHs)																														
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42	12	12	12	12	12	17.9	24.7	37.9	18.1	183	26	12	12	12	12	12	13.5	18.8
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93	8	8	8	8	30.1	60.7	57.1	43.8	51.2	50	26.6	80.4	54.3	8	24.1	8	27.6	20.4
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86	16	16	16	16	16	188	130	158	111	205	93	654	89.7	16	130	16	57.7	50.2
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56	14	14	14	44.4	23.4	650	492	867	378	1450	563	1160	206	23.2	1060	14	284	288
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81	15	15	15	46	15	739	425	769	308	1750	435	736	165	21.2	839	15	295	284
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77	15	15	15	111	38.2	1080	738	1300	536	2410	706	939	228	39.3	890	15	484	423
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77	14	14	14	29.2	14	335	235	411	165	766	266	395	100	14	455	14	160	134
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07	24	24	24	24	24	630	342	676	262	1210	355	457	127	24	431	24	260	229
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79	10	10	10	72.4	26.9	612	572	790	371	1410	580	1080	216	30.3	865	21.2	300	319
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23	0.023	0.023	0.023	0.023	0.023	107	80.8	163	61	223	68.4	117	0.023	0.023	179	0.023	63.5	47
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37	0.018	0.018	0.018	51	0.018	648	348	501	204	1320	416	570	150	24.1	428	0.018	268	194
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23	0.017	0.017	0.017	108	51.7	1110	812	1120	658	1630	672	3030	549	33.5	1100	0.017	488	500
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09	10	10	10	10	10	55.1	45	45.9	38.9	47.2	18.6	142	27	10	41	10	25.2	21.4
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51	9	9	9	9	39.7	66.5	107	113	105	107	77.1	86.7	74	9	23.9	34.9	80.3	47.2
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56	15	15	15	71.5	35.7	607	574	540	498	609	295	2310	470	29	498	93.1	314	266
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00	0.015	0.015	0.015	0.0862	0.0415	1.16	1.06	1.69	0.997	2.17	1.32	2.37	0.503	0.0356	0.83	0.015	0.564	0.527
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00	0.118	0.118	0.118	0.619	0.287	8.06	6.05	9.23	4.76	15.5	5.91	14.1	2.96	0.236	7.79	0.149	3.68	3.37
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00	102	85.9	106	95.6	89.3	96.7	93.7	86.7	89.2	95.1	98.8	93.5	93.1	88.8	94.8	85.9	86.3	98
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00	92.1	84.8	94.9	88.6	92.1	96.6	105	91.6	99.2	97.8	101	95.4	101	92.4	93.5	84.5	91.5	88.9
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00	85.6	89.9	90.2	91.9	95.2	97	116	105	108	97.8	100	96.6	103	93.4	97.9	83.7	95.7	87.8
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00	97.5	99.7	98.5	92.3	82.1	89.3	101	83.7	86.4	88.9	93.6	91.6	83.8	78	113	72.9	75.3	104
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00	104	90.2	102	91.8	82.8	91.5	101	85.9	89.3	88.2	92.6	90.6	82.6	72.6	101	75.1	75	104
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00	6.47	0.1	78.1	6.85	9.07	181	210	219	232	140	154	141	128	108	19.8	14.2	167	134
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00	23.3	11.6	376	34.7	45.8	149	120	116	147	83.2	101	79	65.5	41.2	19.1	11.9	63.6	90.5
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00	29.8	11.6	454	41.6	54.9	330	330	335	380	223	255	220	194	149	39.2	26.3	231	225
Metals - (Solid)																														
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00			26100	33500	9170	18600	28600	53300	88500	57500	89100	91100	108000	69000	67100	54500	6400	16100	48500	28600
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00			351	340	388	356	297	6230	9120	6100	5070	11000	6690	9660	18100	3910	319	484	6810	3040
Metals - (Liquid)																														
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00			169000	-	284000	49400	-	91300	145000	-	-	-	-	-	203000	86800	-	151000	161000	-
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00			28600	-	5290	16300	-	12100	15600	-	-	-	-	-	12400	11500	-	20600	16800	-
Phenols																														
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00	0.0433	0.01	0.01	0.01	0.01	0.01	0.0222	0.0109	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.522	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0116	0.01	0.0232	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.186	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00	0.0433	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.731	0.035	0.035
Inorganics																														
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55																		
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93																		
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00																			
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55																		
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55																		
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55																		
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00																		
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00																		
Asbestos																														
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		430	0	0					0.00		02/07/2018	-	21/06/2018	21/06/2018	-	20/06/2018	21/06/2018	-	-	-	-	-	21/06/2018	21/06/2018	-	15/06/2018	15/06/2018	-
Analysed By	TM048	No units		430	0	0					0.00		Marcin Magdziarek	-	James Richards	Marcin Magdziarek	-	Barbara Urbanek-Walsh	Marcin Magdziarek	-	-	-	-	-	James Richards	Andrzej Ferfecki	-	Renata Bozhkov	Renata Bozhkov	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00																			
Analysts Comments	TM304	No units		83	0	0					0.00																			
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00		Detected	-	Not Detected	Not Detected	-	Detected	Detected	-	-	-	-	-	Detected	Not Detected	-	Trace	Not Detected	-
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00		Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Comments	TM048	No units		430	0	0			0.00	0.00	0.00		Loose fibre in soi	-	0	0	-	Loose fibres in soil	Loose fibres in soi	-	-	-	-	-	Soil containing material typical of asbestos cement debri	0	-	Loose fibres in soi	0	-
Volatile Organic Compounds (VOCs)																														
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00		108	116	117	111	106	118	111	114	108	112	110	115	112	124	108	105	105	105
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00		100	99.8	99.8	99.1	98.6	97.7	95.3	88.9	96	98.7	88.7	94.3	96.8	96.3	99.5	97.8	96.9	98.2
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00		95.7	93.7	96.3	92.9	93.9	94.8	88.2	74	87.3	105	75.7	83.8	92.9	93.5	92.9	96.4	94.6	98.8
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																														
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00		0.5	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00		0.5	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00		0.5	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00		0.5	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00		1.08	-	-	-	-	-	-	-	1.98	1.52	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00		9.31	-	-	-	-	-	-	-	33.9	33	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00		10.3	-	-	-	-	-	-	-	35.2	34	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40AP15	40AP15	40AP15	40AP10V	40AP11V	40AP13V	40AP15V	40AQ18	40AQ20	40AQ20	40AQ21
	1.001.00	2.002.00	3.003.00	2.602.60	2.402.40	2.002.00	4.204.20	0.200.20	0.800.80	1.501.50	1.501.50
	14/06/2018	14/06/2018	14/06/2018	22/06/2018	22/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	07/06/2018
Carbon											
Soil Organic Matter (SOM)	3.83	4.38	5.03	5.26	46	58.6	0.469	3.19	2.83	2.74	2.43
Metals (Solids)											
Arsenic	7.48	8.11	11.5	12.6	31.2	11	6.84	10.6	6.77	10.7	5.97
Cadmium	0.465	0.528	0.02	0.02	0.58	0.266	0.485	0.384	0.229	0.326	0.448
Chromium	33	24.8	33.3	37.2	13.4	12.7	25.8	27.8	9.45	51	283
Copper	18.2	24.7	24.3	26.2	34.1	17.1	10.1	22.2	42	18	17.8
Lead	30.6	45.5	25.1	30.9	9.86	9.55	21.2	25.9	28.5	19.9	47
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	14.3	16.8	31	34.6	57.9	26.1	7.78	18.5	33.1	12.9	12.4
Selenium	1.59	2.57	1	1	3.26	2.91	1	2.46	1.17	2.31	7.35
Vanadium	58.7	48.6	52	55.3	49.1	28.6	43.1	80.9	28	44.5	248
Zinc	83.4	140	113	115	75.8	27.6	79.7	53.8	102	46.6	238
TPH Criteria Working Group (TPH CWG)											
Benzene											
Toluene											
Ethylbenzene											
sum of detected mpo xylene by GC											
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.0479	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.106	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.0888	0.384	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	8.37	10.8	0.1	0.1	0.1	0.1	6.19	0.863	0.1	0.1	8.26
Aliphatics >C16-C21	66.8	107	0.1	0.1	2.56	5.8	23.6	3.58	1.44	4.48	20.8
Aliphatics >C21-C35	1820	3220	11	7.04	133	201	60.9	20.3	1.53	24.4	134
Aliphatics >C35-C44	632	841	0.1	0.1	3.4	46.9	9.35	3.25	0.1	2.81	32.2
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.0718	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.0599	0.256	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	6.42	9.3	0.1	0.1	2.71	0.1	1.77	1.34	0.1	1.14	1.5
Aromatics >EC16-EC21	22.2	32.1	0.1	0.555	6.96	10.4	7.06	3.11	0.7	3.87	10.7
Aromatics >EC21-EC35	412	732	41.4	29.2	304	253	21.4	21.4	0.1	11.1	46.2
Aromatics >EC35-EC44	383	239	10.6	8.8	25.8	59.7	5.15	3.61	0.1	1.38	16.3
Aromatics >EC40-EC44	173	65.8	3.52	3.31	7.36	23	1.69	0.1	0.1	0.1	6.42
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	12	12	12	12	12	12	12	12	12	12	12
Acenaphthene	21.7	89.2	8	8	8	8	8	8	8	11.1	10.8
Anthracene	19.5	137	16	16	16	16	16	16	16	16	64.3
Benz(a)anthracene	101	396	14	14	14	14	31.4	14	14	26.1	545
Benzo(a)pyrene	117	330	15	15	15	15	21.6	15	15	20	340
Benzo(b)fluoranthene	137	407	15	15	15	15	35.7	32.7	15	27.6	377
Benzo(k)fluoranthene	66.7	180	14	14	14	14	14	14	14	14	202
Benzo(g,h,i)perylene	135	216	24	24	24	24	24	24	24	24	215
Chrysene	110	388	10	10	10	10	38.1	25.2	20.3	29.6	477
Dibenzo(a,h)anthracene	0.023	43.4	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	46.2
Indeno(1,2,3-cd)pyrene	104	195	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	188
Fluoranthene	185	857	0.017	0.017	0.017	0.017	75.6	30.9	29	70.2	1180
Fluorene	29.4	81.2	10	10	10	10	10	10	14	11.6	11.5
Naphthalene	44.5	65.6	9	9	9	9	15.1	13	36.4	15.5	24.9
Phenanthrene	182	868	15	15	15	15	90.6	53	117	62.7	122
Pyrene	0.176	0.751	0.015	0.015	0.015	0.015	0.0557	0.0275	0.015	0.0639	1.42
PAH, Total Detected USEPA 16	1.43	5.01	0.118	0.118	0.118	0.118	0.364	0.182	0.216	0.338	5.22
Naphthalene-d8 % recovery**	89.9	91.5	93.7	92.4	92.1	99.7	94.1	83.8	92.9	92	88.3
Acenaphthene-d10 % recovery**	90.1	91	91.1	87.2	95.4	97.3	92.4	88.4	87.3	91.7	86.3
Phenanthrene-d10 % recovery**	85.7	99.5	91.4	88.1	100	98	97.3	95.1	89.1	93	92
Chrysene-d12 % recovery**	91	108	91.6	86.4	82.8	97.9	107	78.3	84	89.5	91.5
Perylene-d12 % recovery**	94	90.6	90.8	85.9	74.6	99.1	94.6	77	82.3	93.7	92.5
Total Aliphatics >C12-C44	2530	4180	11	7.04	139	254	100	28	2.96	31.7	196
Total Aromatics >EC12-EC44	823	1010	52.1	38.5	339	323	35.3	29.5	0.7	17.5	74.7
Total Aliphatics & Aromatics >C5-C44	3350	5190	63.1	45.6	478	577	135	57.5	3.66	49.2	270
Metals - (Solid)											
Iron	24300	21600	30700	27600	27800	20300	55000	31000	24000	18100	53300
Manganese	3810	1990	280	261	390	428	2490	2300	535	4000	19300
Metals - (Liquid)											
Calcium	188000	-	252000	-	255000	-	-	-	-	-	155000
Magnesium	21500	-	6760	-	7470	-	-	-	-	-	17500
Phenols											
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0264	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.176	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.176	0.035	0.035	0.035	0.035
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE											
pH											
Sulphate, Total											
Sulphur, Total											
Sulphate, Total potentia											
Sulphate, acid soluble (total)											
Cyanide, Total											
Exchangeable Ammonia as N											
Asbestos											
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	15/06/2018	-	18/06/2018	-	18/06/2018	-	-	-	-	-	29/06/2018
Analysed By	Renata Bozhkov	-	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	-	-	-	-	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)											
Analysts Comments											
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Detected
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected
Comments	0	-	0	-	0	-	-	-	-	-	Fibre bundles in soi
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	109	109	98.9	99.6	8.9	118	107	105	103	108	109
Toluene-d8**	97.7	97.2	97.9	97.8	94.9	100	95.4	92.5	97.2	97.7	98.1
4-Bromofluorobenzene**	95	95.9	97	97.5	98.7	97	81.7	81.9	98.9	97.2	93.9
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	0.5
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	0.5
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	0.5
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	0.5
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	1.05
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	6.72
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	7.7

Determinand	40AQ24	40AQ24	40AQ24	40AQ27	40AQ27	40AQ27	40AQ27	40AQ18V	40AQ20V	40AQ21V	40AQ24V
	0.500.50	1.001.00	2.002.00	0.200.20	0.700.70	1.201.20	1.901.90	0.300.30	1.801.80	3.003.00	2.102.10
	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	14/06/2018	14/06/2018	07/06/2018	06/06/2018
Carbon											
Soil Organic Matter (SOM)	1.47	6.36	1.6	0.35	0.35	0.35	3.53	26.4	81.2	1.68	1.41
Metals (Solids)											
Arsenic	5.37	8.15	9.48	6	6.7	6	8.79	14.9	3.64	9.48	12.8
Cadmium	0.573	0.547	0.732	0.657	0.401	0.443	0.424	0.378	0.0904	0.251	0.208
Chromium	155	162	266	416	466	468	60.6	29.6	5.01	43.8	32.8
Copper	17.6	30.2	18.5	14.9	14	14	54.2	30.9	8.31	15.2	13.6
Lead	34.5	67.7	45.7	14.4	16.1	19.2	42.2	16.7	2.2	30.4	25.6
Mercury	0.14	0.14	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14
Nickel	10.3	12.4	18.4	5.34	2.99	2	52.8	34.9	9.48	39.7	40.3
Selenium	6.13	6.97	10	12.4	14.2	13.7	1.61	2.74	1.88	1.26	1
Vanadium	276	237	444	965	929	1020	59.8	49.1	10.4	72.2	57.8
Zinc	171	416	131	36.2	24	33.9	1270	53.9	9.1	116	104
TPH Criteria Working Group (TPH CWG)											
Benzene											
Toluene											
Ethylbenzene											
sum of detected mpo xylene by GC											
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.103	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0814	0.04	0.04	0.04
Aliphatics >C10-C12	0.0644	0.04	0.04	0.04	0.04	0.04	0.04	0.0902	0.04	0.04	0.04
Aliphatics >C12-C16	8.23	5.08	0.407	10.7	4.53	1.27	0.1	0.873	1.05	0.1	0.166
Aliphatics >C16-C21	25.6	17.1	4.81	20.9	13.9	3.01	0.1	2.09	0.952	0.335	0.1
Aliphatics >C21-C35	231	146	69	67.1	63.8	29.4	0.1	53	70.5	7.84	0.449
Aliphatics >C35-C44	50.5	35.9	29.8	13.7	9.08	13.8	0.1	0.1	0.353	0.63	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.055	0.151	0.04	0.04
Aromatics >EC10-EC12	0.0433	0.04	0.04	0.04	0.04	0.04	0.04	0.0594	0.04	0.04	0.04
Aromatics >EC12-EC16	2.36	1.07	0.558	0.1	0.1	0.1	0.1	0.1	0.493	0.1	0.1
Aromatics >EC16-EC21	18	7.21	5.47	3.56	0.814	1.21	0.1	7.02	3.54	0.602	0.1
Aromatics >EC21-EC35	92.2	57.9	61.9	5.76	1.36	26.6	0.1	178	445	2.74	1.17
Aromatics >EC35-EC44	49.1	29.9	45.9	0.1	0.565	23.2	0.1	19.8	14.1	0.41	0.834
Aromatics >EC40-EC44	18.9	12.3	17.8	0.1	0.1	9.38	0.1	3.82	0.1	0.1	0.21
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	12	12	13.3	12	12	12	12	12	24	12	12
Acenaphthene	8	12.6	8	35.2	78.2	8	8	8	16	14.9	8
Anthracene	16	100	51.6	45.7	154	16	16	16	32	29	16
Benz(a)anthracene	108	342	422	387	322	54.7	14	14	0.028	63.9	14
Benzo(a)pyrene	77.6	329	310	178	161	50.9	15	15	1210	55.7	15
Benzo(b)fluoranthene	133	453	628	416	267	86	15	15	3	86.5	15
Benzo(k)fluoranthene	57.1	246	294	178	111	27.7	14	14	0.028	28.9	14
Benzo(g,h,i)perylene	69.4	280	291	163	110	48.2	24	24	<0.048	50.2	24
Chrysene	130	360	482	441	283	62.8	10	10	0.02	70.4	10
Dibenzo(a,h)anthracene	0.023	55.7	60.2	38	28.1	0.023	0.023	0.023	0.046	0.023	0.023
Indeno(1,2,3-cd)pyrene	62.3	237	302	187	117	42.6	0.018	0.018	0.036	38	0.018
Fluoranthene	131	422	680	830	1070	180	0.017	0.017	0.034	174	0.017
Fluorene	10	15	10	10	13.8	10	10	10	0.02	10	10
Naphthalene	32.6	44.4	16.5	14.2	49	9	9	24.1	0.018	17.4	19.7
Phenanthrene	65.9	217	282	525	471	229	15	15	3	143	15
Pyrene	0.282	0.6	0.618	0.742	0.883	0.144	0.015	0.015	0.03	0.179	0.015
PAH, Total Detected USEPA 16	1.15	3.71	4.45	4.18	4.12	0.926	0.118	0.118	1.21	0.951	0.118
Naphthalene-d8 % recovery**	92.4	91.4	88.2	87.1	90.3	89.8	80.6	97.1	96.8	90.4	87.5
Acenaphthene-d10 % recovery**	90.8	89.3	89.3	88.1	94.8	93.5	83.2	95.6	97.1	86.6	57.4
Phenanthrene-d10 % recovery**	93.1	91.5	92.2	84.5	99.2	98.2	90.1	94.7	99.5	89.4	94.3
Chrysene-d12 % recovery**	88.4	86.7	95.3	89.3	94.7	90	89.4	87.8	109	89.3	93.1
Perylene-d12 % recovery**	93.9	91.1	97.2	93.1	90.5	84.7	92.9	88.1	107	95.4	88.6
Total Aliphatics >C12-C44	315	204	104	112	91.3	47.4	0.1	55.9	72.9	8.81	0.615
Total Aromatics >EC12-EC44	162	96.2	114	9.32	2.74	51	0.1	205	463	3.75	2.01
Total Aliphatics & Aromatics >C5-C44	477	300	218	122	94	98.4	0.1	261	536	12.6	2.62
Metals - (Solid)											
Iron	66100	91600	160000	177000	214000	226000	35900	17300	7950	32300	30600
Manganese	15600	18200	25300	37600	39000	14.2	489	180	308	763	697
Metals - (Liquid)											
Calcium	-	83400	255000	-	169000	-	161000	-	-	-	-
Magnesium	-	7980	17700	-	41300	-	12900	-	-	-	-
Phenols											
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE											
pH											
Sulphate, Total											
Sulphur, Total											
Sulphate, Total potentia											
Sulphate, acid soluble (total)											
Cyanide, Total											
Exchangeable Ammonia as N											
Asbestos											
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	29/06/2018	20/06/2018	-	15/06/2018	-	18/06/2018	-	-	-	-
Analysed By	-	Andrzej Ferfecki	Barbara Urbanek-Walsh	-	Renata Bozhkov	-	Barbara Urbanek-Walsh	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)											
Analysts Comments											
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Amosite (Brown) Asbestos	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Fibrous Anthophyllite	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Fibrous Tremolite	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Fibrous Actinolite	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Non-Asbestos Fibre	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-
Comments	-	0	0	-	0	-	0	-	-	-	-
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	112	107	116	113	113	123	106	110	108	103	110
Toluene-d8**	99.2	99.6	98.9	97.4	95.9	97.6	97.1	99.1	99.6	89.9	97
4-Bromofluorobenzene**	93.5	99.7	95.1	92.5	95.5	95	96.2	102	98.7	70.1	96.8
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d	0.5	0.5	-	-	-	-	-	0.5	-	-	-
Gross Calorific Value Original Q(V/gr/ar	0.5	0.5	-	-	-	-	-	0.5	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	0.5	0.5	-	-	-	-	-	0.5	-	-	-
Net Calorific Value in Original Q(V/net/ar	0.5	0.5	-	-	-	-	-	0.5	-	-	-
Water Analytical M (ad)	0.6	0.5	-	-	-	-	-	1.53	-	-	-
Water Gross M(ex)	12.6	15.2	-	-	-	-	-	37.4	-	-	-
Water Total M(ar)	13.2	15.2	-	-	-	-	-	38.4	-	-	-

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances	40AQ27V	40AR11	40AR11	40AR11	40AR16	40AR16	40AR21	40AR25	40AR25	40AR11V	40AR13V	40AR16V	40AR21V	40AR25V	40AS12	40AS12	40AS18	40AS18	40AS18	40AS27	40AS27
													2.002.00	0.500.50	1.001.00	1.701.70	0.500.50	1.001.00	0.500.50	0.500.50	1.001.00	2.302.30	0.200.20	1.401.40	0.700.70	1.301.30	0.500.50	1.001.00	0.500.50	1.001.00	2.002.00	0.200.20	0.700.70
													06/06/2018	22/06/2018	22/06/2018	22/06/2018	14/06/2018	14/06/2018	07/06/2018	06/06/2018	06/06/2018	22/06/2018	14/06/2018	14/06/2018	07/06/2018	06/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	06/06/2018	06/06/2018
Carbon																																	
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00	2.33	1.5	0.379	2.1	2.53	0.893	1.57	0.872	7.48	1.7	50.2	1.11	1.17	4.69	2.21	2.1	3.91	1.18	1.81	1.95	11.2
Metals (Solids)																																	
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51	7.81	5.9	9.65	6.68	11.3	7.37	8.82	6.74	17.5	8.9	14.2	12.6	9.82	10.2	6.82	7.27	45.1	15.5	2.74	3.67	18.3
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30	0.69	0.409	0.322	0.743	1.5	0.471	0.804	0.242	0.02	0.229	0.281	0.21	0.245	0.399	0.336	0.221	1.84	0.998	0.253	0.263	0.757
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14	57	63.6	8.18	91.6	222	36.9	124	52.3	35.8	37.9	11	30.3	31.7	10.7	0.989	35.9	24.2	9	105	50.1	40.9
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00	15.2	6.34	5.73	19.6	75.3	18	49.8	21.2	24.3	15.6	17.5	11.6	12.7	22.9	9.21	23.8	18.5	14	8.66	12.9	29.6
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26	58.4	20.9	13.1	49.4	91.4	45.9	61.2	17.9	37.3	29.5	6.62	28.4	28.4	25.5	13.1	24.9	34.8	40.6	11.7	14.8	49.8
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05	16.2	6.99	9.06	12	65.7	12.4	21.4	8.1	29	42	30.7	38.1	37.7	44.6	10.2	13.9	18.3	18.8	7.21	10.9	30.9
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77	3.71	3.53	1.79	5.2	10	1.83	10	4.75	1	1	1.98	1	1.13	1.45	1	5.3	2.53	10	5.06	4.38	1.5
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00	106	137	40	157	329	42.3	183	137	57.6	60.6	28.4	53.2	56.5	35.9	14.2	108	49.2	16.5	199	171	70
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49	236	104	126	170	476	144	116	46.7	136	98.3	21.5	111	108	128	31.7	49.9	447	75.4	41	54.9	146
TPH Criteria Working Group (TPH CWG)																																	
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00																					
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00																					
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00																					
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00																					
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00	0.01	0.217	0.0749	0.04	0.04	0.04	0.0472	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0622	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00	0.01	1.19	0.339	0.04	0.04	0.04	0.189	0.04	0.04	0.04	0.04	0.04	0.04	0.0564	0.04	0.0754	0.106	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00	2.39	28.6	7.37	4.19	6	2.7	39.5	15.3	0.1	0.267	0.296	1.31	1.46	3.71	1.93	6.44	14.1	0.573	1.12	0.793	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00	18.9	48.8	23.8	17.2	22.7	10.6	96.7	42.2	0.1	0.355	0.572	1.72	3.33	6.53	2.42	11.3	22.6	1.63	2.28	1.53	0.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00	111	74.7	31.7	153	132	99.3	325	200	3.18	1.36	8.84	1.48	17.4	15.5	3.75	62.8	43.5	17.4	15.6	7.8	2.99
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00	36	26.6	10.9	40.7	41.1	26.4	87.6	27.1	0.1	0.1	5.83	0.1	1.65	4.89	0.1	27.9	11.3	3.57	3.05	0.813	0.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00	0.01	0.145	0.0491	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0531	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00	0.01	0.79	0.226	0.04	0.04	0.04	0.125	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.051	0.0712	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00	0.1	9.08	1.77	2.03	2.68	0.329	0.1	4.11	0.114	0.1	0.188	0.1	0.402	1.77	0.1	2.55	4.99	0.1	0.461	0.1	0.1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00	0.45	20.3	8.69	13.5	19.6	3.46	23.1	18.9	1.2	0.1	4.58	0.425	2.52	4.65	0.1	6.73	10.4	0.466	2.04	0.1	1.22
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00	8.04	45.4	22.9	76.9	107	31.4	59.7	60.5	54.8	2.93	127	0.865	11.2	13.6	0.1	42.3	26.3	8.56	15.3	4.59	25.7
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00	1.37	24.8	14.6	38.4	52.3	17.3	8.16	15.3	17.2	0.677	56.2	5.18	1.95	3.47	0.1	28.1	12.3	3.87	4.34	1.07	2.68
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00	1.06	9.9	5.82	15.4	20.2	8.01	1.76	5.63	7.35	0.1	28.5	3.1	0.1	1.18	0.1	11.3	4.69	1.31	1.33	0.123	0.1
Polyaromatic Hydrocarbons (PAHs)																																	
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42	22.4	12	12	60	21.6	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93	19.5	13.6	13	62.5	25.2	27.6	138	223	8	8	8	8	23.2	8	8	13.4	96.7	8	8	8	8
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86	70.3	33.4	23.1	192	150	32.6	225	269	16	16	16	16	30.4	16	16	20.2	79.7	16	16	16	16
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56	471	73.8	21.9	758	2110	113	913	1070	14	14	14	14	112	21.1	18.5	59.9	72.8	26.1	56.1	71.9	27.2
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81	421	63.1	15	506	1390	91.5	880	1200	15	15	15	15	106	15	15	33.8	45.2	21.3	56.5	67.3	28.2
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77	614	120	27.8	878	2740	183	1240	970	31.1	15	15	15	155	31.8	22.7	95.7	101	37.7	101	111	51.9
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77	222	36.2	14	342	1040	63.2	420	438	14	14	14	14	47.3	14	14	30.3	34.6	14	34.4	34.4	14
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07	360	61.8	24	419	988	84.1	619	719	24	24	24	24	73.6	24	24	34	41.8	24	44.1	53.8	24
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79	458	87.4	24	788	2000	146	944	1000	22.7	10	10	10	124	35.2	27.9	85.6	97.7	28.1	56.2	75.4	36.3
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23	81.7	0.023	0.023	0.115	222	0.023	116	156	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37	326	53.5	0.018	450	794	74.1	566	611	0.018	0.018	0.018	0.018	65.7	0.018	0.018	39.4	44.3	0.018	51.7	55.4	0.018
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23	616	141	58.5	2130	1200	264	1570	2160	33.2	0.017	0.017	0.017	201	36.6	36.5	146	255	39.8	91.8	120	57.2
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09	22.5	14.8	16.3	50	13.4	12.9	79.8	126	10	10	10	10	14.5	10	10	10	96.3	10	10	10	10
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51	63.6	33.4	10.7	87.7	66.6	22	97.4	143	9	9	9	9	23.2	13.6	32	39.7	119	15.5	9	11	9
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56	238	89.4	57.5	858	394	217	832	1210	15	15	15	15	135	58.2	67.7	128	423	45.8	58.1	64.8	35.3
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00	0.874	0.152	0.0592	2.24	4.65	0.261	1.7	2.01	0.015	0.015	0.015	0.015	0.178	0.0283	0.0278	0.131	0.18	0.0335	0.0797	0.0943	0.0445
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00	4.88	0.973	0.312	9.71	17.8	1.59	10.3	12.3	0.118	0.118	0.118	0.118	1.29	0.225	0.233	0.858	1.69	0.248	0.63	0.759	0.281
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00	93.1	89.7	98.7	92.2	102	99.1	88.2	89.7	84.2	91.2	99.6	83.8	87.7	89.3	99.7	86.2	84.1	100	92.1	92.2	87.6
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00	102	101	100	77.2	93.4	95.5	95	92.2	81	91.2	91.9	80.5	90.4	91.4	84.3	88.6	88.1	89.3	89.8	42.4	86.7
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00	121	111	101	97.1	99.2	97.8	98.2	97.2	84.4	99.2	92.2	86.9	94.6	95.1	80.4	94.3	91.8	87.4	91.3	97.7	86.1
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00	99.7	101	97.1	77.4	95.3	101	90.2	86.8	84.9	105	96.3	88.7	92.4	80.4	92.5	78.3	73.4	103	96.9	93.6	79.1
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00	95.7	103	100	79.6	94.7	96.5	85.1	89.8	83.6	91.8	100	89.2	87.6	76.3	92	79.3	71.1	104	95.1	88.3	81.9
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00	168	179	73.7	215	202	139	549	284	3.18	1.99	15.5	4.52	23.8	30.6	8.1	108	91.5	23.2	22	10.9	2.99
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00	9.87	99.6	48	131	182	52.5	91	98.8	73.2	3.6	188	6.47	16	23.4	0.1	79.7	53.9	12.9	22.1	5.66	29.6
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00	178	281	122	346	384	191	641	383	76.4	5.59	203	11	39.9	54.1	8.1	188	146	36.1	44.2	16.6	32.6
Metals - (Solid)																																	
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00			66900	21500	19200	54600	103000	33500	91300	84900	27200	28700	16100	28100	34900	32100	21000	53300	22400	78100	30100	28600	23100
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00			6750	4660	2000	14100	18200	3540	8530	11600	299	293	230	837	739	1560	1260	7520	2750	773	7980	6120	228
Metals - (Liquid)																																	
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00			-	24700	-	144000	-	107000	-	170000	-	-	-	135000	-	114000	-	67000	-	117000	-	121000	-
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00			-	6420	-	17200	-	29600	-	24700	-	-	-	40500	-	27600	-	22400	-	11200	-	18100	-
Phenols																																	
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0318	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0174	0.01	0.01	0.0106	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.022	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0424	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																	
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55																					
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93																					
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00																						
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55																					
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55																					
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55																					
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00																					
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00																					
Asbestos																																	
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		430	0	0					0.00		-	21/06/2018	-	21/06/2018	-	21/06/2018	-	18/06/2018	-	-	-	10/08/2018	-	10/08/2018	-	10/08/2018	-	10/08/2018	-	10/08/2018	-
Analysed By	TM048	No units		430	0	0					0.00		-	Andrzej Ferfecki	-	Andrzej Ferfecki	-	James Richards	-	Marcin Magdziarek	-	-	-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00																						
Analysts Comments	TM304	No units		83	0	0					0.00																						
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Detected	-	Detected	-	Not Detected	-	Trace	-	Not Detected	-
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00		-	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	TM048	No units		430	0	0					0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	TM048	No units		430	0	0					0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00		-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Comments	TM048	No units		430	0	0			0.00	0.00	0.00		-	0	-	loose fibres in soi	-	0	-	0	-	-	-	Loose fibres in soil	-	Soil containing ACM debris.	-	0	-	Loose fibres in soil	-	0	-
Volatile Organic Compounds (VOCs)																																	
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00		110	123	109	115	104	114	109	138	110	111	104	99.5	97.3	98.6	99.7	99.2	102	94.4	92.7	96.4	107
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00		96.8	96.9	99.8	96.3	94.4	100	97.6	98.7	92.1	98.7	97.3	98.7	99.3	97.8	102	93.7	102	95.9	94.2	97.1	97.1
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00		96.5	90.5	94.5	91.5	77.9	95.2	96.2	103	93.8	95.7	95.4	86.1	90.7	88.2	91.1	77.2	110	83.2	81	88	89
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.266	0.13	0.13	0.13	0.13	0.13	0.362	0.53	0.302	0.247
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																	
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	40AS12V	40AS18V	40AS27V	RLS2TP1	RLS2TP10	RLS2TP10	RLS2TP10	RLS2TP11	RLS2TP12	RLS2TP13	RLS2TP13	RLS2TP14	RLS2TP14	RLS2TP14	RLS2TP15	RLS2TP15	RLS2TP15	RLS2TP2	RLS2TP2	RLS2TP3
	1.801.80	2.302.30	0.800.80	0.200.20	1.001.00	2.002.00	3.003.00	0.500.50	0.500.50	0.200.20	0.500.50	0.800.80	1.501.50	2.002.00	0.500.50	1.001.00	1.501.50	0.300.30	0.700.70	0.500.50
	14/06/2018	14/06/2018	06/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	12/06/2018	12/06/2018	12/06/2018
Carbon																				
Soil Organic Matter (SOM)	8.93	3.65	16.8	2.5	3	3.15	5.72	2.59	1.18	17.4	4.22	24.8	2.07	3.1	5.79	2.83	1.17	4.14	1.62	2.34
Metals (Solids)																				
Arsenic	21	12.3	18	6.02	6.65	5.64	24.2	8.16	12.4	16.4	7.12	8.03	4.84	6	8.47	7.29	6.16	11.2	11.2	12.6
Cadmium	0.735	0.509	0.641	0.688	1.18	0.579	0.783	0.356	0.76	0.271	0.513	0.553	0.676	0.998	0.867	0.611	0.18	0.246	1.47	0.283
Chromium	35.7	26.3	6.89	77.1	116	64.4	206	36	4.03	4.89	326	47.1	31.9	249	89.1	52.6	29.5	12	203	14
Copper	27.7	21.3	49.3	22.1	25.5	16.5	128	15.2	9.35	20.6	36	39.2	14	22	25.9	18.3	14.3	16.7	25.4	19.5
Lead	51.5	36.3	57.4	68.3	89.6	51.1	110	24.2	20.2	20.6	47.3	48.8	49	67.9	104	49.1	12.8	19.5	52.4	15.9
Mercury	0.14	0.14	0.14	0.14	1.4	0.14	1.11	0.14	0.14	0.14	2.69	0.14	0.14	1.4	0.14	0.14	0.14	0.14	1.4	0.14
Nickel	30.4	29	53.1	12.2	13.7	10.1	19.1	15.8	14	20.4	11.6	20.4	10.9	13.9	16.2	13.5	17	21.6	25.8	24.4
Selenium	1.4	1.02	1.23	3.65	10	2.19	2.57	1.81	2.22	1	6.33	2.07	4.1	10	3.44	2.01	1.19	1.83	13.8	1
Vanadium	58.3	45.3	37.5	108	123	51.5	98.4	67.6	26.6	17.9	248	82.5	54.8	256	152	71.4	121	35.1	532	24.1
Zinc	159	154	83.7	187	344	207	388	84.4	67.5	42.7	146	109	109	145	353	267	40.2	54.7	156	53.2
TPH Criteria Working Group (TPH CWG)																				
Benzene																				
Toluene																				
Ethylbenzene																				
sum of detected mpo xylene by GC																				
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.223	0.04	0.04	0.04	0.04	0.04	0.04	0.0408	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.0627	2.66	0.04	0.04	0.04	0.04	0.04	0.04	0.0864	0.04	0.04	0.04	0.04	0.0496	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.0684	0.0414	0.0526	26	0.04	0.04	0.04	0.04	0.04	0.04	0.158	0.04	0.04	0.04	0.04	0.131	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.0616	0.132	0.0638	12.9	0.04	0.04	0.04	0.04	0.04	0.04	0.456	0.04	0.04	0.04	0.04	0.133	0.04	0.04
Aliphatics >C12-C16	3.76	0.1	2.47	20.8	6.86	8.07	0.1	0.1	0.1	1.18	3.15	3.48	23.9	3.22	4.39	4.89	0.1	0.1	1.07	2.32
Aliphatics >C16-C21	0.559	0.1	2.49	53.8	30.4	22.3	1.92	0.1	0.1	3.45	13.5	20	34.6	18.5	16.4	22.6	0.1	2.38	4.07	17.3
Aliphatics >C21-C35	8.63	3.34	5.73	195	186	170	29.4	13.9	9.73	8.65	96.6	124	36.3	120	71.9	84.9	8.45	39.4	24.5	34.3
Aliphatics >C35-C44	0.1	0.1	0.877	78.5	61.3	42.6	7.75	5.87	2.01	1.88	27.8	28.5	5.5	23.9	12.9	18.9	0.1	7.86	7.67	5.6
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.0456	0.04	0.04	17.4	0.04	0.04	0.04	0.04	0.04	0.04	0.142	0.04	0.04	0.04	0.04	0.0897	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.041	0.0885	0.0426	8.57	0.04	0.04	0.04	0.04	0.04	0.04	0.304	0.04	0.04	0.04	0.04	0.0885	0.04	0.04
Aromatics >EC12-EC16	1.43	0.1	1.31	5.16	1.2	3.4	2.23	0.1	0.1	0.47	2.15	3.64	0.1	1.5	1.43	1.62	0.1	1.57	0.1	0.213
Aromatics >EC16-EC21	1.95	1.28	2.45	19.8	12.2	11.3	14.9	2.04	0.1	0.841	11.9	26.4	3.05	8.77	6.73	9.96	0.977	2.66	5.98	6.72
Aromatics >EC21-EC35	43	17.8	0.1	106	96.1	97.5	79	20.4	5.83	5.86	79.3	122	1.18	51.9	28.9	42.7	4.64	12.9	23.1	22.5
Aromatics >EC35-EC44	7.39	3.21	0.1	71.5	49.2	24.2	31.8	11.9	1.24	1.8	39.3	33.7	0.217	21.9	8.17	16.7	1.61	2.52	9.6	4.48
Aromatics >EC40-EC44	2.29	0.1	0.1	29.2	20.6	8.33	12.2	5.16	0.1	0.1	14.3	11.9	0.1	8.29	2.66	6.43	0.1	0.1	3.62	1.56
Polyaromatic Hydrocarbons (PAHs)																				
Acenaphthylene	12	12	12	15.4	24	12	87.4	12	12	12	12	15.9	12	24	12	12	12	12	12	12
Acenaphthene	8	8	8	31.7	31.2	33.8	208	8	8	8	155	1170	15.3	40.4	33.2	57.8	8	8	8	8
Anthracene	16	16	16	57.5	78.7	55.9	734	23.7	16	16	220	1440	23.4	160	64.6	97.5	16	16	220	16
Benz(a)anthracene	33.3	21.2	14	328	387	233	2030	88.5	14	20.7	1450	5960	68.4	812	222	528	14	51.1	1520	14
Benzo(a)pyrene	34	21.3	15	322	377	191	1800	87.9	15	15	2070	7860	77.1	630	211	617	15	18.6	743	15
Benzo(b)fluoranthene	80.6	45.6	15	626	629	336	3030	134	18.8	39	2030	7540	114	1050	370	876	15	60.8	1800	21.6
Benzo(k)fluoranthene	29.9	14	14	246	221	111	1230	46.1	14	14	866	3900	40.7	339	134	306	14	14	554	14
Benzo(g,h,i)perylene	45.9	24	24	307	320	154	1310	69.5	24	24	1830	5720	64.8	481	193	508	24	24	611	24
Chrysene	51.7	28.5	10	420	485	258	2470	92.5	16.4	38.6	1500	5020	69.1	817	234	554	11.3	92.3	1590	16.5
Dibenzo(a,h)anthracene	0.023	0.023	0.023	46.1	64	34.2	327	0.023	0.023	0.023	318	1120	0.023	99.7	46.4	98.3	0.023	0.023	148	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	335	277	163	1350	65.2	0.018	0.018	1500	5230	54.9	372	190	491	0.018	0.018	697	0.018
Fluoranthene	59.5	41.1	0.017	448	727	380	3770	145	23.7	51.4	2000	9370	155	1360	502	1030	0.017	38	3280	33.3
Fluorene	10	10	10	31.5	30.8	38.6	255	10	10	21.6	74.9	555	10	0.02	16.9	17.1	10	19	10	10
Naphthalene	9	9	13.5	59	60.1	61.8	181	41.5	13.4	124	170	474	98.3	72.3	68.3	34.8	14.7	29	49.4	20.9
Phenanthrene	26.6	23.3	39.9	232	402	265	2520	104	29.4	115	925	5100	119	749	299	398	36.8	72.9	1310	39.2
Pyrene	0.0502	0.0329	0.015	0.576	0.766	0.356	2.92	0.112	0.0213	0.0393	2.13	9.79	0.148	1.24	0.469	1.07	0.015	0.035	3.38	0.0277
PAH, Total Detected USEPA 16	0.412	0.214	0.118	4.08	4.86	2.67	24.2	1.01	0.123	0.45	17.2	70.3	1.05	8.22	3.05	6.68	0.118	0.417	15.9	0.159
Naphthalene-d8 % recovery**	105	100	86.8	93.4	97.7	100	87.8	97.3	95.5	99.6	97.9	98.2	87.1	102	86.3	86.2	91.8	98.4	91	91.7
Acenaphthene-d10 % recovery**	90	88.5	88.8	95.5	100	90.3	84.5	90.2	92	85.5	90.1	90.2	85.8	84.7	78.1	74.5	88.1	85.4	94.3	90.5
Phenanthrene-d10 % recovery**	83.6	92.8	83.2	96.3	99.3	92	90.8	91.3	93.2	74.6	91.1	94.4	98	84.7	94.9	93.6	90.9	88.7	98	94.3
Chrysene-d12 % recovery**	101	94.8	71.1	102	106	102	88.3	85.4	87.3	78.7	107	108	81.3	99.4	75.5	81.6	91.9	88.5	96.9	90.9
Perylene-d12 % recovery**	104	93.7	65.8	102	101	102	93.4	86.5	87.2	84.4	112	113	84.5	102	73.6	82.9	86.1	86.4	91.6	92.1
Total Aliphatics >C12-C44	12.9	3.34	11.6	348	284	243	39	19.7	11.7	15.2	141	176	100	166	106	131	8.45	49.6	37.4	59.4
Total Aromatics >EC12-EC44	53.8	22.3	3.77	202	159	136	128	34.4	7.07	8.97	133	186	4.45	84.1	45.2	71	7.23	19.7	38.7	33.9
Total Aliphatics & Aromatics >C5-C44	66.7	25.6	15.5	551	443	448	167	54.1	18.8	24.1	274	362	106	250	151	202	15.7	69.8	76.1	93.4
Metals - (Solid)																				
Iron	24700	28000	39500	63000	53000	22600	45300	24500	55200	23800	77800	46700	22600	88600	44100	32300	20500	22700	133000	19800
Manganese	262	735	685	5860	7310	3130	5600	2630	2690	625	28600	3910	3770	16100	4450	4180	1300	1180	29900	393
Metals - (Liquid)																				
Calcium	141000	-	-	161000	-	54800	-	128000	-	139000	-	142000	-	163000	-	146000	-	152000	-	189000
Magnesium	11500	-	-	15800	-	11200	-	4870	-	26100	-	22500	-	23000	-	27600	-	28400	-	19000
Phenols																				
Phenol	0.01	0.01	0.01	0.011	0.01	0.0118	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0109	0.0228	0.151	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.0236	0.015	0.015	0.015	0.015	0.015	0.0565	0.015	0.015	0.015	0.0232	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0565	0.035	0.035	0.035	0.174	0.035	0.035	0.035	0.035
Inorganics																				
Soluble Sulphate 2:1 extract as SO4 BRE																				
pH																				
Sulphate, Total																				
Sulphur, Total																				
Sulphate, Total potentia																				
Sulphate, acid soluble (total)																				
Cyanide, Total																				
Exchangeable Ammonia as N																				
Asbestos																				
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	09/08/2018	-	-	21/06/2018	-	18/06/2018	-	18/06/2018	-	19/06/2018	-	19/06/2018	-	18/06/2018	-	19/06/2018	-	19/06/2018	-	19/06/2018
Analysed By	Renata Bozhkov	-	-	Barbara Urbanek-Walsh	-	Paul Poynton	-	Christian Hallam	-	Christian Hallam	-	Christian Hallam	-	Paul Poynton	-	Christian Hallam	-	Christian Hallam	-	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																				
Analysts Comments																				
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Trace	-	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Detected
Amosite (Brown) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Tremolite	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Actinolite	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Comments	Loose fibres in soil.	-	-	Fibre bundles in soil.	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	Soil containing material typical of Asbestos Bitumen
Volatile Organic Compounds (VOCs)																				
Dibromofluoromethane**	99	96.3	103	104	109	111	107	105	99.2	103	106	106	111	101	108	102	103	99.2	105	100
Toluene-d8**	98	97.6	95	99.9	96.9	94.9	97.2	97.8	96.7	97.5	95.9	97.3	95.9	95.6	94.3	95.3	93.4	91.1	95.6	92.4
4-Bromofluorobenzene**	87.9	91.1	92.4	95	93	92.7	98	97.9	92.2	97.2	92.8	95.8	88	85.6	93.4	93	75.7	70.2	94.1	88.7
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.01	0.01	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.009	0.009	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.007	0.007	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.004	0.004	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.01	0.01	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.01	0.01	0.1	0.1
Naphthalene	0.211	0.245	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.013	0.13	0.13	0.013	0.013	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.04	0.04	0.4	0.4
Subcontracted: Inorganics																				
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	RLS2TP4 0.200.20 12/06/2018	RLS2TP5 0.300.30 12/06/2018	RLS2TP5 0.800.80 12/06/2018	RLS2TP6 1.001.00 12/06/2018	RLS2TP6 2.002.00 12/06/2018	RLS2TP6 3.003.00 12/06/2018	RLS2TP7 0.800.80 12/06/2018	RLS2TP7 2.002.00 12/06/2018	RLS2TP7 3.103.10 12/06/2018	RLS2TP8 1.001.00 12/06/2018	RLS2TP8 2.202.20 12/06/2018	RLS2TP8 2.802.80 12/06/2018	RLS2TP9 0.500.50 12/06/2018
Carbon													
Soil Organic Matter (SOM)	3.65	2.22	3.72	5.26	1.95	1.37	5.86	3.74	5.03	2.83	5.38	1.32	1.83
Metals (Solids)													
Arsenic	8.97	11.6	9.25	8.81	10.3	5.53	9.87	7.28	135	9.19	11.3	7.62	9.23
Cadmium	0.493	0.515	1.02	1.45	1.05	0.753	1.16	0.798	0.884	1.26	0.41	1.14	0.492
Chromium	0.9	96.7	73.9	148	121	134	318	25	98.1	81.7	18.1	200	19.1
Copper	14.7	20.3	29.1	21	24.7	19.8	33.1	22.8	126	26.9	23.6	27.2	28.1
Lead	16.6	24.9	65.9	49.6	61.6	69.2	118	71	81.2	145	131	64.7	17.8
Mercury	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4
Nickel	17.7	17.8	24.9	22.2	18.3	14.2	30	17.6	169	20.3	28.2	90.4	26.6
Selenium	1.19	4.76	10	10	10	4.58	4.14	2.11	40.2	3.82	1.68	4.98	10
Vanadium	13.1	175	111	157	136	144	128	39.1	139	117	37.6	269	42.7
Zinc	58	72.7	290	164	134	206	332	169	217	302	79.1	331	67.5
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.244	0.04	0.04	0.04	0.04	0.0433	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.265	0.187	0.237	0.107	0.0439	0.0888	0.0762	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.0414	1.52	1.83	1.44	0.04	0.135	0.291	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	3.58	5.33	2.18	0.04	0.379	0.611	0.04	0.04
Aliphatics >C12-C16	2.01	0.1	5.57	4.97	9.93	4.08	147	35.8	4.42	12.7	9.17	6.54	0.1
Aliphatics >C16-C21	2.8	3.62	27	20.9	32.4	20.8	270	21.2	20.9	34	9.12	31.4	1.72
Aliphatics >C21-C35	10.8	12.7	166	110	217	87.1	424	59.5	136	146	37.5	207	20.1
Aliphatics >C35-C44	1.79	0.1	35.3	24	51	12.2	75.7	6.75	36.2	51.3	10.9	49.6	2.32
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	1.03	1.31	1.01	0.045	0.105	0.213	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	2.39	3.55	1.45	0.04	0.252	0.406	0.04	0.04
Aromatics >EC12-EC16	1.1	1.08	1.96	1.77	3.23	2.11	64.1	5.08	1.68	2.99	2.39	2.4	0.778
Aromatics >EC16-EC21	4.39	4.34	14.6	10	19.5	9.95	116	14.8	7.38	12.9	7.05	18.2	3.51
Aromatics >EC21-EC35	10.7	7.91	77.5	60	130	45.7	159	45.3	51	70.3	31.5	117	15.6
Aromatics >EC35-EC44	3.24	2.35	30.3	25.6	72.3	20.6	50.5	9.22	29.5	50.6	15.2	53.8	8.42
Aromatics >EC40-EC44	1.13	0.901	12.3	9.92	29.6	7.78	20	3.31	12.1	22.8	6.26	20.1	3.55
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	12	12	14.1	14	12	24	140	12	12	12	12	15	12
Acenaphthene	8	9.11	36.6	25.6	38.5	31.9	220	22.2	19.4	10.7	8	20.5	8
Anthracene	18.6	35.8	82.9	104	106	183	385	28.6	44.9	25	16	69.9	16
Benz(a)anthracene	60.5	67.4	295	368	543	578	545	77.3	175	185	24.9	1150	155
Benzo(a)pyrene	64.1	19.4	279	396	433	475	437	57.2	162	191	21.5	1090	93.5
Benzo(b)fluoranthene	122	47.5	550	609	725	781	667	124	264	315	56.8	1810	182
Benzo(k)fluoranthene	39.9	14	151	228	282	307	252	36.2	101	113	18	711	73.8
Benzo(g,h,i)perylene	53.6	24	245	322	382	385	319	44	130	172	24	983	72.9
Chrysene	84.2	143	360	442	590	563	626	93.1	211	238	30.9	1250	172
Dibenzo(a,h)anthracene	0.023	0.023	41.9	61.6	82.7	92.3	78	0.023	30	34.6	0.023	177	0.023
Indeno(1,2,3-cd)pyrene	60.6	21	275	313	488	342	304	54.1	125	141	25.8	866	67.2
Fluoranthene	103	163	461	607	1030	1200	1300	148	330	275	64	854	136
Fluorene	19	13.5	25.1	19	20.1	58.7	601	35.2	13.2	10	10	11.8	10
Naphthalene	43.4	39.1	107	57.6	34	48.2	234	44.2	28.2	27.2	22.8	60	28.2
Phenanthrene	101	183	424	370	597	1090	1720	139	198	124	57.2	288	116
Pyrene	0.0948	0.168	0.47	0.584	0.905	1.16	1.03	0.128	0.342	0.329	0.0522	2.36	0.335
PAH, Total Detected USEPA 16	0.864	0.909	3.82	4.52	6.26	7.29	8.86	1.03	2.17	2.18	0.374	11.7	1.43
Naphthalene-d8 % recovery**	91.4	96.4	89.4	91.5	90.1	93.5	88.2	92.8	91.6	91.7	93.2	92	91
Acenaphthene-d10 % recovery**	90.5	94.8	92.3	91.9	86.8	90.3	99.2	95.3	88.4	95.4	96.2	90.3	91.4
Phenanthrene-d10 % recovery**	89.1	91	93	88.5	92.5	95.2	98.1	96.9	91.4	98.4	98.5	97.9	91.1
Chrysene-d12 % recovery**	87	83.8	102	92.7	90	104	98.7	94.7	95	103	97.1	106	95.8
Perylene-d12 % recovery**	90	80.3	102	97.7	93.7	99.8	93.9	89.8	89.9	100	93.2	107	90.4
Total Aliphatics >C12-C44	17.4	16.3	234	160	311	124	917	123	197	244	66.7	295	24.2
Total Aromatics >EC12-EC44	19.4	15.7	124	97.4	225	78.3	390	74.3	89.6	137	56.1	192	28.3
Total Aliphatics & Aromatics >C5-C44	36.8	32	358	258	536	211	1320	204	287	382	124	487	52.4
Metals - (Solid)													
Iron	38300	40600	66300	110000	73900	59900	74400	19000	78400	56900	27900	86300	52200
Manganese	846	4370	5560	9910	7360	9430	8890	2180	140000	6350	1050	11200	2110
Metals - (Liquid)													
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols													
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.045	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potentia													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysed By	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	-	-	-	-	-
Comments	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	105	107	107	104	103	104	104	108	106	109	108	104	110
Toluene-d8**	97.6	89	99.5	93.2	95.8	92.1	95.6	97.2	95.1	97.9	98.1	96.5	96.6
4-Bromofluorobenzene**	98.1	72.5	98.4	87.4	95.9	88.8	97.2	96	89.2	97.8	97	98.2	89.2
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

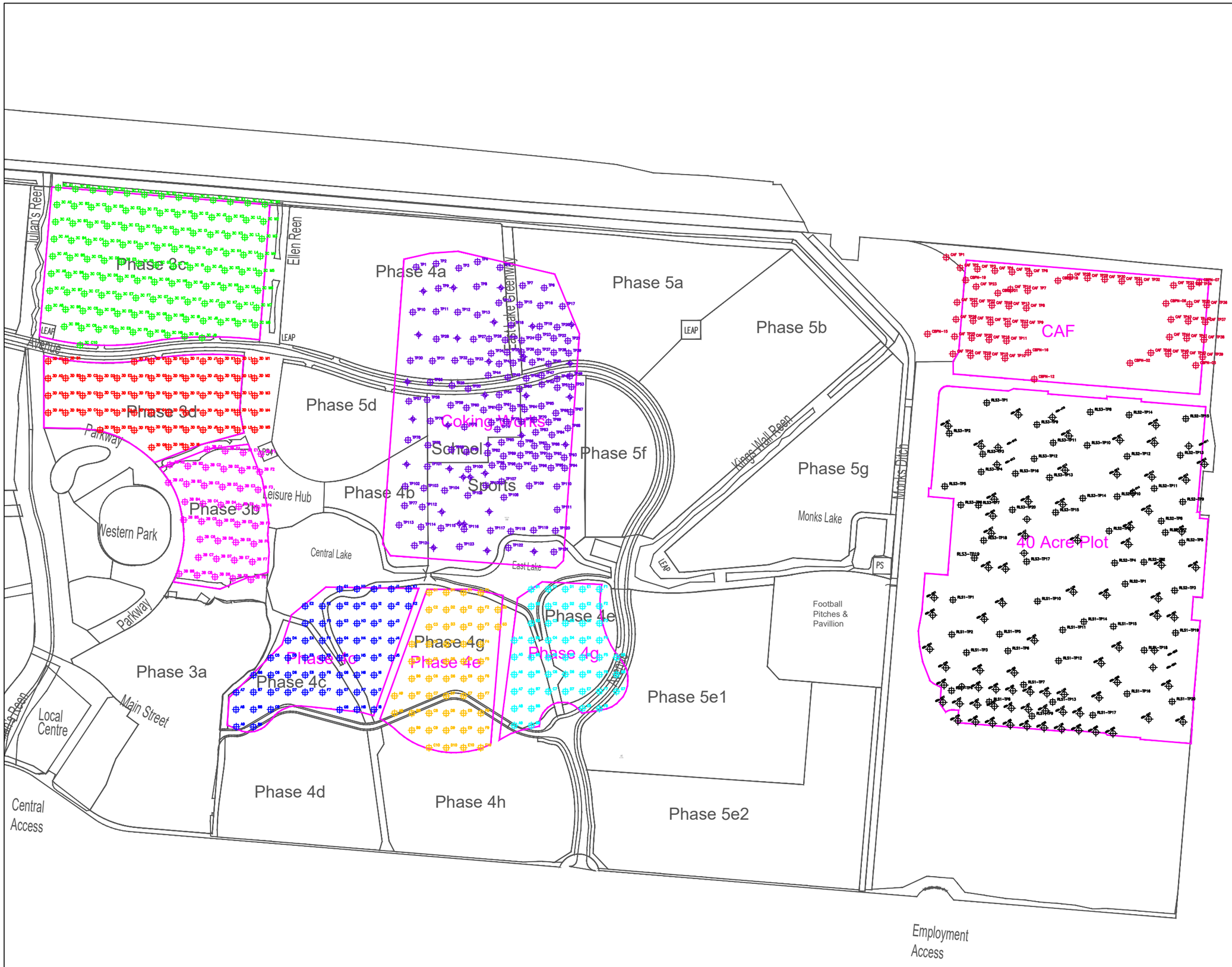
Determinand	RLS2TP9 1.001.00 12/06/2018	RLS2TP10V 4.004.00 12/06/2018	RLS2TP11V 0.800.80 14/06/2018	RLS2TP12V 0.700.70 14/06/2018	RLS2TP13V 0.650.65 14/06/2018	RLS2TP14V 2.252.25 14/06/2018	RLS2TP15V 2.302.30 14/06/2018	RLS2TP1V 0.400.40 12/06/2018	RLS2TP2V 1.201.20 12/06/2018	RLS2TP3V 1.101.10 12/06/2018	RLS2TP4V 0.450.45 12/06/2018	RLS2TP5V 1.301.30 12/06/2018	RLS2TP6V 5.305.30 12/06/2018
Carbon													
Soil Organic Matter (SOM)	55.5	6.72	15.9	7.14	26.5	5.86	1.54	5.83	4.26	4.38	3.97	6.12	1.61
Metals (Solids)													
Arsenic	7.63	16.3	9.36	11.8	11.3	15.5	5.34	5.2	9.65	9.94	11.2	11.2	11.6
Cadmium	0.236	0.379	0.269	0.415	0.607	0.438	0.104	0.177	0.289	0.186	0.304	0.346	0.161
Chromium	16.3	40	32	33.6	30.7	39.2	24	31.2	30.1	22.5	38.9	25.9	33.2
Copper	18	34.1	21.8	26.8	37	26.2	10.4	17.3	21.2	10.9	25.5	14.1	12.9
Lead	7.5	134	19.3	33.4	21.9	35.3	19.5	20.5	21.7	24.7	26.8	20.1	33.9
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	21.3	36.2	29	31.6	36.6	34.1	27.8	29.7	35.7	32.9	42.3	33.1	41.4
Selenium	3.22	1.66	1.66	1.41	2.86	1.29	1	1.1	1	1	1.68	1	1
Vanadium	22.3	61.2	48.6	53	47.5	64.7	40.9	47.5	49.1	44.6	61.2	41.2	59.7
Zinc	64.6	143	81.3	96.6	79.9	122	74.6	76.6	86.2	96.7	104	111	117
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	1.62	0.1	0.1	0.1	3.46	0.102	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	4.95	0.1	0.1	0.1	7.54	2.51	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C21-C35	231	1.98	15.5	3.88	37.9	5.23	0.1	1.23	0.865	6.64	1.15	2.58	0.1
Aliphatics >C35-C44	3.39	0.1	0.1	0.1	1.37	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.1	0.1	0.1	0.1	2.23	0.1	0.1	0.1	0.1	0.1	0.304	0.1	0.1
Aromatics >EC16-EC21	4.52	0.1	2.17	0.1	5.97	0.589	0.1	3.05	0.182	0.1	0.115	0.1	0.1
Aromatics >EC21-EC35	280	7.54	111	21.6	159	17.8	7.46	34.7	5.34	26.5	5.82	7.44	3.8
Aromatics >EC35-EC44	24.8	0.891	6.33	2.31	27.1	1.88	0.1	4.44	0.139	2.12	1.59	3.41	0.1
Aromatics >EC40-EC44	8.32	0.1	0.1	0.1	9.72	0.1	0.1	0.1	0.1	0.1	0.349	1.34	0.1
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	60	12	12	12	12	12	12	12	12	12	12	12	12
Acenaphthene	40	8	8	8	8	8	8	8	8	8	8	8	8
Anthracene	80	16	16	16	16	16	16	16	16	16	16	16	16
Benz(a)anthracene	70	14	14	14	14	14	14	14	14	14	14	14	14
Benzo(a)pyrene	75	15	15	15	15	15	15	15	15	15	15	15	15
Benzo(b)fluoranthene	75	15	15	15	15	35.1	15	15	15	15	15	15	15
Benzo(k)fluoranthene	70	14	14	14	14	14	14	14	14	14	14	14	14
Benzo(g,h,i)perylene	120	24	24	24	24	104	24	24	24	24	24	24	24
Chrysene	50	10	10	20.7	10	20.3	10	10	10	10	10	10	10
Dibenzo(a,h)anthracene	0.115	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	90	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
Fluoranthene	0.085	0.017	0.017	30.4	0.017	32.4	0.017	0.017	0.017	0.017	0.017	0.017	0.017
Fluorene	50	10	10	10	10	10	10	10	10	10	10	10	10
Naphthalene	45	9	9	9	9	9	9	9	9	9	9	9	9
Phenanthrene	75	15	15	15	15	15	15	15	15	15	15	15	15
Pyrene	0.075	0.015	0.015	0.015	0.015	0.0275	0.015	0.015	0.015	0.015	0.015	0.015	0.015
PAH, Total Detected USEPA 16	0.59	0.118	0.118	0.118	0.118	0.219	0.118	0.118	0.118	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	86.1	85.9	96.6	96.6	96.6	89.8	82.2	75.9	88	95.3	90.5	88.7	83
Acenaphthene-d10 % recovery**	81.3	90.5	93.2	91.9	89.6	89.3	81.3	76.5	93	94.7	87.3	86	79.5
Phenanthrene-d10 % recovery**	81.9	101	95	95	92.5	88.1	85.7	85.1	95.6	97.7	89.2	89.6	85
Chrysene-d12 % recovery**	86.7	97.9	89	89.7	103	79.8	85.2	83.3	99.9	95.1	90.1	88.7	92.4
Perylene-d12 % recovery**	79.6	98.9	88.9	87.2	98.4	83.3	85.6	89.7	97.8	95.1	90.8	88.6	87.9
Total Aliphatics >C12-C44	241	1.98	15.5	3.88	50.2	7.85	0.1	1.23	0.865	6.64	1.15	2.58	0.1
Total Aromatics >EC12-EC44	309	8.44	120	23.9	194	20.2	7.46	42.2	5.67	28.7	7.83	10.8	3.8
Total Aliphatics & Aromatics >C5-C44	550	10.4	135	27.8	244	28.1	7.46	43.4	6.53	35.3	8.98	13.4	3.8
Metals - (Solid)													
Iron	14300	30300	21800	22500	20400	22300	23900	24200	31100	28700	28200	23900	30800
Manganese	325	414	164	341	185	240	388	161	326	615	542	405	411
Metals - (Liquid)													
Calcium	-	-	-	193000	-	-	156000	-	175000	-	217000	-	-
Magnesium	-	-	-	18000	-	-	16200	-	26500	-	8890	-	-
Phenols													
Phenol	0.01	0.01	0.0155	0.01	0.01	0.0222	0.01	0.01	0.01	0.0115	0.0109	0.01	0.01
Cresols	0.01	0.01	0.0155	0.01	0.01	0.0555	0.01	0.01	0.0111	0.046	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.0555	0.015	0.015	0.015	0.023	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.133	0.035	0.035	0.035	0.0805	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potentia													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	03/08/2018	-	-	17/07/2018	-	17/07/2018	-	16/07/2018	-	-
Analysed By	-	-	-	Lucy Caroe	-	-	Lucy Caroe	-	Andrzej Ferfecki	-	Marcin Magdziarek	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Amosite (Brown) Asbestos	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Anthophyllite	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Tremolite	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Actinolite	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Non-Asbestos Fibre	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
Comments	-	-	-	0	-	-	0	-	0	-	0	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	107	114	104	102	103	102	96.3	93.5	95.3	100	98.8	97.7	99.1
Toluene-d8**	96.7	97.9	96.9	96.3	97.4	96.6	98	95.1	93.5	97.3	97.2	96.9	99.5
4-Bromofluorobenzene**	97.8	88.7	96.3	91.8	89.8	99	97.8	93.8	88.3	101	102	89.7	107
Methyl Tertiary Butyl Ethe	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.2	2	0.1	0.01	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.18	1.8	0.09	0.009	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	0.14	1.4	0.07	0.007	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.08	0.8	0.04	0.004	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.2	2	0.1	0.01	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.2	2	0.1	0.01	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	24.3	0.286	0.76	37.1	22.5	0.786	0.013	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	0.8	8	0.4	0.04	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	Upper 95th Percentile	WQS	Percentage of exceedances
Carbon												
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7	27		0.00
Metals (Solids)												
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	11.88	22.47	6.74	76.51
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	0.69	2.00	0.19	79.30
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	72.70	291.55	25.08	68.14
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	26.84	54.31	1.20	100.00
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	60.52	155.65	41.85	43.26
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0.41	1.40	0.35	19.53
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	22.79	41.96	30.61	26.05
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4.12	10.00	1.87	59.77
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	120.90	387.05	4.27	100.00
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248.37	746.80	365.79	13.49
TPH Criteria Working Group (TPH CWG)												
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0.04	0.04	0.01	100.00
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0.01	0.01	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0.01	0.01	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0.01	0.01	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0.06	0.08	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0.22	0.31	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0.47	0.78	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14.32	23.54	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	23.70	61.02	150639254.34	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	103.56	261.55	150639254.34	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36.31	117.60	150639254.34	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0.04	0.04	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0.04	0.04	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0.18	0.23	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0.32	0.52	600.15	0.00
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5.41	9.13	1196.62	0.00
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	14.63	33.03	3783.48	0.00
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	84.84	242.55	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38.06	119.20	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	15.77	50.63	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	29.96	69.04	44.45	14.42
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	78.66	157.20	79.05	10.93
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	102.94	277.25	90.76	21.86
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334.30	1176.50	1613.93	2.56
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309.38	1200.00	91.65	45.81
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476.01	1737.00	9.09	99.77
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173.16	631.00	13.44	99.77
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	252.94	881.60	35.35	59.07
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	379.58	1196.00	1651.53	2.79
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	50.95	195.75	2227.85	0.23
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	224.69	848.40	67.35	48.37
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545.11	1932.00	17.67	80.23
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	88.86	143.10	72.09	12.09
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	205.87	304.40	72.28	26.51
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385.24	1150.50	72.09	62.56
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	0.57	2.16	203.18	0.00
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4.19	14.87		0.00
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92.43	105.00		0.00
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91.42	104.00		0.00
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	93.65	107.00		0.00
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87.43	104.00		0.00
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	85.61	104.00		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	177.80	494.00		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	142.91	393.85		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309.32	789.40		0.00
Metals - (Solid)												
Iron	TM224	mg/kg	<1000	430	415	0	<100	443000	56862.51	161800.00		
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731.50	20510.00		
Metals - (Liquid)												
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	########	249000.00		
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369.43	40700.00		
Phenols												
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0.01	0.01	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0.01	0.01	0.00	100.00
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0.02	0.02	0.00	100.00
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0.04	0.04	0.00	100.00
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0.30	0.99	0.00	38.55
pH	TM133	pH Units	<1	83	68	68	<1	12	9.50	11.50	0.00	81.93
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48			0.00	
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0.30	0.44	0.00	38.55
Sulphate, Total potentia	TM132	%	<0.06	83	32	32	<0.06	4	0.89	1.32	0.00	38.55
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0.42	1.03	0.00	38.55
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5.06	21.78	0.00	100.00
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78.02	359.80	0.00	100.00
Asbestos												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Date of Analysis	TM048	No units		430	0	0					0.00	
Analysed By	TM048	No units		430	0	0					0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0					0.00	
Analysts Comments	TM304	No units		83	0	0					0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0.00	0.00	0.00	
Chrysotile (White) Asbestos	TM048	No units		430	0	0					0.00	
Amosite (Brown) Asbestos	TM048	No units		430	0	0					0.00	
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0					0.00	
Fibrous Anthophyllite	TM048	No units		430	0	0					0.00	
Fibrous Tremolite	TM048	No units		430	0	0					0.00	
Fibrous Actinolite	TM048	No units		430	0	0					0.00	
Non-Asbestos Fibre	TM048	No units		430	0	0					0.00	
Comments	TM048	No units		430	0	0			0.00	0.00	0.00	
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	TM116	%		430	415	415		138	106.99	116.00	0.00	
Toluene-d8**	TM116	%		430	415	415		106	96.96	99.90	0.00	
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92.03	104.00	0.00	
Methyl Tertiary Butyl Ethe	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.11	0.10	0.00	
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0.10	0.09	0.00	
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0.08	0.07	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0.05	0.04	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0.12	0.10	0.00	
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0.44	0.38	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0.46	0.40	0.00	
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.86	3.65	0.00	
Gross Calorific Value Original Q(V/gr/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	0.66	1.87	0.00	
Net Calorific Value in Dry Matter Q(V/net/d	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	0.82	3.21	0.00	
Net Calorific Value in Original Q(V/net/ar	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	0.54	0.75	0.00	
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1.35	3.19	0.00	
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	16.93	49.33	0.00	
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	17.95	50.91	0.00	

Determinand	RLS2TP7V	RLS2TP8V	RLS2TP9V	CAFTP10	CAFTP10	CAFTP15	CAFTP15	CAFTP16	CAFTP16	CAFTP16	CAFTP19	CAFTP19	CAFTP20	CAFTP20	CAFTP24	CAFTP24	CAFTP25
	3.803.80	3.203.20	1.601.60	0.000.50	0.002.40	0.000.50	0.002.40	0.000.60	0.001.20	0.002.00	0.000.60	0.002.90	0.000.70	0.002.90	0.001.00	0.002.50	0.000.70
	12/06/2018	12/06/2018	12/06/2018	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017
Carbon																	
Soil Organic Matter (SOM)	30.7	8.29	1.31	5.97	1.19	8.31	9.57	0.778	5.97	5.64	4.86	8.43	0.915	2.14	1.31	2.09	2.97
Metals (Solids)																	
Arsenic	27.5	15.9	6	11.5	5.68	14.4	6.45	8.72	15.3	34.4	6.53	12.2	8.83	4.26	11.9	6	8.76
Cadmium	0.439	0.567	0.2	0.22	0.02	0.412	0.151	0.02	0.327	0.41	0.127	2.61	0.128	0.616	0.0447	0.2	0.02
Chromium	28.5	37	33.1	38	7.78	11	12.8	0.9	45.4	35.9	31.7	61.3	28.1	420	58.4	114	39.5
Copper	35.6	30.3	14	14.3	1.4	20.3	3.82	22.4	32.7	77.1	20.3	14	25	3.88	12.8	17.6	24.8
Lead	19.2	43.5	7	27	0.7	23.6	16.6	3.2	28.8	116	25.9	93.7	18.4	16.6	32	13.1	22.6
Mercury	0.14	0.14	1.4	0.14	0.14	0.401	0.14	0.52	0.14	1.87	0.748	0.14	0.14	0.14	0.14	1.4	0.712
Nickel	39.2	35	4.67	37.3	0.763	35.2	6.38	3.93	33.7	54.8	30.3	47	39.6	7.53	40.7	6.54	35.5
Selenium	3.19	1.37	10	1	8.31	1	6.43	1.65	1.54	1	1	10	1	12.3	1.12	10	1
Vanadium	54.4	62.9	47.2	51.2	21.9	26.4	38.3	16.6	57.7	50.7	60.4	204	35.8	1790	93.9	501	61.7
Zinc	42.1	156	19	102	12.6	128	73.4	19.4	117	331	124	369	71	50.9	115	39.7	126
TPH Criteria Working Group (TPH CWG)																	
Benzene			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene			0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene			0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC			0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0403	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0421	0.0442	0.04	0.0662	0.04	0.04	0.04	0.04	0.104	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.251	0.0527	0.0758	0.04	0.211	0.263	0.04	0.04	0.04	0.084	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.75	0.123	0.0901	0.04	0.488	0.787	0.04	0.04	0.04	0.0759	0.04
Aliphatics >C12-C16	1.13	0.1	3.08	0.228	0.1	0.1	3.49	4.76	0.1	0.1	1.65	1.97	0.109	0.1	0.1	3.76	0.1
Aliphatics >C16-C21	1.24	0.1	10.3	0.154	5.96	1.59	11.8	11.3	0.1	3.77	3.36	8.7	0.1	0.85	0.1	17.8	0.1
Aliphatics >C21-C35	74.1	0.1	15.7	0.1	77.8	14.9	208	42.9	5.59	33.6	8.12	38.9	0.1	6.96	2.67	90.6	3.7
Aliphatics >C35-C44	0.1	0.1	3.89	0.1	40.7	0.1	99	14.9	0.1	6.64	0.1	7.39	0.1	0.485	0.1	15.4	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.173	0.0433	0.0569	0.04	0.14	0.181	0.04	0.04	0.04	0.0575	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.5	0.0819	0.06	0.04	0.325	0.524	0.04	0.04	0.04	0.0506	0.04
Aromatics >EC12-EC16	0.1	0.1	1.31	0.1	0.1	4.62	4.67	1.48	1.51	1.95	2.28	2.67	0.1	0.333	0.1	3.22	0.1
Aromatics >EC16-EC21	4.31	2.01	4.33	0.1	0.777	5.17	27.9	4.2	0.803	5.74	2.38	6.91	0.1	6.95	3.33	24.6	0.1
Aromatics >EC21-EC35	284	19.3	0.1	0.685	43.6	34.4	180	21.1	18.6	38.1	28.3	24.1	0.1	24.8	6.59	191	10.1
Aromatics >EC35-EC44	25.2	2.37	0.1	0.1	56.1	15.2	153	12.3	2.89	19	2.42	11.5	0.1	6.34	0.84	59.1	1.98
Aromatics >EC40-EC44	7.71	0.1	0.1	0.1	24.9	5.49	62.6	4.65	0.1	7.13	0.1	4.02	0.1	1.37	0.1	20.6	0.1
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	12	12	12	12	12	12	24	12	12	78.5	12	12	12	16.7	12	12	12
Acenaphthene	8	8	12.2	8	8	32.9	294	27.9	8	59.5	8	17.7	8	31.7	8	87	8
Anthracene	16	16	16	16	16	45.6	129	16	16	185	16	84.1	16	86	16	143	16
Benz(a)anthracene	14	32.4	25.2	32.9	59.3	129	371	48.1	14	653	28.4	186	14	595	14	1440	26.7
Benzo(a)pyrene	15	25.4	30.2	23	63.2	101	449	26.2	33.5	773	15	139	15	711	15	1740	25
Benzo(b)fluoranthene	15	44.2	50.3	27.6	115	173	778	78.4	48.5	1030	28	214	15	1080	15	2380	34.3
Benzo(k)fluoranthene	14	14	14	14	39.2	73.3	242	25.4	22.7	340	14	79.5	14	338	14	822	14
Benzo(g,h,i)perylene	24	24	33.5	24	102	107	573	50.6	24	625	24	119	24	589	24	1220	24
Chrysene	10	38.3	15.6	23.9	49.2	148	304	48.9	39.5	595	24	178	10	667	10	1400	23.2
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	123	0.023	0.023	155	0.023	26.4	0.023	118	0.023	219	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	23.2	0.018	76.5	87.2	403	38.1	0.018	527	0.018	79.9	0.018	418	0.018	879	0.018
Fluoranthene	0.017	68.3	41.3	35.5	82.2	294	611	84.2	70.8	1020	57.6	294	29.3	925	0.017	2250	32.4
Fluorene	26.1	10	10	10	10	48	129	12.2	10	71.3	16.8	23.6	10	21.2	10	41.4	10
Naphthalene	9	67.4	15.8	43.6	27.9	64.5	253	41.9	18.8	237	9	58.9	9	26.7	9	32.4	9
Phenanthrene	15	107	41.5	105	54.3	246	433	83.1	59.6	572	63.9	398	48.1	383	15	674	15
Pyrene	0.015	0.0556															
PAH, Total Detected USEPA 16	0.118	0.439	0.33	0.321	0.741	1.75	5.61	0.634	0.347	7.7	0.262	2.18	0.118	6.84	0.118	15.5	0.168
Naphthalene-d8 % recovery**	97.6	88.1	97.9	104	97.5	114	103	113	104	118	107	105	110	103	98.8	112	120
Acenaphthene-d10 % recovery**	97.7	87.4	98.2	100	96	111	99.8	110	102	114	103	101	106	98.7	95.7	109	114
Phenanthrene-d10 % recovery**	102	93	96.4	95.3	95.7	106	98	107	101	111	101	95.5	104	95.9	93.3	107	108
Chrysene-d12 % recovery**	90.4	95.6	91.2	96.2	86.4	95.1	101	90.8	94	116	88.7	95.7	104	101	86.5	96	108
Perylene-d12 % recovery**	87.6	90.5	89.9	101	80.4	95.9	108	87.7	90.2	125	88.7	98.3	110	108	76.9	96.1	113
Total Aliphatics >C12-C44	76.5	0.1	33	0.381	124	16.5	323	73.8	5.59	44	13.1	57	0.109	8.29	2.67	128	3.7
Total Aromatics >EC12-EC44	314	23.7	5.64	0.685	100	59.4	366	39.1	23.8	64.7	35.4	45.2	0.1	38.4	10.8	278	12.1
Total Aliphatics & Aromatics >C5-C44	390	23.7															
Metals - (Solid)																	
Iron	21300	27100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	255	277	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals - (Liquid)																	
Calcium	153000	110000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Magnesium	13700	22800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phenols																	
Phenol	0.01	0.249	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.0108	0.01	0.01	0.0128	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.249	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, Total			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, Total potentia			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total			1	1	1	1	1	1	1	1	1	1	1	1.08	1	1	1
Exchangeable Ammonia as N			12	322	13.9	263	12	12	458	12	228	12	92.8	12	152	12	364
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	18/07/2018	18/07/2018	-	-	23/05/17	-	23/05/17	-	-	-	-	23/05/17	-	23/05/17	-	-	-
Analysed By	James Richards	Lucy Caroe	-	-	Lauren Sargeant	-	Lauren Sargeant	-	-	-	-	Lauren Sargeant	-	Lauren Sargeant	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-
Fibrous Anthophyllite	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-
Fibrous Tremolite	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-
Fibrous Actinolite	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-
Non-Asbestos Fibre	Not Detected	Not Detected	-	-	Not Detected	-	Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-
Comments	0	Loose fibres in soi	-	-	0	-	0	-	-	-	-	0	-	0	-	-	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	96.4	98.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	93.6	95.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	84.6	90.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ethe	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	0.09	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	0.07	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.355	0.764	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sum of BTEX	0.4	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix F: Sampling Location Plans



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

PREVIOUSLY SAMPLED PHASE BOUNDARIES

CURRENT SITE PHASING PLAN

CAF TP32 TP LOCATION

NOTES:

PHASES HAVE BEEN TESTED ON A 25x25M GRID

PHASES 4c, 4e AND 4g BOUNDARIES HAVE SUBSEQUENTLY BEEN CHANGED IN LATER SITE PHASING PLANS, THE ORIGINAL BOUNDARIES AS SAMPLED ARE SHOWN IN PINK

Rev	Date	Amendments	By	Chk
A	01/05/2022	TPs Added	SR	CW

Client

St Modwen Developments

Project

P18-669 Llanwern Reclamation

Drawing Title

CWRA Assessment

Soil Samples Location Plan

INFORMATION

	Drawn	Checked	Date
NTS	SR	CW	19.04.22

Drawing No. Rev.

18669-RLL-22-XX-DR-O-0254

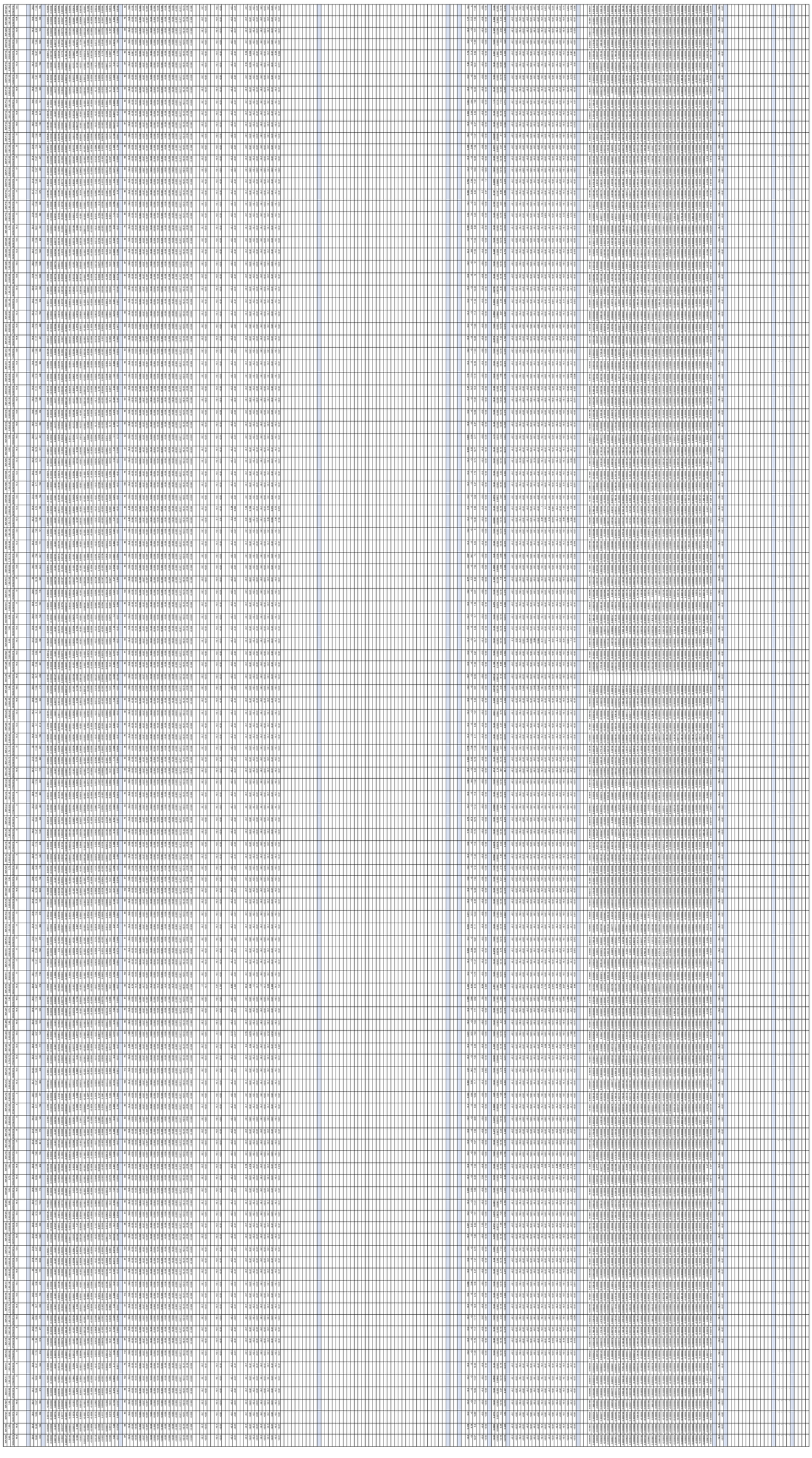
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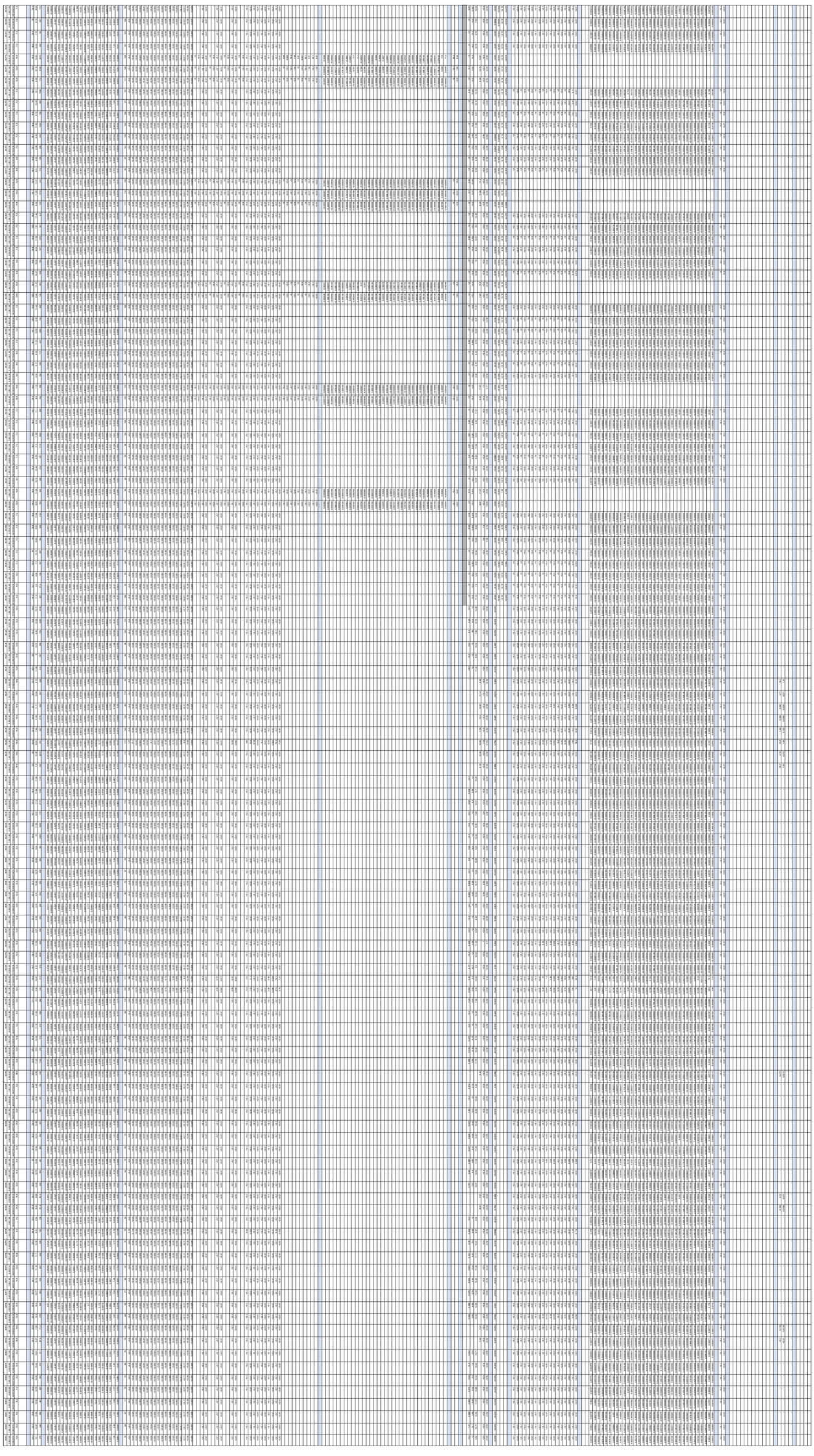
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Appendix G: Soil Leachate Analysis

Glan Llyn Leachate Data

Determinand	Method	Units	LOD	No. of samples	No. of Samples >LOD	No. of Samples > EQS	Min	Max	EQS
Waste Acceptance Criteria (WAC)									
CEN 10:1 - Temperature	PM115	°C		1121	1119	0		25.70000	n/a
CEN 10:1 - pH	PM115	pH Units		1121	1119	0		12.75000	n/a
CEN 10:1 - Conductivity @ 20 deg.C	PM115	µS/cm		1121	1119	0		########	n/a
Filtered (Dissolved) Metals									
CEN 10:1 - Arsenic (diss.filt)	TM152	mg/l	<0.0005	1121	931	1	<0.0005	0.07700	0.05
CEN 10:1 - Cadmium (diss.filt)	TM152	mg/l	<0.00008	1121	16	1	<0.00008	0.00028	0.00025
CEN 10:1 - Chromium (diss.filt)	TM152	mg/l	<0.001	1121	601	601	<0.001	0.07960	0.00047
CEN 10:1 - Copper (diss.filt)	TM152	mg/l	<0.0003	1121	960	843	<0.0003	0.14300	0.001
CEN 10:1 - Lead (diss.filt)	TM152	mg/l	<0.0002	1121	474	164	<0.0002	0.49000	0.0012
CEN 10:1 - Mercury (diss.filt)	TM183	mg/l	<0.00001	1121	230	0	<0.00001	0.00047	0.07
CEN 10:1 - Nickel (diss.filt)	TM152	mg/l	<0.0004	1121	744	26	<0.0004	0.00777	0.004
CEN 10:1 - Selenium (diss.filt)	TM152	mg/l	<0.0005	1121	857	41	<0.0005	0.06640	0.01
CEN 10:1 - Vanadium (diss.filt)	TM152	mg/l	<0.001	1121	1034	711	<0.001	1.01000	0.02
CEN 10:1 - Zinc (diss.filt)	TM152	mg/l	<0.001	1121	742	98	<0.001	2.09000	0.0109
CEN 10:1 - Mercury (diss.filt)	TM183	mg/kg	<0.0001	1121	230	0	<0.0001	0.00471	n/a
CEN 10:1 - Arsenic (diss.filt)	TM152	mg/kg	<0.005	1121	931	0	<0.005	0.77000	n/a
CEN 10:1 - Cadmium (diss.filt)	TM152	mg/kg	<0.0008	1121	16	0	<0.0008	0.00276	n/a
CEN 10:1 - Chromium (diss.filt)	TM152	mg/kg	<0.01	1121	601	0	<0.01	0.79600	n/a
CEN 10:1 - Copper (diss.filt)	TM152	mg/kg	<0.003	1121	960	0	<0.003	1.43000	n/a
CEN 10:1 - Lead (diss.filt)	TM152	mg/kg	<0.002	1121	474	0	<0.002	4.90000	n/a
CEN 10:1 - Nickel (diss.filt)	TM152	mg/kg	<0.004	1121	744	0	<0.004	0.07770	n/a
CEN 10:1 - Selenium (diss.filt)	TM152	mg/kg	<0.005	1121	857	0	<0.005	0.66400	n/a
CEN 10:1 - Vanadium (diss.filt)	TM152	mg/kg	<0.01	1121	1034	0	<0.01	10.10000	n/a
CEN 10:1 - Zinc (diss.filt)	TM152	mg/kg	<0.01	1121	742	0	<0.01	20.90000	n/a
TPH Criteria Working Group (TPH CWG)									
CEN 10:1 - GRO Surrogate % recovery**	TM245	%		1121	1118	0		129.00000	n/a
CEN 10:1 - GRO >C5-C12	TM245	mg/l	<0.05	1121	57	0	<0.05	312.00000	n/a
CEN 10:1 - GRO >C5-C12	TM245	mg/kg	<0.5	1121	57	0	<0.5	96.20000	n/a
CEN 10:1 - Methyl tertiary butyl ether (MTBE)	TM245	mg/l	<0.03	1121	17	0	<0.03	0.12000	n/a
CEN 10:1 - Methyl tertiary butyl ether (MTBE)	TM245	mg/kg	<0.003	1121	17	0	<0.003	0.01200	n/a
CEN 10:1 - Benzene	TM245	mg/l	<0.07	1121	15	15	<0.07	5.21000	0.01
CEN 10:1 - Benzene	TM245	mg/kg	<0.007	1121	15	0	<0.007	0.52100	n/a
CEN 10:1 - Toluene	TM245	mg/l	<0.04	1121	22	7	<0.04	4.90000	0.074
CEN 10:1 - Toluene	TM245	mg/kg	<0.004	1121	22	0	<0.004	0.49000	n/a
CEN 10:1 - Ethylbenzene	TM245	mg/l	<0.05	1121	4	4	<0.05	0.39000	0.02
CEN 10:1 - Ethylbenzene	TM245	mg/kg	<0.005	1121	4	0	<0.005	0.03900	n/a
CEN 10:1 - m,p-Xylene	TM245	mg/l	<0.08	1121	11	0	<0.08	3.15000	n/a
CEN 10:1 - m,p-Xylene	TM245	mg/kg	<0.008	1121	11	0	<0.008	0.31500	n/a
CEN 10:1 - o-Xylene	TM245	mg/l	<0.03	1121	13	0	<0.03	1.02000	n/a
CEN 10:1 - o-Xylene	TM245	mg/kg	<0.003	1121	13	0	<0.003	0.10200	n/a
CEN 10:1 - Sum of detected Xylenes	TM245	mg/kg	<0.011	1121	12	7	<0.011	4.08000	0.03
CEN 10:1 - Sum of detected Xylenes	TM245	mg/l	<0.11	1121	12	0	<0.11	1.31000	n/a
CEN 10:1 - Sum of detected BTEX	TM245	mg/l	<0.28	1121	11	0	<0.28	14.30000	n/a
CEN 10:1 - Sum of detected BTEX	TM245	mg/kg	<0.028	1121	11	0	<0.028	1.43000	n/a
CEN 10:1 - Aliphatics >C12-C16 (diss.filt)	TM174	mg/l	<0.01	590	0	0	<0.01	<0.01	n/a
CEN 10:1 - Aliphatics >C12-C16 (diss.filt)	TM174	mg/kg	<0.1	590	0	0	<0.1	<0.1	n/a
CEN 10:1 - Aliphatics >C5-C6	TM245	mg/l	<0.01	1121	2	0	<0.01	0.33000	n/a
CEN 10:1 - Aliphatics >C5-C6	TM245	mg/kg	<0.1	1121	2	0	<0.1	0.03300	n/a
CEN 10:1 - Aliphatics >C16-C21 (diss.filt)	TM174	mg/l	<0.1	590	2	0	<0.1	0.20000	n/a
CEN 10:1 - Aliphatics >C16-C21 (diss.filt)	TM174	mg/kg	<0.01	590	2	0	<0.01	0.02000	n/a
CEN 10:1 - Aliphatics >C6-C8	TM245	mg/l	<0.1	1121	22	0	<0.1	1.37000	n/a
CEN 10:1 - Aliphatics >C6-C8	TM245	mg/kg	<0.01	1121	22	0	<0.01	0.13700	n/a
CEN 10:1 - Aliphatics >C21-C35 (diss.filt)	TM174	mg/l	<0.1	590	0	0	<0.1	<0.1	n/a
CEN 10:1 - Aliphatics >C21-C35 (diss.filt)	TM174	mg/kg	<0.01	590	0	0	<0.01	<0.01	n/a
CEN 10:1 - Aliphatics >C8-C10	TM245	mg/l	<0.1	1121	36	0	<0.1	8.63000	n/a
CEN 10:1 - Aliphatics >C8-C10	TM245	mg/kg	<0.01	1121	36	0	<0.01	0.86300	n/a
CEN 10:1 - Total Aliphatics >C12-C35 (diss.filt)	TM174	mg/l	<0.1	590	2	0	<0.1	0.27000	n/a
CEN 10:1 - Total Aliphatics >C12-C35 (diss.filt)	TM174	mg/kg	<0.01	590	2	0	<0.01	0.02700	n/a
CEN 10:1 - Aliphatics >C10-C12	TM245	mg/l	<0.1	1121	68	0	<0.1	182.00000	n/a
CEN 10:1 - Aliphatics >C10-C12	TM245	mg/kg	<0.01	1121	68	0	<0.01	18.20000	n/a
CEN 10:1 - Aromatics >EC5-EC7	TM245	mg/l	<0.01	1121	10	0	<0.01	5.21000	n/a
CEN 10:1 - Aromatics >EC5-EC7	TM245	mg/kg	<0.1	1121	10	0	<0.1	0.52100	n/a
CEN 10:1 - Aromatics >EC7-EC8	TM245	mg/l	<0.1	1121	5	0	<0.1	4.90000	n/a
CEN 10:1 - Aromatics >EC7-EC8	TM245	mg/kg	<0.01	1121	5	0	<0.01	0.49000	n/a
CEN 10:1 - Aromatics >EC8-EC10	TM245	mg/l	<0.1	1121	31	0	<0.1	7.00000	n/a
CEN 10:1 - Aromatics >EC8-EC10	TM245	mg/kg	<0.01	1121	31	0	<0.01	0.70000	n/a
CEN 10:1 - Aromatics >EC10-EC12	TM245	mg/l	<0.1	1121	60	0	<0.1	121.00000	n/a
CEN 10:1 - Aromatics >EC10-EC12	TM245	mg/kg	<0.01	1121	60	0	<0.01	12.10000	n/a
CEN 10:1 - Aromatics >EC12-EC16 (diss.filt)	TM174	mg/l	<0.1	590	4	0	<0.1	8.68000	n/a
CEN 10:1 - Aromatics >EC12-EC16 (diss.filt)	TM174	mg/kg	<0.01	590	4	0	<0.01	0.86800	n/a
CEN 10:1 - Aromatics >EC16-EC21 (diss.filt)	TM174	mg/l	<0.01	590	5	0	<0.01	78.80000	n/a
CEN 10:1 - Aromatics >EC16-EC21 (diss.filt)	TM174	mg/kg	<0.1	590	5	0	<0.1	7.88000	n/a
CEN 10:1 - Aromatics >EC21-EC35 (diss.filt)	TM174	mg/l	<0.1	590	1	0	<0.1	5.61000	n/a
CEN 10:1 - Aromatics >EC21-EC35 (diss.filt)	TM174	mg/kg	<0.01	590	1	0	<0.01	0.56100	n/a
CEN 10:1 - Total Aromatics >EC12-EC35 (diss.filt)	TM174	mg/l	<0.01	590	6	0	<0.01	93.10000	n/a
CEN 10:1 - Total Aromatics >EC12-EC35 (diss.filt)	TM174	mg/kg	<0.1	590	6	0	<0.1	9.31000	n/a
CEN 10:1 - Total Aliphatics & Aromatics >C5-35 (diss.filt)	TM174	mg/l	<0.01	590	12	0	<0.01	93.10000	n/a
CEN 10:1 - Total Aliphatics & Aromatics >C5-35 (diss.filt)	TM174	mg/kg	<0.1	590	12	0	<0.1	98.60000	n/a
Polyaromatic Hydrocarbons (PAHs)									
CEN 10:1 - Naphthalene (diss.filt)	TM178	mg/l	<0.0001	590	99	0	<0.0001	########	n/a
CEN 10:1 - Naphthalene (diss.filt)	TM178	mg/kg	<0.00001	590	99	0	<0.00001	194.00000	n/a
CEN 10:1 - Acenaphthene (diss.filt)	TM178	mg/l	<0.000005	590	77	0	<0.000005	0.79100	n/a
CEN 10:1 - Acenaphthene (diss.filt)	TM178	mg/kg	<0.00005	590	77	0	<0.00005	2.21000	n/a
CEN 10:1 - Acenaphthylene (diss.filt)	TM178	mg/l	<0.000005	590	59	0	<0.000005	0.90100	n/a
CEN 10:1 - Acenaphthylene (diss.filt)	TM178	mg/kg	<0.00005	590	59	0	<0.00005	9.01000	n/a
CEN 10:1 - Fluoranthene (diss.filt)	TM178	mg/l	<0.00005	590	114	0	<0.00005	8.70000	n/a
CEN 10:1 - Fluoranthene (diss.filt)	TM178	mg/kg	<0.000005	590	114	0	<0.000005	0.87000	n/a
CEN 10:1 - Anthracene (diss.filt)	TM178	mg/l	<0.00005	590	88	0	<0.00005	111.00000	n/a
CEN 10:1 - Anthracene (diss.filt)	TM178	mg/kg	<0.000005	590	88	0	<0.000005	11.10000	n/a
CEN 10:1 - Phenanthrene (diss.filt)	TM178	mg/l	<0.00005	590	115	0	<0.00005	7.58000	n/a
CEN 10:1 - Phenanthrene (diss.filt)	TM178	mg/kg	<0.000005	590	115	0	<0.000005	0.75800	n/a
CEN 10:1 - Fluorene (diss.filt)	TM178	mg/l	<0.00005	590	81	0	<0.00005	3.56000	n/a
CEN 10:1 - Fluorene (diss.filt)	TM178	mg/kg	<0.000005	590	81	0	<0.000005	0.35600	n/a
CEN 10:1 - Chrysene (diss.filt)	TM178	mg/l	<0.00005	590	56	0	<0.00005	28.30000	n/a
CEN 10:1 - Chrysene (diss.filt)	TM178	mg/kg	<0.000005	590	56	0	<0.000005	2.83000	n/a
CEN 10:1 - Pyrene (diss.filt)	TM178	mg/l	<0.00005	590	112	0	<0.00005	9.23000	n/a
CEN 10:1 - Pyrene (diss.filt)	TM178	mg/kg	<0.000005	590	112	0	<0.000005	0.92300	n/a
CEN 10:1 - Benzo(a)anthracene (diss.filt)	TM178	mg/l	<0.00005	590	55	0	<0.00005	21.20000	n/a
CEN 10:1 - Benzo(a)anthracene (diss.filt)	TM178	mg/kg	<0.000005	590	55	0	<0.000005	2.12000	n/a
CEN 10:1 - Benzo(b)fluoranthene (diss.filt)	TM178	mg/l	<0.000005	590	54	0	<0.000005	2.11000	n/a
CEN 10:1 - Benzo(b)fluoranthene (diss.filt)	TM178	mg/kg	<0.00005	590	54	0	<0.00005	21.10000	n/a
CEN 10:1 - Benzo(k)fluoranthene (diss.filt)	TM178	mg/l	<0.00005	590	42	0	<0.00005	30.30000	n/a
CEN 10:1 - Benzo(k)fluoranthene (diss.filt)	TM178	mg/kg	<0.000005	590	42	0	<0.000005	3.03000	n/a
CEN 10:1 - Benzo(a)pyrene (diss.filt)	TM178	mg/l	<0.00002	590	56	0	<0.00002	21.10000	n/a
CEN 10:1 - Benzo(a)pyrene (diss.filt)	TM178	mg/kg	<0.000002	590	56	0	<0.000002	2.11000	n/a
CEN 10:1 - Dibenzo(a,h)anthracene (diss.filt)	TM178	mg/l	<0.00005	590	23	0	<0.00005	22.20000	n/a
CEN 10:1 - Dibenzo(a,h)anthracene (diss.filt)	TM178	mg/kg	<0.000005	590	23	0	<0.000005	2.22000	n/a
CEN 10:1 - Benzo(g,h,i)perylene (diss.filt)	TM178	mg/l	<0.00005	590	32	0	<0.00005	32.80000	n/a
CEN 10:1 - Benzo(g,h,i)perylene (diss.filt)	TM178	mg/kg	<0.000005	590	32	0	<0.000005	3.28000	n/a
CEN 10:1 - Indeno(1,2,3-cd)pyrene (diss.filt)	TM178	mg/l	<0.000005	590	35	0	<0.000005	2.49000	n/a
CEN 10:1 - Indeno(1,2,3-cd)pyrene (diss.filt)	TM178	mg/kg	<0.00005	590	35	0	<0.00005	24.90000	n/a
CEN 10:1 - PAH Sum of EPA 16 detected (Diss filt)	TM178	mg/l	<0.00082	590	99	0	<0.00082	########	n/a
CEN 10:1 - PAH Sum of EPA 16 detected (Diss filt)	TM178	mg/kg	<0.000082	590	99	0	<0.000082	219.00000	n/a
Volatile Organic Compounds (VOCs)									
CEN 10:1 - Aromatics >EC16-EC35 (diss.filt)	TM174	mg/l	<0.01	590	5	0	<0.01	84.40000	n/a
CEN 10:1 - Aromatics >EC16-EC35 (diss.filt)	TM174	mg/kg	<0.1	590	5	0	<0.1	8.44000	n/a
Inorganics									
CEN 10:1 - Ammoniacal Nitrogen as N			<2	145	0	0	<2	<2	
CEN 10:1 - Ammoniacal Nitrogen as N			<0.2	1121	328	0	<0.2	76.90000	
CEN 10:1 - Ammoniacal Nitrogen as N			<2	1121	328	0	<2	590.00000	
CEN 10:1 - pH			<1	1121	1016	0	<1	12.83000	
CEN 10:1 - pH (diss.filt)			<1	1121	103	0	<1	12.75000	
CEN 10:1 - Cyanide, Total			<0.5	1121	78	0	<0.5	70.00000	
CEN 10:1 - Cyanide, Total			<0.05	1121	78	0	<0.05	7.00000	
Filtered (Total) Metals									
CEN 10:1 - Manganese (diss.filt)			<0.01	1121	321	0	<0.01	21.60000	
CEN 10:1 - Manganese (diss.filt)			<0.001	936	249	0	<0.001	2.16000	
CEN 10:1 - Iron (Dis.Filt)			<0.019	936	337	0	<0.019	681.00000	
CEN 10:1 - Iron (Dis.Filt)			<0.19	936	337	0	<0.19	68.10000	
TPH Criteria Working Group (TPH CWG) (aq)									
CEN 10:1 - Aliphatics >C12-C16 (aq)			<0.1	1121	5	0	<0.1	0.30000	
CEN 10:1 - Aliphatics >C12-C16 (aq)			<0.01	1121	6	0	<0.01	0.81000	
CEN 10:1 - Aliphatics >C16-C21 (aq)			<0.01	1121	12	0	<0.01	1.01000	
CEN 10:1 - Aliphatics >C16-C21 (aq)			<0.1	1121	12	0	<0.1	0.81000	
CEN 10:1 - Aliphatics >C21-C35 (aq)			<0.1	1121	11	0	<0.1	0.88000	
CEN 10:1 - Aliphatics >C21-C35 (aq)			<0.01	1121	22	0	<0.01	2.48000	
CEN 10:1 - Total Aliphatics >C12-C35 (aq)			<0.1	1121	26	0	<0.1	1.97000	
CEN 10:1 - Total Aliphatics >C12-C35 (aq)			<0.01	1121	27	0	<0.01	2.00000	
CEN 10:1 - Aromatics >EC12-EC16 (aq)			<0.1	1121	64	0	<0.1	28.10000	
CEN 10:1 - Aromatics >EC12-EC16 (aq)			<0.01	1121	58	0	<0.01	2.81000	
CEN 10:1 - Aromatics >EC16-EC21 (aq)			<0.01	1121	66	0	<0.01	15.20000	
CEN 10:1 - Aromatics >EC16-EC21 (aq)			<0.1	1121	72	0	<0.1	4.14000	
CEN 10:1 - Aromatics >EC21-EC35 (aq)			<0.1	1121	40	0	<0.1	1.33000	
CEN 10:1 - Aromatics >EC21-EC35 (aq)			<0.01	1121	47	0	<0.01	11.50000	
CEN 10:1 - Total Aromatics >EC12-EC35 (aq)			<0.01	1121	94	0	<0.01	42.30000	
CEN 10:1 - Total Aromatics >EC12-EC35 (aq)			<0.1	1070	74	0	<0.1	4.23000	
CEN 10:1 - Total Aliphatics & Aromatics >C5-35 (aq)			<0.01	1070	167	0	<0.01	354.00000	
CEN 10:1 - Total Aliphatics & Aromatics >C5-35 (aq)			<0.1	1070	167	0	<0.1	40.70000	
TPH Criteria Working Group (TPH CWG) (aq)				269	0	0			
CEN 10:1 - Total EPH (C8-C40) (aq)			<1	145	0	0	<1	<1	
CEN 10:1 - Total EPH (C8-C40) (aq)			<0.1	145	0	0	<0.1	<0.1	
CEN 10:1 - Naphthalene (aq)			<0.0001	1121	792	0	<0.0001	118.00000	
CEN 10:1 - Naphthalene (aq)			<0.00001	1121	792	0	<0.00001	11.90000	
CEN 10:1 - Acenaphthene (aq)			<0.00005	1121	583	0	<0.00005	0.81500	
CEN 10:1 - Acenaphthene (aq)			<0.000005	1121	583	0	<0.000005	0.08150	
CEN 10:1 - Acenaphthylene (aq)			<0.00005	1121	450	0	<0.00005	9.37000	
CEN 10:1 - Acenaphthylene (aq)			<0.000005	1121	450	0	<0.000005	0.93700	
CEN 10:1 - Fluoranthene (aq)			<0.00005	1121	898	0	<0.00005	0.37300	
CEN 10:1 - Fluoranthene (aq)			<0.000005	1121	898	0	<0.000005	0.03730	
CEN 10:1 - Anthracene (aq)			<0.00005	1121	664	0	<0.00005	0.23600	
CEN 10:1 - Anthracene (aq)			<0.000005	1121	664	0	<0.000005	0.02360	
CEN 10:1 - Phenanthrene (aq)			<0.00005	1121	882	0	<0.00005	2.35000	
CEN 10:1 - Phenanthrene (aq)			<0.000005	1121	882	0	<0.000005	0.23500	
CEN 10:1 - Fluorene (aq)			<0.00005	1121	592	0	<0.00005	1.99000	
CEN 10:1 - Fluorene (aq)			<0.000005	1121	592	0	<0.000005	0.19900	
CEN 10:1 - Chrysene (aq)			<0.00005	1121	493	0	<0.00005	0.10500	
CEN 10:1 - Chrysene (aq)			<0.000005	1121	493	0	<0.000005	0.01050	
CEN 10:1 - Pyrene (aq)			<0.00005	1121	887	0	<0.00005	0.20600	
CEN 10:1 - Pyrene (aq)			<0.000005	1121	887	0	<0.000005	0.02060	
CEN 10:1 - Benzo(a)anthracene (aq)			<0.00005	1121	483	0	<0.00005	0.09460	
CEN 10:1 - Benzo(a)anthracene (aq)			<0.000005	1121	483	0	<0.000005	0.00946	
CEN 10:1 - Benzo(b)fluoranthene (aq)			<0.00005	1121	485	0	<0.00005	0.15100	
CEN 10:1 - Benzo(b)fluoranthene (aq)			<0.000005	1121	485	0	<0.000005	0.01510	
CEN 10:1 - Benzo(k)fluoranthene (aq)			<0.00005	1121	392	0	<0.00005	0.11800	
CEN 10:1 - Benzo(k)fluoranthene (aq)			<0.000005	1121	392	0	<0.000005	0.01180	
CEN 10:1 - Benzo(a)pyrene (aq)			<0.00002	1121	471	0	<0.00002	0.10400	
CEN 10:1 - Benzo(a)pyrene (aq)			<0.000002	1121	471	0	<0.000002	0.01040	
CEN 10:1 - Dibenzo(a,h)anthracene (aq)			<0.00005	1121	186	0	<0.00005	0.09230	
CEN 10:1 - Dibenzo(a,h)anthracene (aq)			<0.000005	1121	186	0	<0.000005	0.00923	
CEN 10:1 - Benzo(g,h,i)perylene (aq)			<0.00005	1121	284	0	<0.00005	0.09280	
CEN 10:1 - Benzo(g,h,i)perylene (aq)			<0.000005	1121	284	0	<0.000005	0.03000	
CEN 10:1 - Indeno(1,2,3-cd)pyrene (aq)			<0.00005	1121	306	0	<0.00005	0.11100	
CEN 10:1 - Indeno(1,2,3-cd)pyrene (aq)			<0.000005	1121	306	0	<0.000005	0.01110	
CEN 10:1 - PAH, Total Detected USEPA 16 (aq)			<0.00082	1121	760	0	<0.00082	133.00000	
CEN 10:1 - PAH, Total Detected USEPA 16 (aq)			<0.000082	1121	760	0	<0.000082	13.30000	
EPH CWG (Speciated)				1121	0	0			
CEN 10:1 - Aliphatics >C16-C35 Aqueous			<0.1	1121	15	0	<0.1	1.84000	
CEN 10:1 - Aliphatics >C16-C35 Aqueous			<0.01	1121	15	0	<0.01	0.18400	
Volatile Organic Compounds (VOCs)				145	0	0			
CEN 10:1 - Benzene			<0.01	145	23	0	<0.01	0.21100	
CEN 10:1 - Benzene			<0.001	145	23	0	<0.001	0.02110	
CEN 10:1 - Toluene			<0.001	145	14	0	<0.001	0.00983	
CEN 10:1 - Toluene			<0.01	145	14	0	<0.01	0.09830	
CEN 10:1 - Ethylbenzene			<0.01	145	0	0	<0.01	<0.01	
CEN 10:1 - Ethylbenzene			<0.001	145	0	0	<0.001	<0.001	
CEN 10:1 - m,p-Xylene			<0.01	145	6	0	<0.01	0.10300	
CEN 10:1 - m,p-Xylene			<0.001	145	6	0	<0.001	0.01030	
CEN 10:1 - o-Xylene			<0.01	145	2	0	<0.01	0.03470	
CEN 10:1 - o-Xylene			<0.001	145	2	0	<0.001	0.00347	
CEN 10:1 - Sum of detected Xylenes			<0.02	145	3	0	<0.02	0.13800	
CEN 10:1 - Sum of detected Xylenes			<0.002	145	3	0	<0.002	0.01380	
Addition Inorganic									
CEN 10:1 - Ammoniacal Nitrogen as N (low level)	TM099	mg/kg	<0.1	531	20	0	<0.1	78.70000	
CEN 10:1 - Ammoniacal Nitrogen as N (low level)	TM099	mg/l	<0.01	531	20	0	<0.01	7.87000	
CEN 10:1 - Cyanide, Free	TM227	mg/kg	<0.5	976	0	0	<0.5	<0.5	
CEN 10:1 - Cyanide, Free	TM227	mg/l	<0.05	976	0	0	<0.05	<0.05	
Phenols				445	0	0			
CEN 10:1 - Phenol	TM259	mg/kg	<0.02	445	0	0	<0.02	<0.02	
CEN 10:1 - Phenol	TM259	mg/l	<0.002	445	0	0	<0.002	<0.002	

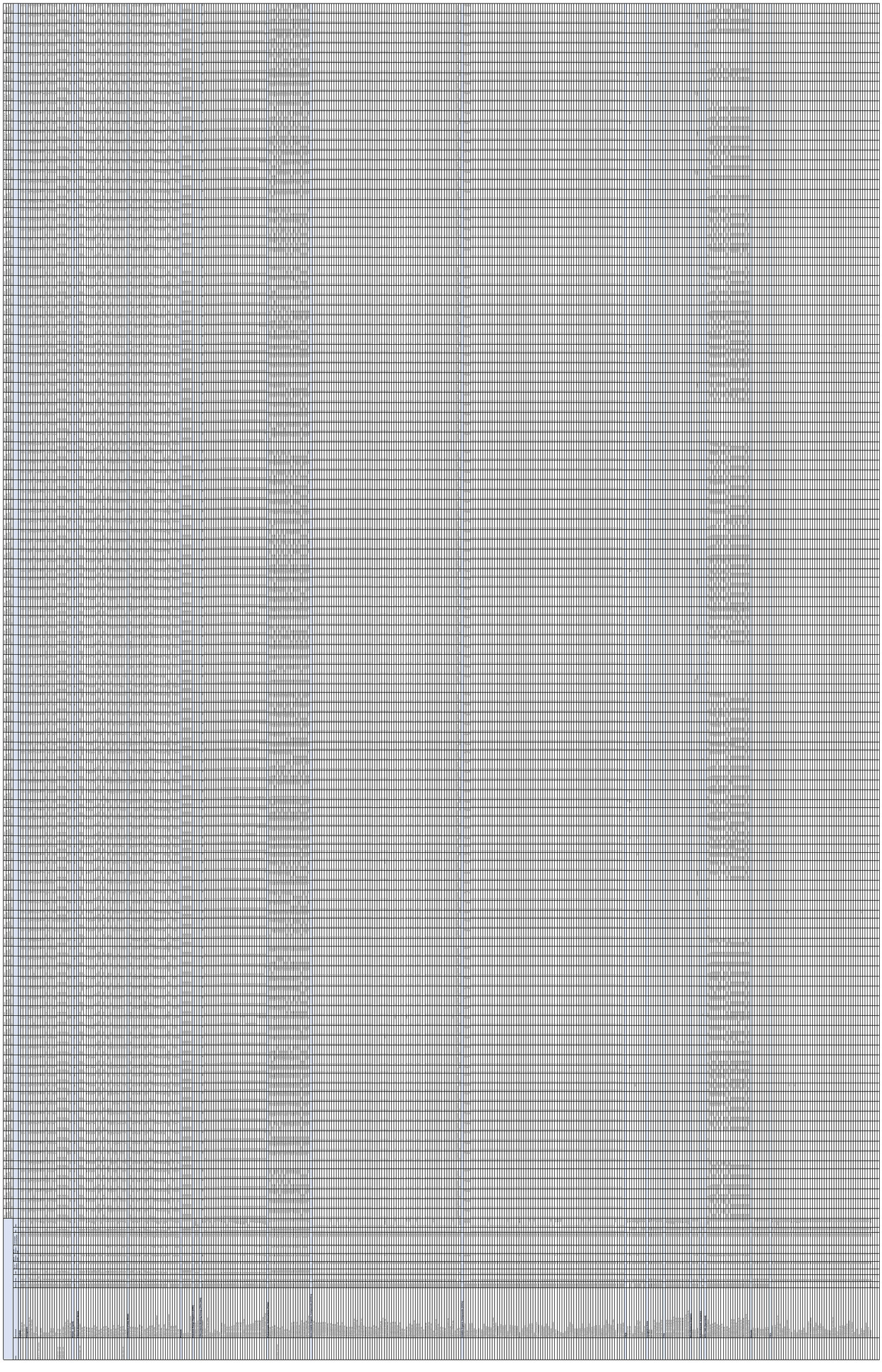




Appendix H: Surface Waters Analysis

Glan Llyn Surface Water Data

Notes	Determinand	Method	Units	LOD	No. of Samples	No. of Samples <LOD	No. of Samples > EQS	% of samples exceeding EQS	Min	Max	EQS
	Carbon										
	Inorganics										
	Metals - (Liquid)										
	Filtered (Dissolved) Metals										
	Unfiltered (Total) Metals										
	Phenols										
	Gasoline Range Organics (GRO)										
	TPH Criteria Working Group (TPH CWG)										
	Polyaromatic Hydrocarbons (PAHs)										
	Semi-Volatile Organic Compounds (SVOCs)										
	Volatile Organic Compounds (VOCs)										
	TICS										
	Inorganics Extra										
	TPH										
	Miscellaneous Organics										
	Subcontracted: Inorganics										
	EPH CWG (Speciated)										
	Glycols										
	TICs										





Appendix I: Chemical Input Parameters and Justifications

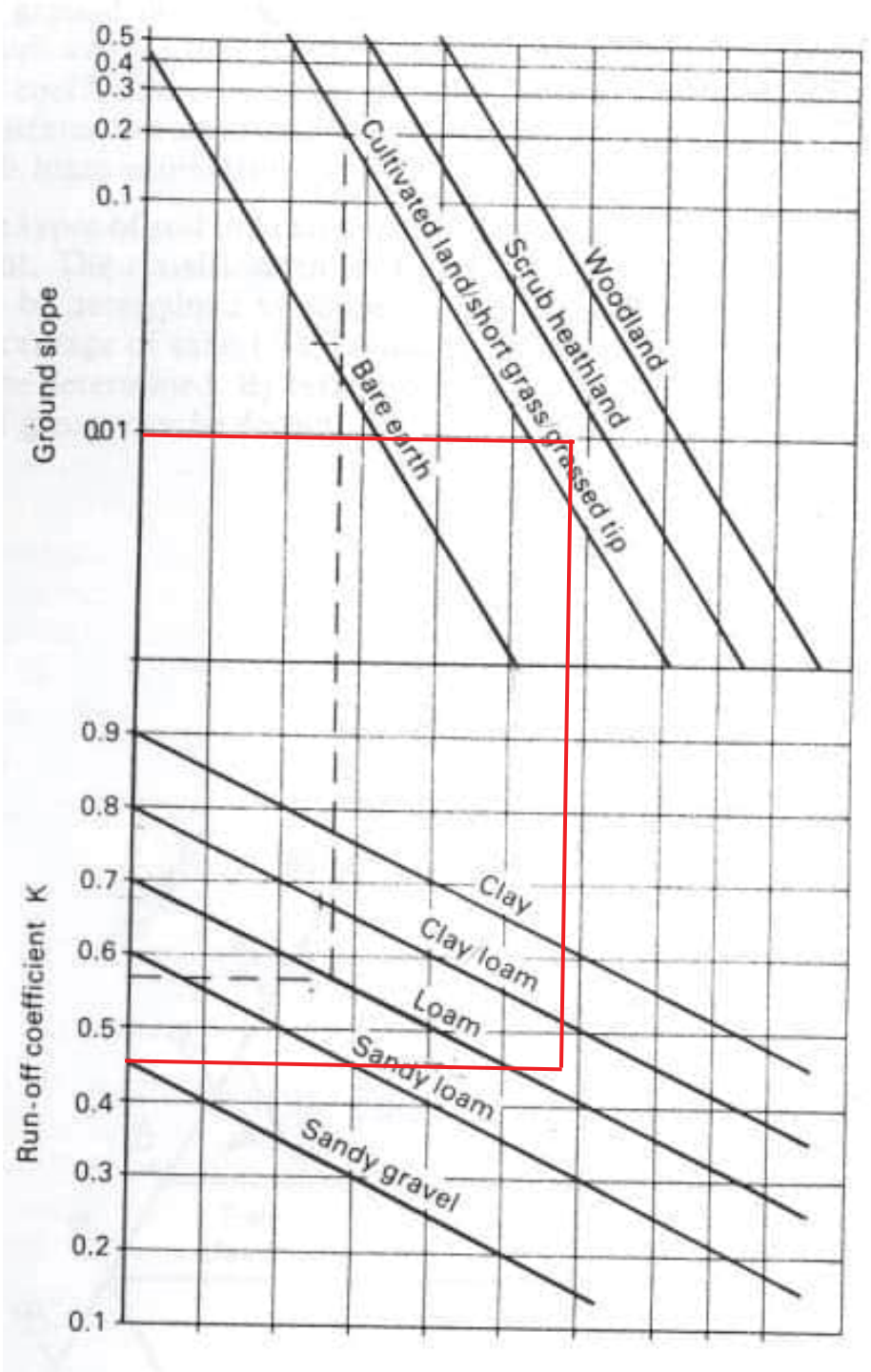
Half-Life and other Determinand-Specific Values Utilised for Specific PAHs Modelled in RT Worksheet Level 3 Groundwater Assessment

Benzo(a)pyrene	Value Utilised	Data Source/Justification
Half life	36500 days	This is a conservative estimation as aerobic conditions are considered likely to prevail in pore-waters in re-engineered Made Ground (within surface 1.00m-3.00m depth). Handbook of Environmental Degradation Rates (CRC Press - 2019 edition) indicates an aqueous biodegradation rate of between 1.45 years (aerobic conditions) and 5.8 years (anaerobic conditions).
Kd	10183	This is a site specific value derived previous by Atkins and is based on the product of the contaminant-specific organic partition coefficient (k_{oc}) and the fraction of organic carbon ($f_{oc.}$).
Contaminant Target Concentration	0.00000017mg/l (0.00017µg/l)	Water Framework Directive (DEFRA/Ministers 2015).

Benzo(b)fluoranthene	Value Utilised	Data Source/Justification
Half life	36500 days	This is a conservative estimation as aerobic conditions are considered likely to prevail in pore-waters in re-engineered Made Ground (within surface 1.00m-3.00m depth). Handbook of Environmental Degradation Rates (CRC Press - 2019 edition) indicates an aqueous biodegradation rate of between 1.67 years (aerobic conditions) and 6.68 years (anaerobic conditions).
Kd	53442	This is a site specific value derived previous by Atkins and is based on the product of the contaminant-specific organic partition coefficient (k_{oc}) and the fraction of organic carbon ($f_{oc.}$).
Contaminant Target Concentration	0.00000017mg/l (0.00017µg/l)	Water Framework Directive (DEFRA/Ministers 2015).

Naphthalene	Value Utilised	Data Source/Justification
Half life	100 days	This is a conservative estimation, as aerobic conditions are considered likely to prevail in pore-waters in re-engineered Made Ground (within surface 1.00m-3.00m depth). Handbook of Environmental Degradation Rates (CRC Press - 2019 edition) indicates an aqueous biodegradation rate of between 12 hours (aerobic conditions) and 258 days (anaerobic conditions).
Kd	36	This is a site specific value derived previous by Atkins and is based on the product of the contaminant-specific organic partition coefficient (k_{oc}) and the fraction of organic carbon ($f_{oc.}$).
Contaminant Target Concentration	0.002mg/l (2µg/l)	Water Framework Directive (DEFRA/Ministers 2015).

Runoff Coefficient Nomogram (National Coal Board, 1982)



Determinand-Specific Parameters

Determinand	Henrys Law Coefficient (H)	Ref.	Soil Organic Carbon-Water Partitioning Coefficient (koc)	Ref.	Solid/Liquid Partition Coefficient (Kd)	Ref.
Units	**(cm^3/cm^3)**		**(-)**		**l/kg**	
Inorganic Metals and Metalloids						
Arsenic	1	-	-	-	134	6
Cadmium	1	-	-	-	776	6
Chromium	1	-	-	-	5,336	6
Copper	1	-	-	-	1,199	6
Iron	1	-	-	-	810	5
Lead	1	-	-	-	34,877	6
Manganese	1	-	-	-	720	5
Mercury	1	-	-	-	5,000	6
Nickel	1	-	-	-	7,652	6
Selenium	1	-	-	-	186	6
Vanadium	1	-	-	-	213	6
Zinc	1	-	-	-	33,558	6
Other Inorganics						
Ammoniacal Nitrogen	1	-	-	-	1	5
Cyanide	1	-	-	-	5	7
Organics						
Benzene	0.182	1	27	5	0.64	koc*foc
Toluene	0.221	1	178	1	4.25	koc*foc
Ethylbenzene	0.3	1	432	1	10.31	koc*foc
Xylene*	0.22	1	260	5	6.20	koc*foc
Phenol	0.000068	1	28.8	1	0.69	koc*foc
TPH Criteria Working Group						
TPH Aliphatic >C5-C6	33	2	794	3	19	koc*foc
TPH Aliphatic >C_6-C_8	50	2	3,981	3	95	koc*foc
TPH Aliphatic >C_8-C_{10}	80	2	31,623	3	755	koc*foc
TPH Aliphatic >C_{10}-C_{12}	120	2	25,1189	3	5,996	koc*foc
TPH Aliphatic >C_{12}-C_{16}	520	2	501,1872	3	119,643	koc*foc

TPH Aliphatic >C_{16}-C_{21}	4,900	2	630,957,344	3	15,062,116	koc*foc
TPH Aliphatic >C_{21}-C_{35}	4,900	2	630,957,344	3	15,062,116	koc*foc
TPH Aliphatic >C_{35}-C_{44}	4,900	2	630,957,344	3	15,062,116	koc*foc
TPH Aromatic >C_5-C_7	0.23	2	79	5	2	koc*foc
TPH Aromatic >C_7-C_8	0.27	2	251	5	6	koc*foc
TPH Aromatic >C_8-C_{10}	0.48	2	1,585	3	38	koc*foc
TPH Aromatic >C_{10}-C_{12}	0.14	2	2,512	3	60	koc*foc
TPH Aromatic >C_{12}-C_{16}	0.05	2	5,012	3	120	koc*foc
TPH Aromatic >C_{16}-C_{21}	0.01	2	15,849	3	378	koc*foc
TPH Aromatic >C_{21}-C_{35}	0.00067	2	125,893	3	3,005	koc*foc
TPH Aromatic >C_{35}-C_{44}	0.00067	2	125,893	3	3,005	koc*foc
TPH Aromatic >C_{40}-C_{44}	0.00067	2	125,893	3	3,005	koc*foc
Polyaromatic Hydrocarbons						
Acenaphthene	0.0049	1	18,621	4	445	koc*foc
Acenaphthylene	0.0034	1	33,113	4	791	koc*foc
Anthracene	0.0016	1	38,019	4	908	koc*foc
Benzo(a)anthracene	0.00024	1	676,083	4	16,139	koc*foc
Benzo(a)pyrene	0.000019	1	426,580	4	10,183	koc*foc
Benzo(b)fluoranthene	0.0002	1	2,238,721	4	53,442	koc*foc
Benzo(k)fluoranthene	0.000034	1	3,311,311	4	79,047	koc*foc
Benzo(g,h,i)perylene	0.00003	1	8,709,636	4	207,915	koc*foc
Chrysene	0.000026	1	691,831	4	16,515	koc*foc
Di-benz(a,h)anthracene	0.0000006	1	933,254	4	22,279	koc*foc
Indeno(1,2,3-cd)pyrene	0.000066	1	16,595,869	4	396,174	koc*foc
Fluoranthene	0.00042	1	117,490	4	2,805	koc*foc
Fluorene	0.0032	1	30,200	4	721	koc*foc
Naphthalene	0.017	1	1,514	4	36	koc*foc
Phenanthrene	0.0013	1	30,200	4	721	koc*foc
Pyrene	0.00037	1	85,114	4	2,032	koc*foc

* Parameterised as total xylene

Determinand-Specific Parameter References:

1 - Environment Agency/Atkins, 2003. Review of the Fate and Transport of Selected Contaminants in the Soil Environment. Tables 2.4, 3.2 & 4.3

2 - Total Petroleum Hydrocarbon Criteria Working Group Series (TPHCWG), 1999. Human Health Risk-Based Evaluation of Petroleum Release Sites: Implementing the Working Group Approach, Volume 5, Table 1

3 - Total Petroleum Hydrocarbon Criteria Working Group Series (TPHCWG), 1997. Selection of representative TPH fractions based on fate & transport considerations, Volume 3, Table 7

4 - Geometric mean of koc values from Physical-Chemical Properties and Environmental Fate for Organic Chemicals, Mackay ET. al. 2006. 2nd Ed.

5 - ConSim Help files

6. Site specific Kd

7. Kow x 0.35 after USEPA FIRST User Manual. Kow value from EA Science Report SC040038/SR6.

Appendix J: Table 5-4 CWDQRA Reuse Criteria for 40% Infiltration

Table 5.4 CWDQRA Reuse Criteria for 40% Infiltration of Incident Rainfall into Engineered Made Ground - Comparison of Calculated CWDQRA Reuse Criteria against Maximum Soil Concentrations Determined (Soils 2017 onwards)

Determinand	Commercial Area				Residential Area			
	Re-use Criteria C_{mg} (mg/kg)	Maximum Soil Sample Value* (mg/kg)	Average Soil Sample Value* (mg/kg)	95th Percentile	Re-use Criteria (mg/kg)	Maximum Soil Sample Value (mg/kg)	Average Soil Sample Value* (mg/kg)	95th Percentile
Inorganic Metals and Metalloids								
Arsenic	11468.786	397.00	12.12	22.00	2902.688	397.00	12.12	22.00
Cadmium	330.551	31.30	0.66	2.22	83.661	31.30	0.66	2.22
Chromium	42699.080	3090.00	123.26	533.00	10806.907	3090.00	123.26	533.00
Copper	2042.252	1970.00	25.60	53.84	516.883	1970.00	25.60	53.84
Iron	1379515.806	*2390000.00*	92413.21	255000.00	349148.010	*2390000.00*	92413.21	255000.00
Lead	71246.366	4220.00	81.71	211.60	18032.071	4220.00	81.71	211.60
Manganese	150835.652	*408000.00*	8689.62	32270.00	38175.690	*408000.00*	8689.62	32270.00
Mercury	595.859	*14.00*	0.61	1.40	150.809	*14.00*	0.61	1.40
Nickel	52109.372	313.00	25.04	43.86	13188.601	313.00	25.04	43.86
Selenium	3177.881	51.70	5.62	15.60	804.305	51.70	5.62	15.60
Vanadium	7270.791	2880.00	186.56	645.25	1840.198	2880.00	186.56	645.25
Zinc	622690.141	13300.00	281.36	771.40	157599.516	13300.00	281.36	771.40
Other Inorganics								
Ammoniacal Nitrogen	699.276	*1590.00*	62.39	269.00	176.983	*1590.00*	62.39	269.00
Cyanide	9.140	*272.00*	2.53	4.58	2.313	*272.00*	2.53	4.58
Organics								
Benzene	17.220	7.03	0.15	0.20	4.358	7.03	0.15	0.20
Toluene	581.530	28.30	0.13	0.14	147.182	28.30	0.13	0.14
Ethylbenzene	363.617	1.15	0.06	0.08	92.030	1.15	0.06	0.08
Xylene	335.724	61.50	0.20	0.20	84.970	61.50	0.20	0.20
Phenol	13.816	1.51	0.02	0.03	3.497	1.51	0.02	0.03
TPH Criteria Working Group								
Aliphatics >C5-C6	330.563	0.92	0.03	0.04	83.664	0.92	0.03	0.04
Aliphatics >C6-C8	1626.370	3.90	0.04	0.08	411.626	3.90	0.04	0.08
Aliphatics >C8-C10	12860.726	74.20	0.20	0.16	3254.980	74.20	0.20	0.16
Aliphatics >C10-C12	102089.217	987.00	2.06	0.48	25838.230	987.00	2.06	0.48
Aliphatics >C12-C16	2036742.733	1330.00	7.41	19.40	515488.601	1330.00	7.41	19.40
Aliphatics >C16-C21	256407138.283	3530.00	26.15	74.28	64895263.78	3530.00	26.15	74.28
Aliphatics >C21-C35	256407138.283	3580.00	73.42	212.40	64895263.78	3580.00	73.42	212.40
Aliphatics >C35-C44	256407138.283	1380.00	23.71	81.28	64895263.78	1380.00	23.71	81.28
Aromatics >EC5-EC7	38.530	5.26	0.04	0.04	9.752	5.26	0.04	0.04
Aromatics >EC7-EC8	801.639	20.30	0.05	0.04	202.890	20.30	0.05	0.04
Aromatics >EC8-EC10	650.327	49.50	0.15	0.14	164.594	49.50	0.15	0.14
Aromatics >EC10-EC12	1027.020	658.00	1.38	0.32	259.933	658.00	1.38	0.32
Aromatics >EC12-EC16	2042.955	5280.00	11.68	20.96	517.061	5280.00	11.68	20.96
Aromatics >EC16-EC21	6446.891	9800.00	46.85	127.80	1631.673	9800.00	46.85	127.80
Aromatics >EC21-EC35	51166.143	9010.00	113.20	400.80	12949.875	9010.00	113.20	400.80
Aromatics >EC35-EC44	51166.143	1580.00	39.47	145.40	12949.875	1580.00	39.47	145.40
Aromatics >EC40-EC44	51166.143	724.00	14.62	51.92	12949.875	724.00	14.62	51.92
Polyaromatic Hydrocarbons								
Acenaphthylene	75.733	2100.00	2.35	1.96	19.168	2100.00	2.35	1.96
Acenaphthene	134.627	193.00	0.37	0.31	34.073	193.00	0.37	0.31
Anthracene	154.563	1860.00	2.78	4.00	39.119	1860.00	2.78	4.00
Benz(a)anthracene	2747.512	1150.00	3.62	8.63	695.380	1150.00	3.62	8.63
Benzo(a)pyrene	156.023	714.00	2.92	7.93	39.489	714.00	2.92	7.93
Benzo(b)fluoranthene	15.466	1110.00	4.15	11.18	3.914	1110.00	4.15	11.18
Benzo(k)fluoranthene	22.876	373.00	1.63	4.18	5.790	373.00	1.63	4.18
Benzo(g,h,i)perylene	60.170	333.00	1.98	5.62	15.229	333.00	1.98	5.62
Chrysene	2811.508	1090.00	3.31	8.46	711.578	1090.00	3.31	8.46
Dibenzo(a,h)anthracene	3792.598	177.00	0.58	1.40	959.886	177.00	0.58	1.40
Indeno(1,2,3-cd)pyrene	114.651	374.00	2.04	5.46	29.018	374.00	2.04	5.46
Fluoranthene	30.083	2940.00	8.97	20.50	7.614	2940.00	8.97	20.50
Fluorene	122.786	1890.00	2.17	1.75	31.077	1890.00	2.17	1.75
Naphthalene	124.264	4680.00	8.42	4.14	31.450	4680.00	8.42	4.14
Phenanthrene	122.786	3810.00	7.57	11.48	31.077	3810.00	7.57	11.48
Pyrene	345.946	1.95	0.01	0.02	87.557	1.95	0.01	0.02

***Recent analyses carried out from 2017(Master Results)**

Indicates maximum soil concentration exceeds calculated Re-use Criteria

Appendix K: P20 Level 3 Groundwater Excel Sheets

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment

Site Name:	**Glan Llyn**			
Site Address:	**Llanwern**			
Completed by:	**Ross Cameron**			
Date:	**25-Jun-22**		**Version:**	**1**
Contaminant	**Ammoniacal Nitrogen**			
Target Concentration (C_T)	**0.3**	**mg/l**	**Origin of C_T:**	**Water Framework Directive (DEFRA/Ministers 2015)**

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

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		**Ammoniacal Nitrogen**		
Target concentration	C_T	**0.3**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
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**	**1.34E+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	**4.04E+01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.3	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	25-Jun-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Ammoniacal Nitrogen**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**0.3** **mg/l**	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentr**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	25-Jun-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Ammoniacal Nitrogen		from Level 1
Target Concentration	C_T	0.3	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		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 pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	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	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point	**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction** partitioning equation. 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 ionic organic chemicals (acids)

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		fraction
Organic carbon partition coefficient	Koc		l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

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

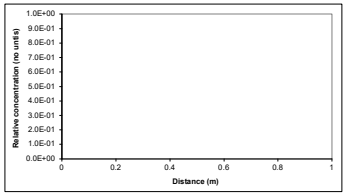
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	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 desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation 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.

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:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	**1.0E+00**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

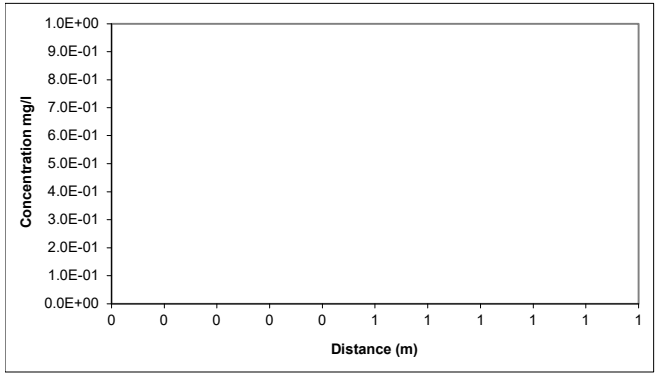
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_W	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Ammoniacal Nitrogen		from Level 1
Target Concentration	C_T	3.00E-01	mg/l	from Level 1

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

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

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
Initial contaminant concentration in groundwater at plume core	C_0	2.55E+02	mg/l	*Based on 95th percentile soil conc of 644mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	2.19E+03	days	*Buss et al NC/02/49 2003 (EA)*
Calculated decay rate	λ	3.17E-04	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappir*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	3.00E+01	m	*Site data*
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	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	2.13E+02	l/kg	*see options*
Longitudinal dispersivity	ax	2.13E+00	m	*see options*
Transverse dispersivity	az	2.13E-01	m	*see options*
Vertical dispersivity	ay	2.13E-02	m	*see options*

Calculated Parameters

	Variable	
Groundwater flow velocity	v	1.08E-03 m/d
Retardation factor	Rf	3.62E+03 fraction
Decay rate used	λ	8.74E-08 d^{-1}
Rate of contaminant flow due to retardation	u	2.98E-07 m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	4.53E-01 mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**5.62E+02**

Remedial Targets

Remedial Target		**1.69E+02**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**30**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**4.53E-01**	**mg/l**	Domenico - Steady state

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.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	2.13E+02	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		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	2.13E+02	l/kg

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

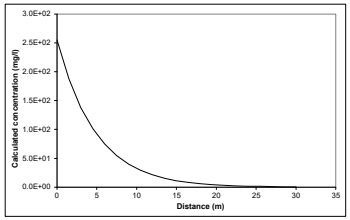
Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	3.00E+00	2.13E+00	m
Transverse dispersivity	**az**	0.00E+00	3.00E-01	2.13E-01	m
Vertical dispersivity	**ay**	0.00E+00	3.00E-02	2.13E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

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



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, 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 it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater 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 9.0E+99.

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

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	2.5E+02
1.5	1.88E+02
3.0	1.38E+02
4.5	1.02E+02
6.0	7.46E+01
7.5	5.46E+01
9.0	3.99E+01
10.5	2.91E+01
12.0	2.12E+01
13.5	1.54E+01
15.0	1.12E+01
16.5	8.11E+00
18.0	5.89E+00
19.5	4.27E+00
21.0	3.10E+00
22.5	2.25E+00
24.0	1.63E+00
25.5	1.18E+00
27.0	8.60E-01
28.5	6.24E-01
30.0	4.53E-01

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **ımoniacal Nitrogen**

Parameter	Value	Units
(carried over from input sheet)		
C_T	3.00E-01	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **4.04E+01 mg/kg** **for Ammoniacal Nitrogen**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	25/06/2022
Version:	1

Level 2 Calculation Sheet

Contaminant nmoniacal Nitrogen

Site assessed:	Glan Llyn
Date:	25/06/2022
Version:	1

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	
		m3/d
A	0.00E+00	m2
		m3/d
Cc	0.00E+00	mg/l
C_T	3.00E-01	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

Calculation based on target concentration #DIV/0!

Calculation based on observed contaminant concentration #DIV/0!



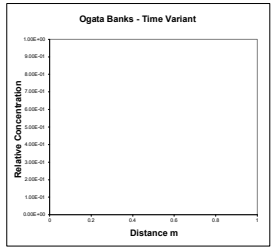
Contaminant ammoniacal Nitrogen

OGATA BANKS SOLUTION

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	3.000E-01	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

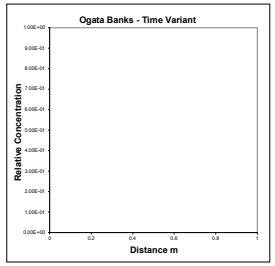
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



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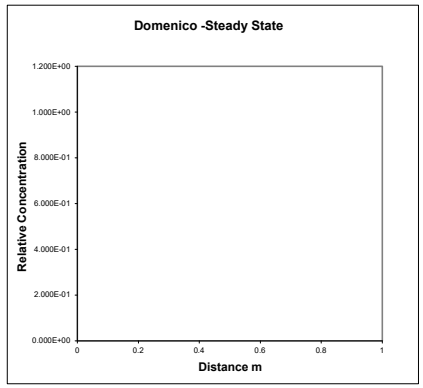
Contaminant **noniacal Nitrogen**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	3.000E-01	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!



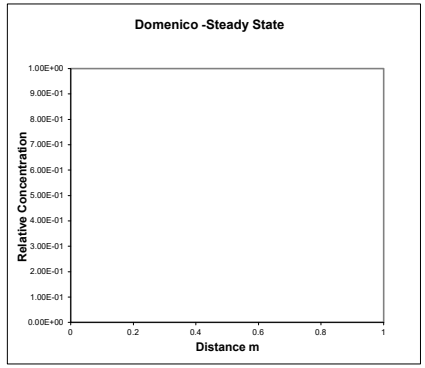
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!



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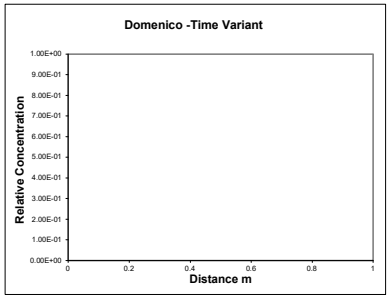
DOMENICO (TIME VARIANT)

Contaminant noniacal Nitrogen

Input	Value	Units
C_T	0.3	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

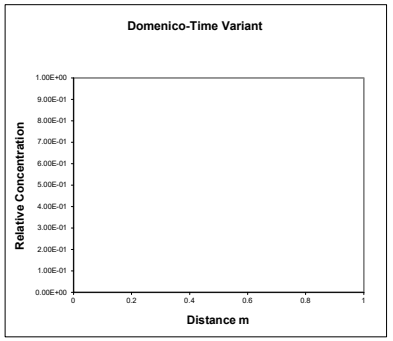
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	25/06/2022
Version:	1

OGATA BANKS SOLUTION

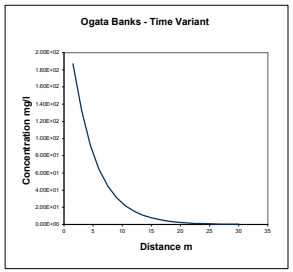
Contaminant **ımoniacal Nitrogen**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.3	mg/l
Co	2.55E+02	mg/l
λ	8.74E-08	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	2.13E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	3.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.13E+00	m
az	2.13E-01	m
ay	2.13E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

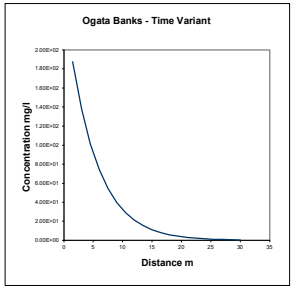
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1.5	31.8475	-3.1E-01	7.4E-01	-3.5E+46	2.000	1.0E+00	2.7E+00	3.5E+46	0.000	2.2E+02	1	-2.2E+02	-1	2.1E+00	0.997	-2.1E+00	-0.997	1.87E+02
2	3	31.8475	-6.1E-01	5.4E-01	-3.5E+46	2.000	2.0E+00	7.6E+00	3.5E+46	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9642	-1.5E+00	-0.96416	1.33E+02
3	4.5	31.8475	-9.2E-01	4.0E-01	-3.5E+46	2.000	3.0E+00	2.1E+01	3.5E+46	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9134	-1.2E+00	-0.9134	9.28E+01
4	6	31.8475	-1.2E+00	2.9E-01	-3.5E+46	2.000	4.0E+00	5.7E+01	3.5E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8622	-1.0E+00	-0.8622	6.45E+01
5	7.5	31.8475	-1.5E+00	2.2E-01	-3.5E+46	2.000	5.1E+00	1.6E+02	3.5E+46	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8156	-9.4E-01	-0.81561	4.49E+01
6	9	31.8475	-1.8E+00	1.6E-01	-3.5E+46	2.000	6.1E+00	4.3E+02	3.5E+46	0.000	9.0E+01	1	-9.0E+01	-1	8.6E-01	0.7744	-8.6E-01	-0.77438	3.14E+01
7	10.5	31.8475	-2.1E+00	1.2E-01	-3.5E+46	2.000	7.1E+00	1.2E+03	3.5E+46	0.000	8.4E+01	1	-8.4E+01	-1	7.9E-01	0.7381	-7.9E-01	-0.73807	2.20E+01
8	12	31.8475	-2.5E+00	8.6E-02	-3.5E+46	2.000	8.1E+00	3.3E+03	3.5E+46	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.706	-7.4E-01	-0.706	1.55E+01
9	13.5	31.8475	-2.8E+00	6.3E-02	-3.5E+46	2.000	9.1E+00	9.0E+03	3.5E+46	0.000	7.4E+01	1	-7.4E+01	-1	7.0E-01	0.6775	-7.0E-01	-0.67751	1.10E+01
10	15	31.8475	-3.1E+00	4.7E-02	-3.5E+46	2.000	1.0E+01	2.5E+04	3.5E+46	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6521	-6.6E-01	-0.65206	7.76E+00
11	16.5	31.8475	-3.4E+00	3.4E-02	-3.5E+46	2.000	1.1E+01	6.8E+04	3.5E+46	0.000	6.7E+01	1	-6.7E+01	-1	6.3E-01	0.6292	-6.3E-01	-0.62917	5.51E+00
12	18	31.8475	-3.7E+00	2.5E-02	-3.5E+46	2.000	1.2E+01	1.9E+05	3.5E+46	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6085	-6.1E-01	-0.60845	3.92E+00
13	19.5	31.8475	-4.0E+00	1.9E-02	-3.5E+46	2.000	1.3E+01	5.1E+05	3.5E+46	0.000	6.1E+01	1	-6.1E+01	-1	5.8E-01	0.5896	-5.8E-01	-0.5896	2.80E+00
14	21	31.8475	-4.3E+00	1.4E-02	-3.5E+46	2.000	1.4E+01	1.4E+06	3.5E+46	0.000	5.9E+01	1	-5.9E+01	-1	5.6E-01	0.5724	-5.6E-01	-0.57237	2.00E+00
15	22.5	31.8475	-4.6E+00	1.0E-02	-3.5E+46	2.000	1.5E+01	3.9E+06	3.5E+46	0.000	5.7E+01	1	-5.7E+01	-1	5.4E-01	0.5565	-5.4E-01	-0.55654	1.43E+00
16	24	31.8475	-4.9E+00	7.4E-03	-3.5E+46	2.000	1.6E+01	1.1E+07	3.5E+46	0.000	5.5E+01	1	-5.5E+01	-1	5.2E-01	0.5419	-5.2E-01	-0.54193	1.03E+00
17	25.5	31.8475	-5.2E+00	5.5E-03	-3.5E+46	2.000	1.7E+01	2.9E+07	3.5E+46	0.000	5.4E+01	1	-5.4E+01	-1	5.1E-01	0.5284	-5.1E-01	-0.52839	7.36E-01
18	27	31.8475	-5.5E+00	4.0E-03	-3.5E+46	2.000	1.8E+01	8.0E+07	3.5E+46	0.000	5.2E+01	1	-5.2E+01	-1	4.9E-01	0.5158	-4.9E-01	-0.51581	5.29E-01
19	28.5	31.8475	-5.8E+00	3.0E-03	-3.5E+46	2.000	1.9E+01	2.2E+08	3.5E+46	0.000	5.1E+01	1	-5.1E+01	-1	4.8E-01	0.5041	-4.8E-01	-0.50408	3.81E-01
20	30	31.8475	-6.1E+00	2.2E-03	-3.5E+46	2.000	2.0E+01	6.1E+08	3.5E+46	0.000	4.9E+01	1	-4.9E+01	-1	4.7E-01	0.4931	-4.7E-01	-0.49311	2.74E-01



Calc	Value	
v	1.08E-03	m/d
Rc	3.62E+03	
u	2.98E-07	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1.5	31.8475	-3.1E-01	7.4E-01	-3.5E+46	2.000	1.0E+00	2.7E+00	3.5E+46	0.000	2.2E+02	1	-2.2E+02	-1	4.2E+00	1	-4.2E+00	-1	1.88E+02
2	3	31.8475	-6.1E-01	5.4E-01	-3.5E+46	2.000	2.0E+00	7.6E+00	3.5E+46	0.000	1.6E+02	1	-1.6E+02	-1	3.0E+00	1	-3.0E+00	-0.99997	1.38E+02
3	4.5	31.8475	-9.2E-01	4.0E-01	-3.5E+46	2.000	3.0E+00	2.1E+01	3.5E+46	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9994	-2.4E+00	-0.99939	1.02E+02
4	6	31.8475	-1.2E+00	2.9E-01	-3.5E+46	2.000	4.0E+00	5.7E+01	3.5E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.1E+00	0.997	-2.1E+00	-0.997	7.46E+01
5	7.5	31.8475	-1.5E+00	2.2E-01	-3.5E+46	2.000	5.1E+00	1.6E+02	3.5E+46	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.9921	-1.9E+00	-0.99206	5.46E+01
6	9	31.8475	-1.8E+00	1.6E-01	-3.5E+46	2.000	6.1E+00	4.3E+02	3.5E+46	0.000	9.0E+01	1	-9.0E+01	-1	1.7E+00	0.9846	-1.7E+00	-0.98463	3.99E+01
7	10.5	31.8475	-2.1E+00	1.2E-01	-3.5E+46	2.000	7.1E+00	1.2E+03	3.5E+46	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9751	-1.6E+00	-0.97515	2.91E+01
8	12	31.8475	-2.5E+00	8.6E-02	-3.5E+46	2.000	8.1E+00	3.3E+03	3.5E+46	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9642	-1.5E+00	-0.96416	2.12E+01
9	13.5	31.8475	-2.8E+00	6.3E-02	-3.5E+46	2.000	9.1E+00	9.0E+03	3.5E+46	0.000	7.4E+01	1	-7.4E+01	-1	1.4E+00	0.9522	-1.4E+00	-0.95215	1.54E+01
10	15	31.8475	-3.1E+00	4.7E-02	-3.5E+46	2.000	1.0E+01	2.5E+04	3.5E+46	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9395	-1.3E+00	-0.93951	1.12E+01
11	16.5	31.8475	-3.4E+00	3.4E-02	-3.5E+46	2.000	1.1E+01	6.8E+04	3.5E+46	0.000	6.7E+01	1	-6.7E+01	-1	1.3E+00	0.9265	-1.3E+00	-0.92652	8.11E+00
12	18	31.8475	-3.7E+00	2.5E-02	-3.5E+46	2.000	1.2E+01	1.9E+05	3.5E+46	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9134	-1.2E+00	-0.9134	5.89E+00
13	19.5	31.8475	-4.0E+00	1.9E-02	-3.5E+46	2.000	1.3E+01	5.1E+05	3.5E+46	0.000	6.1E+01	1	-6.1E+01	-1	1.2E+00	0.9003	-1.2E+00	-0.90032	4.27E+00
14	21	31.8475	-4.3E+00	1.4E-02	-3.5E+46	2.000	1.4E+01	1.4E+06	3.5E+46	0.000	5.9E+01	1	-5.9E+01	-1	1.1E+00	0.8874	-1.1E+00	-0.88738	3.10E+00
15	22.5	31.8475	-4.6E+00	1.0E-02	-3.5E+46	2.000	1.5E+01	3.9E+06	3.5E+46	0.000	5.7E+01	1	-5.7E+01	-1	1.1E+00	0.8747	-1.1E+00	-0.87465	2.25E+00
16	24	31.8475	-4.9E+00	7.4E-03	-3.5E+46	2.000	1.6E+01	1.1E+07	3.5E+46	0.000	5.5E+01	1	-5.5E+01	-1	1.0E+00	0.8622	-1.0E+00	-0.8622	1.63E+00
17	25.5	31.8475	-5.2E+00	5.5E-03	-3.5E+46	2.000	1.7E+01	2.9E+07	3.5E+46	0.000	5.4E+01	1	-5.4E+01	-1	1.0E+00	0.8501	-1.0E+00	-0.85006	1.18E+00
18	27	31.8475	-5.5E+00	4.0E-03	-3.5E+46	2.000	1.8E+01	8.0E+07	3.5E+46	0.000	5.2E+01	1	-5.2E+01	-1	9.9E-01	0.8382	-9.9E-01	-0.83824	8.60E-01
19	28.5	31.8475	-5.8E+00	3.0E-03	-3.5E+46	2.000	1.9E+01	2.2E+08	3.5E+46	0.000	5.1E+01	1	-5.1E+01	-1	9.6E-01	0.8268	-9.6E-01	-0.82675	6.24E-01
20	30	31.8475	-6.1E+00	2.2E-03	-3.5E+46	2.000	2.0E+01	6.1E+08	3.5E+46	0.000	4.9E+01	1	-4.9E+01	-1	9.4E-01	0.8156	-9.4E-01	-0.81561	4.53E-01



Date:	25/06/2022
Version:	1

Contaminant **noniacal Nitrogen**

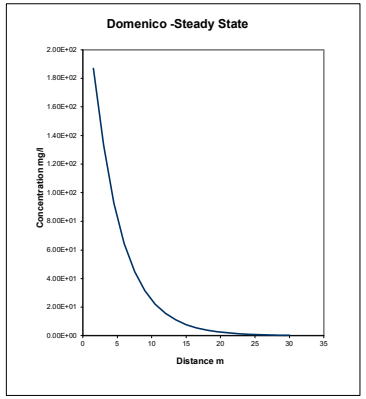
DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.3	mg/l
Co	2.55E+02	mg/l
λ	8.74E-08	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	2.13E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	3.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.13E+00	m
az	2.13E-01	m
ay	2.13E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1.5	63.695	-3.06E-01	7.36E-01	2.21E+02	1	-2.21E+02	-1	2.10E+00	0.997	-2.10E+00	-0.997	1.87E+02
2	3	63.695	-6.13E-01	5.42E-01	1.56E+02	1	-1.56E+02	-1	1.48E+00	0.964	-1.48E+00	-0.9642	1.33E+02
3	4.5	63.695	-9.19E-01	3.99E-01	1.28E+02	1	-1.28E+02	-1	1.21E+00	0.913	-1.21E+00	-0.9134	9.28E+01
4	6	63.695	-1.23E+00	2.94E-01	1.11E+02	1	-1.11E+02	-1	1.05E+00	0.862	-1.05E+00	-0.8622	6.45E+01
5	7.5	63.695	-1.53E+00	2.16E-01	9.89E+01	1	-9.89E+01	-1	9.39E-01	0.816	-9.39E-01	-0.8156	4.49E+01
6	9	63.695	-1.84E+00	1.59E-01	9.03E+01	1	-9.03E+01	-1	8.57E-01	0.774	-8.57E-01	-0.7744	3.14E+01
7	10.5	63.695	-2.14E+00	1.17E-01	8.36E+01	1	-8.36E+01	-1	7.93E-01	0.738	-7.93E-01	-0.7381	2.20E+01
8	12	63.695	-2.45E+00	8.62E-02	7.82E+01	1	-7.82E+01	-1	7.42E-01	0.706	-7.42E-01	-0.706	1.55E+01
9	13.5	63.695	-2.76E+00	6.34E-02	7.37E+01	1	-7.37E+01	-1	7.00E-01	0.678	-7.00E-01	-0.6775	1.10E+01
10	15	63.695	-3.06E+00	4.67E-02	7.00E+01	1	-7.00E+01	-1	6.64E-01	0.652	-6.64E-01	-0.6521	7.76E+00
11	16.5	63.695	-3.37E+00	3.44E-02	6.67E+01	1	-6.67E+01	-1	6.33E-01	0.629	-6.33E-01	-0.6292	5.51E+00
12	18	63.695	-3.68E+00	2.53E-02	6.39E+01	1	-6.39E+01	-1	6.06E-01	0.608	-6.06E-01	-0.6085	3.92E+00
13	19.5	63.695	-3.98E+00	1.86E-02	6.14E+01	1	-6.14E+01	-1	5.82E-01	0.59	-5.82E-01	-0.5896	2.80E+00
14	21	63.695	-4.29E+00	1.37E-02	5.91E+01	1	-5.91E+01	-1	5.61E-01	0.572	-5.61E-01	-0.5724	2.00E+00
15	22.5	63.695	-4.60E+00	1.01E-02	5.71E+01	1	-5.71E+01	-1	5.42E-01	0.557	-5.42E-01	-0.5565	1.43E+00
16	24	63.695	-4.90E+00	7.43E-03	5.53E+01	1	-5.53E+01	-1	5.25E-01	0.542	-5.25E-01	-0.5419	1.03E+00
17	25.5	63.695	-5.21E+00	5.47E-03	5.37E+01	1	-5.37E+01	-1	5.09E-01	0.528	-5.09E-01	-0.5284	7.36E-01
18	27	63.695	-5.52E+00	4.03E-03	5.21E+01	1	-5.21E+01	-1	4.95E-01	0.516	-4.95E-01	-0.5158	5.29E-01
19	28.5	63.695	-5.82E+00	2.96E-03	5.08E+01	1	-5.08E+01	-1	4.81E-01	0.504	-4.81E-01	-0.5041	3.81E-01
20	30	63.695	-6.13E+00	2.18E-03	4.95E+01	1	-4.95E+01	-1	4.69E-01	0.493	-4.69E-01	-0.4931	2.74E-01



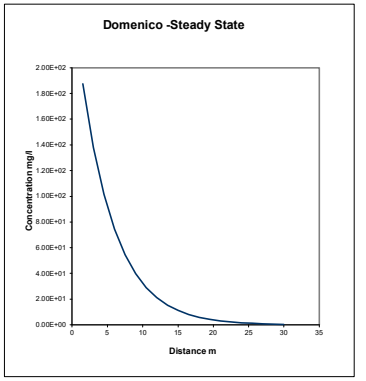
Calc **Value**

v	1.08E-03	m/d
Rc	3.62E+03	
u	2.98E-07	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1.5	63.695	-3.06E-01	7.36E-01	2.21E+02	1	-2.21E+02	-1	4.20E+00	1	-4.20E+00	-1	1.88E+02
2	3	63.695	-6.13E-01	5.42E-01	1.56E+02	1	-1.56E+02	-1	2.97E+00	1	-2.97E+00	-1	1.38E+02
3	4.5	63.695	-9.19E-01	3.99E-01	1.28E+02	1	-1.28E+02	-1	2.42E+00	0.999	-2.42E+00	-0.9994	1.02E+02
4	6	63.695	-1.23E+00	2.94E-01	1.11E+02	1	-1.11E+02	-1	2.10E+00	0.997	-2.10E+00	-0.997	7.46E+01
5	7.5	63.695	-1.53E+00	2.16E-01	9.89E+01	1	-9.89E+01	-1	1.88E+00	0.992	-1.88E+00	-0.9921	5.46E+01
6	9	63.695	-1.84E+00	1.59E-01	9.03E+01	1	-9.03E+01	-1	1.71E+00	0.985	-1.71E+00	-0.9846	3.99E+01
7	10.5	63.695	-2.14E+00	1.17E-01	8.36E+01	1	-8.36E+01	-1	1.59E+00	0.975	-1.59E+00	-0.9751	2.91E+01
8	12	63.695	-2.45E+00	8.62E-02	7.82E+01	1	-7.82E+01	-1	1.48E+00	0.964	-1.48E+00	-0.9642	2.12E+01
9	13.5	63.695	-2.76E+00	6.34E-02	7.37E+01	1	-7.37E+01	-1	1.40E+00	0.952	-1.40E+00	-0.9522	1.54E+01
10	15	63.695	-3.06E+00	4.67E-02	7.00E+01	1	-7.00E+01	-1	1.33E+00	0.94	-1.33E+00	-0.9395	1.12E+01
11	16.5	63.695	-3.37E+00	3.44E-02	6.67E+01	1	-6.67E+01	-1	1.27E+00	0.927	-1.27E+00	-0.9265	8.11E+00
12	18	63.695	-3.68E+00	2.53E-02	6.39E+01	1	-6.39E+01	-1	1.21E+00	0.913	-1.21E+00	-0.9134	5.89E+00
13	19.5	63.695	-3.98E+00	1.86E-02	6.14E+01	1	-6.14E+01	-1	1.16E+00	0.9	-1.16E+00	-0.9003	4.27E+00
14	21	63.695	-4.29E+00	1.37E-02	5.91E+01	1	-5.91E+01	-1	1.12E+00	0.887	-1.12E+00	-0.8874	3.10E+00
15	22.5	63.695	-4.60E+00	1.01E-02	5.71E+01	1	-5.71E+01	-1	1.08E+00	0.875	-1.08E+00	-0.8747	2.25E+00
16	24	63.695	-4.90E+00	7.43E-03	5.53E+01	1	-5.53E+01	-1	1.05E+00	0.862	-1.05E+00	-0.8622	1.63E+00
17	25.5	63.695	-5.21E+00	5.47E-03	5.37E+01	1	-5.37E+01	-1	1.02E+00	0.85	-1.02E+00	-0.8501	1.18E+00
18	27	63.695	-5.52E+00	4.03E-03	5.21E+01	1	-5.21E+01	-1	9.89E-01	0.838	-9.89E-01	-0.8382	8.60E-01
19	28.5	63.695	-5.82E+00	2.96E-03	5.08E+01	1	-5.08E+01	-1	9.63E-01	0.827	-9.63E-01	-0.8268	6.24E-01
20	30	63.695	-6.13E+00	2.18E-03	4.95E+01	1	-4.95E+01	-1	9.39E-01	0.816	-9.39E-01	-0.8156	4.53E-01



Date:	25/06/2022
Version:	1

DOMENICO (TIME VARIANT)

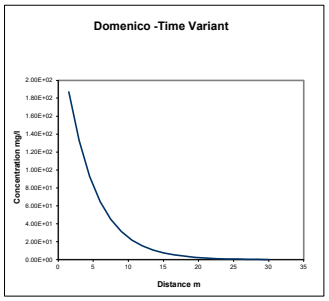
Contaminant **ɴoniacal Nitrogen**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.3	mg/l
Co	2.55E+02	mg/l
λ	8.74E-08	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	2.13E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	3.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.13E+00	m
az	2.13E-01	m
ay	2.13E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

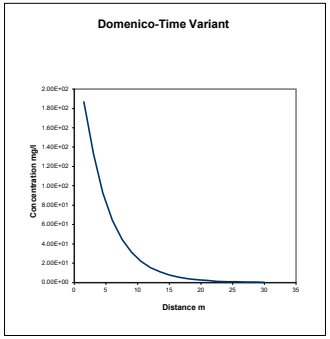
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1.5	31.8475	-3.06E-01	7.36E-01	-3.50E+46	2	2.21E+02	1	-2.21E+02	-1	2.10E+00	0.997	-2.10E+00	-0.997	1.87E+02
2	3	31.8475	-6.13E-01	5.42E-01	-3.50E+46	2	1.56E+02	1	-1.56E+02	-1	1.48E+00	0.9642	-1.48E+00	-0.964	1.33E+02
3	4.5	31.8475	-9.19E-01	3.99E-01	-3.50E+46	2	1.28E+02	1	-1.28E+02	-1	1.21E+00	0.9134	-1.21E+00	-0.913	9.28E+01
4	6	31.8475	-1.23E+00	2.94E-01	-3.50E+46	2	1.11E+02	1	-1.11E+02	-1	1.05E+00	0.8622	-1.05E+00	-0.862	6.45E+01
5	7.5	31.8475	-1.53E+00	2.16E-01	-3.50E+46	2	9.89E+01	1	-9.89E+01	-1	9.39E-01	0.8156	-9.39E-01	-0.816	4.49E+01
6	9	31.8475	-1.84E+00	1.59E-01	-3.50E+46	2	9.03E+01	1	-9.03E+01	-1	8.57E-01	0.7744	-8.57E-01	-0.774	3.14E+01
7	10.5	31.8475	-2.14E+00	1.17E-01	-3.50E+46	2	8.36E+01	1	-8.36E+01	-1	7.93E-01	0.7381	-7.93E-01	-0.738	2.20E+01
8	12	31.8475	-2.45E+00	8.62E-02	-3.50E+46	2	7.82E+01	1	-7.82E+01	-1	7.42E-01	0.706	-7.42E-01	-0.706	1.55E+01
9	13.5	31.8475	-2.76E+00	6.34E-02	-3.50E+46	2	7.37E+01	1	-7.37E+01	-1	7.00E-01	0.6775	-7.00E-01	-0.678	1.10E+01
10	15	31.8475	-3.06E+00	4.67E-02	-3.50E+46	2	7.00E+01	1	-7.00E+01	-1	6.64E-01	0.6521	-6.64E-01	-0.652	7.76E+00
11	16.5	31.8475	-3.37E+00	3.44E-02	-3.50E+46	2	6.67E+01	1	-6.67E+01	-1	6.33E-01	0.6292	-6.33E-01	-0.629	5.51E+00
12	18	31.8475	-3.68E+00	2.53E-02	-3.50E+46	2	6.39E+01	1	-6.39E+01	-1	6.06E-01	0.6085	-6.06E-01	-0.608	3.92E+00
13	19.5	31.8475	-3.98E+00	1.86E-02	-3.50E+46	2	6.14E+01	1	-6.14E+01	-1	5.82E-01	0.5896	-5.82E-01	-0.59	2.80E+00
14	21	31.8475	-4.29E+00	1.37E-02	-3.50E+46	2	5.91E+01	1	-5.91E+01	-1	5.61E-01	0.5724	-5.61E-01	-0.572	2.00E+00
15	22.5	31.8475	-4.60E+00	1.01E-02	-3.50E+46	2	5.71E+01	1	-5.71E+01	-1	5.42E-01	0.5565	-5.42E-01	-0.557	1.43E+00
16	24	31.8475	-4.90E+00	7.43E-03	-3.50E+46	2	5.53E+01	1	-5.53E+01	-1	5.25E-01	0.5419	-5.25E-01	-0.542	1.03E+00
17	25.5	31.8475	-5.21E+00	5.47E-03	-3.50E+46	2	5.37E+01	1	-5.37E+01	-1	5.09E-01	0.5284	-5.09E-01	-0.528	7.36E-01
18	27	31.8475	-5.52E+00	4.03E-03	-3.50E+46	2	5.21E+01	1	-5.21E+01	-1	4.95E-01	0.5158	-4.95E-01	-0.516	5.29E-01
19	28.5	31.8475	-5.82E+00	2.96E-03	-3.50E+46	2	5.08E+01	1	-5.08E+01	-1	4.81E-01	0.5041	-4.81E-01	-0.504	3.81E-01
20	30	31.8475	-6.13E+00	2.18E-03	-3.50E+46	2	4.95E+01	1	-4.95E+01	-1	4.69E-01	0.4931	-4.69E-01	-0.493	2.74E-01



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

Calc	Value	
v	1.08E-03	m/d
Rc	3.62E+03	
u	2.98E-07	m/d

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1.5	31.8475	-3.06E-01	7.36E-01	-3.50E+46	2	2.21E+02	1	-2.21E+02	-1	4.20E+00	1	-4.20E+00	-1	1.88E+02
2	3	31.8475	-6.13E-01	5.42E-01	-3.50E+46	2	1.56E+02	1	-1.56E+02	-1	2.97E+00	1	-2.97E+00	-1	1.38E+02
3	4.5	31.8475	-9.19E-01	3.99E-01	-3.50E+46	2	1.28E+02	1	-1.28E+02	-1	2.42E+00	0.9994	-2.42E+00	-0.999	1.02E+02
4	6	31.8475	-1.23E+00	2.94E-01	-3.50E+46	2	1.11E+02	1	-1.11E+02	-1	2.10E+00	0.997	-2.10E+00	-0.997	7.46E+01
5	7.5	31.8475	-1.53E+00	2.16E-01	-3.50E+46	2	9.89E+01	1	-9.89E+01	-1	1.88E+00	0.9921	-1.88E+00	-0.992	5.46E+01
6	9	31.8475	-1.84E+00	1.59E-01	-3.50E+46	2	9.03E+01	1	-9.03E+01	-1	1.71E+00	0.9846	-1.71E+00	-0.985	3.99E+01
7	10.5	31.8475	-2.14E+00	1.17E-01	-3.50E+46	2	8.36E+01	1	-8.36E+01	-1	1.59E+00	0.9751	-1.59E+00	-0.975	2.91E+01
8	12	31.8475	-2.45E+00	8.62E-02	-3.50E+46	2	7.82E+01	1	-7.82E+01	-1	1.48E+00	0.9642	-1.48E+00	-0.964	2.12E+01
9	13.5	31.8475	-2.76E+00	6.34E-02	-3.50E+46	2	7.37E+01	1	-7.37E+01	-1	1.40E+00	0.9522	-1.40E+00	-0.952	1.54E+01
10	15	31.8475	-3.06E+00	4.67E-02	-3.50E+46	2	7.00E+01	1	-7.00E+01	-1	1.33E+00	0.9395	-1.33E+00	-0.94	1.12E+01
11	16.5	31.8475	-3.37E+00	3.44E-02	-3.50E+46	2	6.67E+01	1	-6.67E+01	-1	1.27E+00	0.9265	-1.27E+00	-0.927	8.11E+00
12	18	31.8475	-3.68E+00	2.53E-02	-3.50E+46	2	6.39E+01	1	-6.39E+01	-1	1.21E+00	0.9134	-1.21E+00	-0.913	5.89E+00
13	19.5	31.8475	-3.98E+00	1.86E-02	-3.50E+46	2	6.14E+01	1	-6.14E+01	-1	1.16E+00	0.9003	-1.16E+00	-0.9	4.27E+00
14	21	31.8475	-4.29E+00	1.37E-02	-3.50E+46	2	5.91E+01	1	-5.91E+01	-1	1.12E+00	0.8874	-1.12E+00	-0.887	3.10E+00
15	22.5	31.8475	-4.60E+00	1.01E-02	-3.50E+46	2	5.71E+01	1	-5.71E+01	-1	1.08E+00	0.8747	-1.08E+00	-0.875	2.25E+00
16	24	31.8475	-4.90E+00	7.43E-03	-3.50E+46	2	5.53E+01	1	-5.53E+01	-1	1.05E+00	0.8622	-1.05E+00	-0.862	1.63E+00
17	25.5	31.8475	-5.21E+00	5.47E-03	-3.50E+46	2	5.37E+01	1	-5.37E+01	-1	1.02E+00	0.8501	-1.02E+00	-0.85	1.18E+00
18	27	31.8475	-5.52E+00	4.03E-03	-3.50E+46	2	5.21E+01	1	-5.21E+01	-1	9.89E-01	0.8382	-9.89E-01	-0.838	8.60E-01
19	28.5	31.8475	-5.82E+00	2.96E-03	-3.50E+46	2	5.08E+01	1	-5.08E+01	-1	9.63E-01	0.8268	-9.63E-01	-0.827	6.24E-01
20	30	31.8475	-6.13E+00	2.18E-03	-3.50E+46	2	4.95E+01	1	-4.95E+01	-1	9.39E-01	0.8156	-9.39E-01	-0.816	4.53E-01



Date:	25/06/2022
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	27-Apr-22		Version:	1
Contaminant	Vanadium			
Target Concentration (C_T)	0.02	mg/l	Origin of C_T:	UK Standard (Statutory): Protection of Aquatic Life (Cc

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

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		**Vanadium**	
Target concentration	C_T	**0.02**	**mg/l**

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
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	

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.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.69E+00**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.02	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Vanadium**		from Level 1
Target concentration	C_T	**0.02**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters	Variable	Value	Unit	Source
Contaminant		Vanadium		from Level 1
Target Concentration	C_T	0.02	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		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 pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	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	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target		**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**#DIV/0!**	**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 ionic organic chemicals (acids)

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		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

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

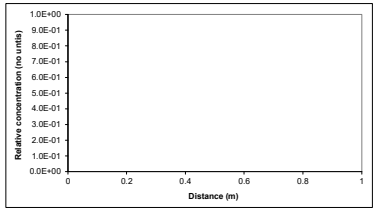
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	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 desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation 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.

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:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

Only input required is Soil Contaminant Concentration

	Input Parameters		
	Soil contaminant concentration	C_0	0.00E+00 mg/kg

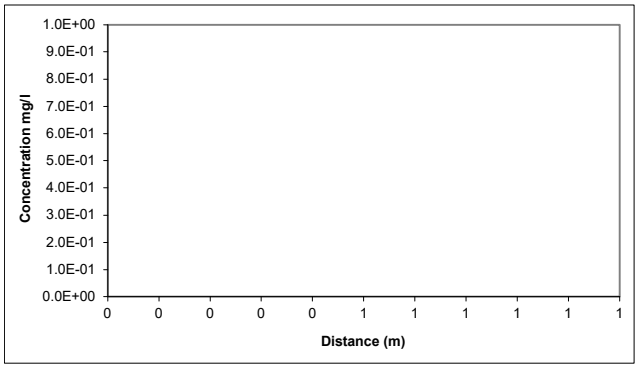
Level 1 Parameters

	Water filled soil porosity	θ_W	5.00E-01 fraction
	Air filled soil porosity	θa	3.70E-01 fraction
	Bulk density	ρ	1.36E+00 g/cm^3
	Henry's Law constant	H	1.00E+00 dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02 l/kg
	Factor (partitioning between soil and water)		1.35E+02 dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Vanadium		from Level 1
Target Concentration	C_T	2.00E-02	mg/l	from Level 1

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

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

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

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	3.01E+00	mg/l	*Based on 95th percentile soil conc of 644mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Estimation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
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	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	2.13E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	3.62E+03	fraction
Decay rate used	λ	2.13E-104	d^{-1}
Rate of contaminant flow due to retardation	u	2.98E-07	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	2.84E+00	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.06E+00**	

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	2.13E+02	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		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	2.13E+02	l/kg

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

Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00 m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01 m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02

Note values of dispersivity must be > 0

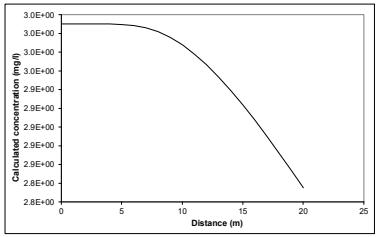
For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

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

Remedial Targets

Remedial Target		**2.12E-02**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	C_{ED}/C_0	**2.84E+00**	**mg/l**	Domenico - Steady state

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.



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, 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 it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater 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 9.0E+99.

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

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	3.0E+00
1.0	3.01E+00
2.0	3.01E+00
3.0	3.01E+00
4.0	3.01E+00
5.0	3.01E+00
6.0	3.01E+00
7.0	3.01E+00
8.0	3.00E+00
9.0	3.00E+00
10.0	2.99E+00
11.0	2.98E+00
12.0	2.97E+00
13.0	2.95E+00
14.0	2.94E+00
15.0	2.92E+00
16.0	2.91E+00
17.0	2.89E+00
18.0	2.87E+00
19.0	2.85E+00
20.0	2.84E+00

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Vanadium**

Parameter	Value	Units
(carried over from input sheet)		
C_T	2.00E-02	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

calc calc Calc Kd l/kg

Calculation of partition coefficient for ionic organic chemical

Partition coefficient used in Level 1 Assessment 1.34E+02 l/kg

Calculated Remedial Target **2.69E+00 mg/kg** **for Vanadium**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27/04/2022
Version:	1

Level 2 Calculation Sheet

Contaminant **Vanadium**

Site assessed:	Glan Llyn
Date:	27/04/2022
Version:	1

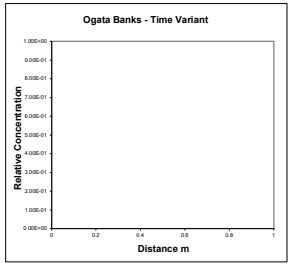
Parameter	Value	Units		
(carried over from input sheet)				
Mz	0.00E+00	m		
L	0.00E+00	m		
da	0.00E+00	m		Calculated
Inf	0.00E+00	m/d		Dilution Factor
K	0.00E+00	m/d		
i	0.00E+00		Calculation based on target concentration	#DIV/0!
		m3/d		
A	0.00E+00	m2	Calculation based on observed contaminant concentration	#DIV/0!
		m3/d		
Cc	0.00E+00	mg/l		
C_T	2.00E-02	mg/l		
Cu	0.00E+00	mg/l		
w	0.00E+00	m		

OGATA BANKS SOLUTION

Contaminant	Vanadium	
Input	**Value**	**Units**
C_T	2.000E-02	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

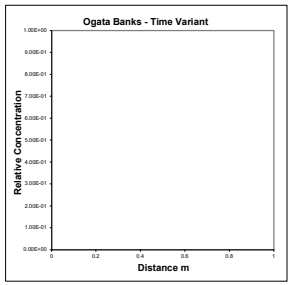
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	27/04/2022
Version:	1

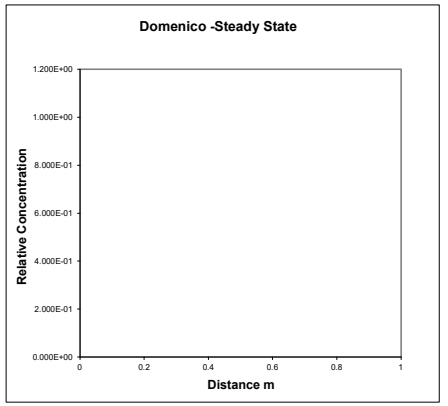
Contaminant **Vanadium**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	2.000E-02	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



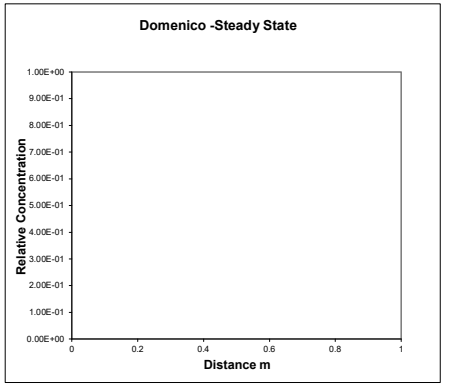
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

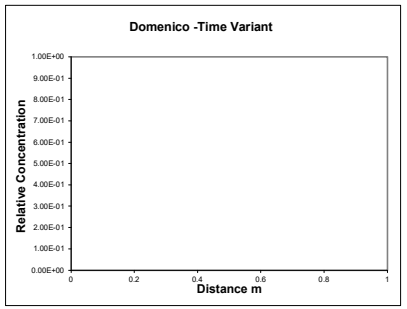
	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



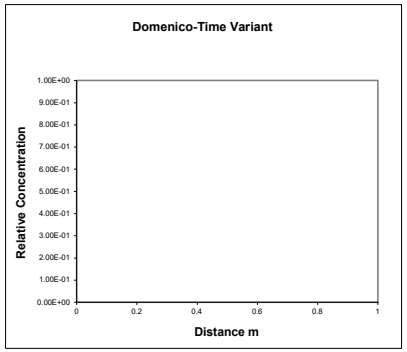
Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

Contaminant	Vanadium																
			Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)														
				X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
Input	**Value**	**Units**		m														
C_T	0.02	mg/l	1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DF	#DIV/0!		2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
λ	6.931E-101	$days^{-1}$	5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sz	0.000E+00	m	6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sy	0.000E+00	m	7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Kd	0.000E+00	l/kg	8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ρ	0.000E+00	g/cm3	9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
n	0.000E+00		10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
i	#DIV/0!		11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
K	0.000E+00	m/d	12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
x	0.000E+00	m	13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
z	0.000E+00	m	14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
y	0.000E+00	m	15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
t	1.000E+99	days	16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ax	0.000E+00	m	17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
az	0.000E+00	m	18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ay	0.000E+00	m	19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value																
			Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT														
				X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
v	#DIV/0!	m/d		m														
Rc	#DIV/0!		1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
u	#DIV/0!	m/d	2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



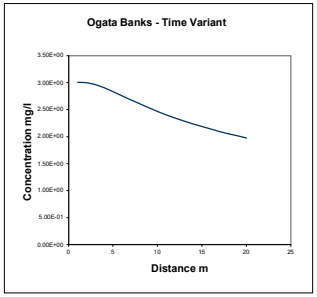
Date:	27/04/2022
Version:	1

OGATA BANKS SOLUTION

Contaminant	Vanadium	
Input	**Value**	**Units**
C_T	0.02	mg/l
Co	3.01E+00	mg/l
λ	2.13E-104	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	2.13E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	6.4E-01	1.9E+00	2.2E+46	0.000	3.2E+02	1	-3.2E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	3.01E+00
2	2	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.3E+00	3.6E+00	2.2E+46	0.000	2.2E+02	1	-2.2E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	3.00E+00
3	3	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.9E+00	6.8E+00	2.2E+46	0.000	1.8E+02	1	-1.8E+02	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	2.97E+00
4	4	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	2.6E+00	1.3E+01	2.2E+46	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	2.91E+00
5	5	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	3.2E+00	2.4E+01	2.2E+46	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	2.84E+00
6	6	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	3.8E+00	4.6E+01	2.2E+46	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9163	-1.2E+00	-0.91633	2.76E+00
7	7	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	4.5E+00	8.7E+01	2.2E+46	0.000	1.2E+02	1	-1.2E+02	-1	1.1E+00	0.8907	-1.1E+00	-0.89072	2.68E+00
8	8	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	5.1E+00	1.7E+02	2.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8659	-1.1E+00	-0.86587	2.61E+00
9	9	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	5.7E+00	3.1E+02	2.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8422	-1.0E+00	-0.84215	2.53E+00
10	10	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	6.4E+00	5.9E+02	2.2E+46	0.000	1.0E+02	1	-1.0E+02	-1	9.5E-01	0.8197	-9.5E-01	-0.81971	2.47E+00
11	11	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	7.0E+00	1.1E+03	2.2E+46	0.000	9.5E+01	1	-9.5E+01	-1	9.0E-01	0.7986	-9.0E-01	-0.79858	2.40E+00
12	12	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	7.7E+00	2.1E+03	2.2E+46	0.000	9.1E+01	1	-9.1E+01	-1	8.6E-01	0.7787	-8.6E-01	-0.77872	2.34E+00
13	13	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	8.3E+00	4.0E+03	2.2E+46	0.000	8.8E+01	1	-8.8E+01	-1	8.3E-01	0.7601	-8.3E-01	-0.76006	2.29E+00
14	14	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	8.9E+00	7.6E+03	2.2E+46	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7425	-8.0E-01	-0.74253	2.24E+00
15	15	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	9.6E+00	1.4E+04	2.2E+46	0.000	8.2E+01	1	-8.2E+01	-1	7.7E-01	0.726	-7.7E-01	-0.72604	2.19E+00
16	16	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.0E+01	2.7E+04	2.2E+46	0.000	7.9E+01	1	-7.9E+01	-1	7.5E-01	0.7105	-7.5E-01	-0.71052	2.14E+00
17	17	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.1E+01	5.2E+04	2.2E+46	0.000	7.7E+01	1	-7.7E+01	-1	7.3E-01	0.6959	-7.3E-01	-0.69588	2.09E+00
18	18	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.1E+01	9.8E+04	2.2E+46	0.000	7.4E+01	1	-7.4E+01	-1	7.1E-01	0.6821	-7.1E-01	-0.68205	2.05E+00
19	19	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.2E+01	1.8E+05	2.2E+46	0.000	7.2E+01	1	-7.2E+01	-1	6.9E-01	0.669	-6.9E-01	-0.66897	2.01E+00
20	20	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.3E+01	3.5E+05	2.2E+46	0.000	7.1E+01	1	-7.1E+01	-1	6.7E-01	0.6566	-6.7E-01	-0.65658	1.98E+00

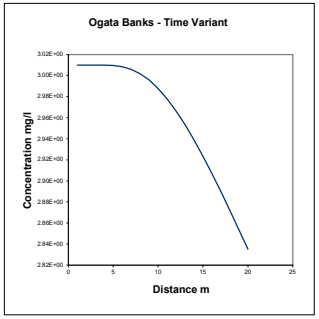


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	3.62E+03	
u	2.98E-07	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	6.4E-01	1.9E+00	2.2E+46	0.000	3.2E+02	1	-3.2E+02	-1	6.0E+00	1	-6.0E+00	-1	3.01E+00
2	2	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.3E+00	3.6E+00	2.2E+46	0.000	2.2E+02	1	-2.2E+02	-1	4.2E+00	1	-4.2E+00	-1	3.01E+00
3	3	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.9E+00	6.8E+00	2.2E+46	0.000	1.8E+02	1	-1.8E+02	-1	3.5E+00	1	-3.5E+00	-1	3.01E+00
4	4	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	2.6E+00	1.3E+01	2.2E+46	0.000	1.6E+02	1	-1.6E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	3.01E+00
5	5	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	3.2E+00	2.4E+01	2.2E+46	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99985	3.01E+00
6	6	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	3.8E+00	4.6E+01	2.2E+46	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9995	-2.4E+00	-0.99946	3.01E+00
7	7	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	4.5E+00	8.7E+01	2.2E+46	0.000	1.2E+02	1	-1.2E+02	-1	2.3E+00	0.9986	-2.3E+00	-0.99864	3.01E+00
8	8	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	5.1E+00	1.7E+02	2.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	3.00E+00
9	9	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	5.7E+00	3.1E+02	2.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9953	-2.0E+00	-0.99527	3.00E+00
10	10	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	6.4E+00	5.9E+02	2.2E+46	0.000	1.0E+02	1	-1.0E+02	-1	1.9E+00	0.9926	-1.9E+00	-0.99263	2.99E+00
11	11	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	7.0E+00	1.1E+03	2.2E+46	0.000	9.5E+01	1	-9.5E+01	-1	1.8E+00	0.9894	-1.8E+00	-0.98938	2.98E+00
12	12	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	7.7E+00	2.1E+03	2.2E+46	0.000	9.1E+01	1	-9.1E+01	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	2.97E+00
13	13	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	8.3E+00	4.0E+03	2.2E+46	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9812	-1.7E+00	-0.98124	2.95E+00
14	14	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	8.9E+00	7.6E+03	2.2E+46	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9765	-1.6E+00	-0.97647	2.94E+00
15	15	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	9.6E+00	1.4E+04	2.2E+46	0.000	8.2E+01	1	-8.2E+01	-1	1.5E+00	0.9713	-1.5E+00	-0.97133	2.92E+00
16	16	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.0E+01	2.7E+04	2.2E+46	0.000	7.9E+01	1	-7.9E+01	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	2.91E+00
17	17	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.1E+01	5.2E+04	2.2E+46	0.000	7.7E+01	1	-7.7E+01	-1	1.5E+00	0.9601	-1.5E+00	-0.96015	2.89E+00
18	18	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.1E+01	9.8E+04	2.2E+46	0.000	7.4E+01	1	-7.4E+01	-1	1.4E+00	0.9542	-1.4E+00	-0.95421	2.87E+00
19	19	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.2E+01	1.8E+05	2.2E+46	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9481	-1.4E+00	-0.94812	2.85E+00
20	20	0.37625	0.0E+00	1.0E+00	-2.2E+46	2.000	1.3E+01	3.5E+05	2.2E+46	0.000	7.1E+01	1	-7.1E+01	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	2.84E+00



Date:	27/04/2022
Version:	1

Contaminant **Vanadium**

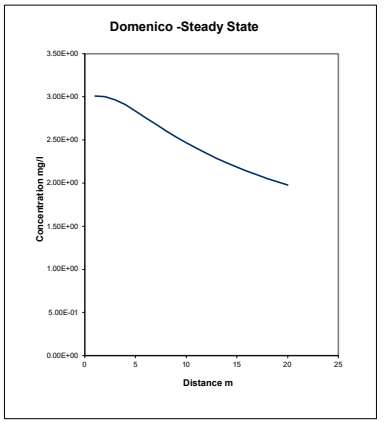
DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.02	mg/l
Co	3.01E+00	mg/l
λ	2.13E-104	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	2.13E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.7525	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	3.01E+00
2	2	0.7525	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.9973	3.00E+00
3	3	0.7525	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.9856	2.97E+00
4	4	0.7525	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.9659	2.91E+00
5	5	0.7525	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.9419	2.84E+00
6	6	0.7525	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.9163	2.76E+00
7	7	0.7525	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.8907	2.68E+00
8	8	0.7525	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.8659	2.61E+00
9	9	0.7525	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.8422	2.53E+00
10	10	0.7525	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.8197	2.47E+00
11	11	0.7525	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.7986	2.40E+00
12	12	0.7525	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.7787	2.34E+00
13	13	0.7525	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.7601	2.29E+00
14	14	0.7525	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.7425	2.24E+00
15	15	0.7525	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	2.19E+00
16	16	0.7525	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.7105	2.14E+00
17	17	0.7525	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.6959	2.09E+00
18	18	0.7525	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.6821	2.05E+00
19	19	0.7525	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	2.01E+00
20	20	0.7525	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.6566	1.98E+00



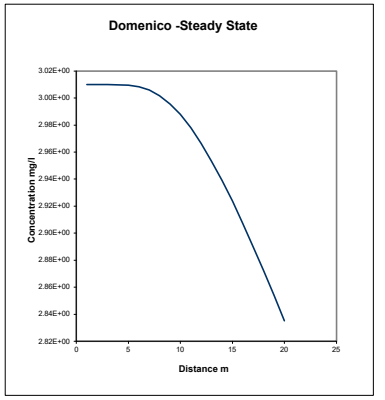
Calc **Value**

v	1.08E-03	m/d
Rc	3.62E+03	
u	2.98E-07	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.7525	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	3.01E+00
2	2	0.7525	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	3.01E+00
3	3	0.7525	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	3.01E+00
4	4	0.7525	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	3.01E+00
5	5	0.7525	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-0.9998	3.01E+00
6	6	0.7525	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.9995	3.01E+00
7	7	0.7525	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.9986	3.01E+00
8	8	0.7525	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.9973	3.00E+00
9	9	0.7525	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.9953	3.00E+00
10	10	0.7525	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.9926	2.99E+00
11	11	0.7525	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.9894	2.98E+00
12	12	0.7525	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.9856	2.97E+00
13	13	0.7525	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.9812	2.95E+00
14	14	0.7525	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.9765	2.94E+00
15	15	0.7525	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.9713	2.92E+00
16	16	0.7525	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.9659	2.91E+00
17	17	0.7525	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.9601	2.89E+00
18	18	0.7525	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.9542	2.87E+00
19	19	0.7525	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.9481	2.85E+00
20	20	0.7525	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.9419	2.84E+00



Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

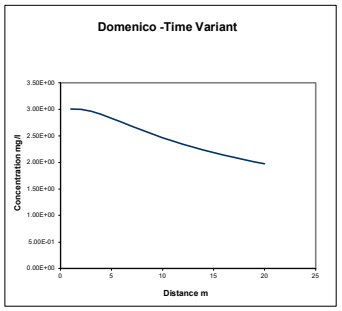
Contaminant	Vanadium	
Input	**Value**	**Units**
C_T	0.02	mg/l
Co	3.01E+00	mg/l
λ	2.13E-104	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	2.13E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option: Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	3.62E+03	
u	2.98E-07	m/d

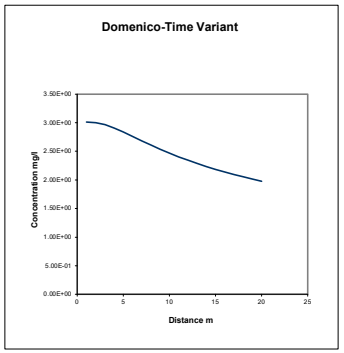
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	3.01E+00
2	2	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	3.00E+00
3	3	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.986	2.97E+00
4	4	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.966	2.91E+00
5	5	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.942	2.84E+00
6	6	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.916	2.76E+00
7	7	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.891	2.68E+00
8	8	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.866	2.61E+00
9	9	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.842	2.53E+00
10	10	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.82	2.47E+00
11	11	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.799	2.40E+00
12	12	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.779	2.34E+00
13	13	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.76	2.29E+00
14	14	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.743	2.24E+00
15	15	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	2.19E+00
16	16	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.711	2.14E+00
17	17	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.696	2.09E+00
18	18	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.682	2.05E+00
19	19	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	2.01E+00
20	20	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.657	1.98E+00



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	3.01E+00
2	2	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	3.01E+00
3	3	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	3.01E+00
4	4	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	3.01E+00
5	5	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-1	3.01E+00
6	6	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.999	3.01E+00
7	7	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.999	3.01E+00
8	8	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	3.00E+00
9	9	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.995	3.00E+00
10	10	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.993	2.99E+00
11	11	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.989	2.98E+00
12	12	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.986	2.97E+00
13	13	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.981	2.95E+00
14	14	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.976	2.94E+00
15	15	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.971	2.92E+00
16	16	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.966	2.91E+00
17	17	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.96	2.89E+00
18	18	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.954	2.87E+00
19	19	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.948	2.85E+00
20	20	0.37625	0.00E+00	1.00E+00	-2.18E+46	2	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.942	2.84E+00



Date:	27/04/2022
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment

Site Name:	**Glan Llyn**			
Site Address:	**Llanwern**			
Completed by:	**Ross Cameron**			
Date:	**25-Jun-22**		**Version:**	**1**
Contaminant	**TPH - n-Eicosane**			
Target Concentration (C_T)	**0.01**	**mg/l**	**Origin of C_T:**	**UK Drinking Water Standards 1989**

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

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		**TPH - n-Eicosane**		
Target concentration	**C_T**	**0.01**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
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**	**1.34E+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	**1.35E+00**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.01	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	25-Jun-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**TPH - n-Eicosane**		from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**0.01**	**mg/l**	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters

	Variable	Value	Unit	Source of parameter value	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	25-Jun-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters	Variable	Value	Unit	Source
Contaminant		TPH - n-Eicosane		from Level 1
Target Concentration	C_T	0.01	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		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 pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	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	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point	**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water
			partitioning equation.
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**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 ionic organic chemicals (acids)

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		fraction
Organic carbon partition coefficient	Koc		l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{soc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{soc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

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

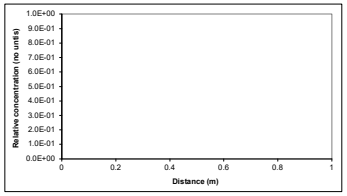
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	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 desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation 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.

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:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	**1.0E+00**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

Only input required is Soil Contaminant Concentration

Input Parameters			
Soil contaminant concentration	C_0	0.00E+00	mg/kg

Level 1 Parameters

Water filled soil porosity	θ_W	5.00E-01	fraction
Air filled soil porosity	θa	3.70E-01	fraction
Bulk density	ρ	1.36E+00	g/cm^3
Henry's Law constant	H	1.00E+00	dimensionless
Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
Factor (partitioning between soil and water)		1.35E+02	dimensionless

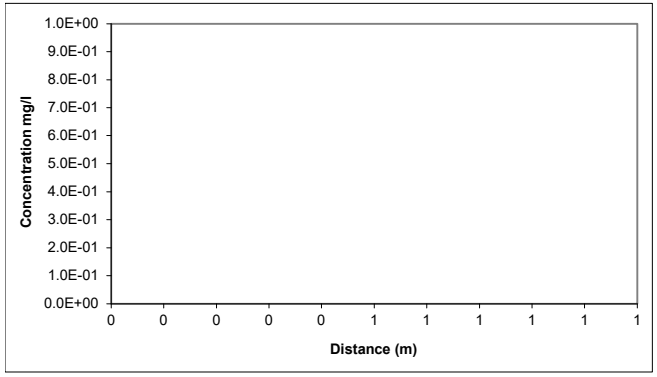
Level 2 Parameters **Dilution Factor** DF #DIV/0!

Level 3 Parameters **Attenuation factor (C_O/C_{ED})** AF #DIV/0!

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		TPH - n-Eicosane		from Level 1
Target Concentration	C_T	1.00E-02	mg/l	from Level 1

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

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

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
Initial contaminant concentration in groundwater at plume core	C_0	1.47E-05	mg/l	*Based on 95 percentile soil conc of 11.55*
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+04	days	*10 year half life estimation*
Calculated decay rate	λ	1.90E-05	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappir*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	*Estimate*
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
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	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	1.51E+07	l/kg	*see options*
Longitudinal dispersivity	ax	2.00E+00	m	*see options*
Transverse dispersivity	az	2.00E-01	m	*see options*
Vertical dispersivity	ay	2.00E-02	m	*see options*

Calculated Parameters

	Variable	
Groundwater flow velocity	v	1.08E-03 m/d
Retardation factor	Rf	2.56E+08 fraction
Decay rate used	λ	7.42E-14 d^{-1}
Rate of contaminant flow due to retardation	u	4.22E-12 m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	9.46E-06 mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.55E+00**

Remedial Targets

Remedial Target		**1.55E-02**	**mg/l**
Domenico - Steady state			
Distance to compliance point		**20**	**m**
Concentration of contaminant at compliance point	**C_{ED}/C_s**	**9.46E-06**	**mg/l**

For comparison with measured groundwater concentration.

Domenico - Steady state

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.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	1.51E+07	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		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	1.51E+07	l/kg

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

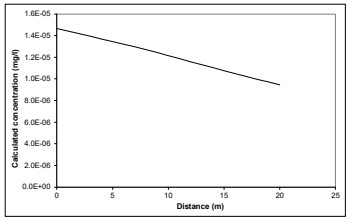
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

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



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, 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 it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater 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 9.0E+99.

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

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	1.5E-05
1.0	1.44E-05
2.0	1.42E-05
3.0	1.39E-05
4.0	1.37E-05
5.0	1.35E-05
6.0	1.32E-05
7.0	1.30E-05
8.0	1.27E-05
9.0	1.24E-05
10.0	1.22E-05
11.0	1.19E-05
12.0	1.16E-05
13.0	1.13E-05
14.0	1.10E-05
15.0	1.08E-05
16.0	1.05E-05
17.0	1.02E-05
18.0	9.97E-06
19.0	9.71E-06
20.0	9.46E-06

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant ΓPH - n-Eicosane

Parameter (carried over from input sheet)	Value	Units
C_T	1.00E-02	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target 1.35E+00 mg/kg for TPH - n-Eicosane

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Level 2 Calculation Sheet

Contaminant TPH - n-Eicosane

Site assessed:	Glan Llyn
Date:	25/06/2022
Version:	1

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	
		m3/d
A	0.00E+00	m2
		m3/d
Cc	0.00E+00	mg/l
C_T	1.00E-02	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

Calculation based on target concentration: #DIV/0!

Calculation based on observed contaminant concentration: #DIV/0!



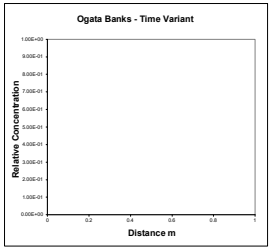
Contaminant TPH - n-Eicosane

OGATA BANKS SOLUTION

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.000E-02	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

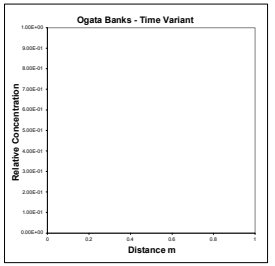
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	25/06/2022
Version:	1

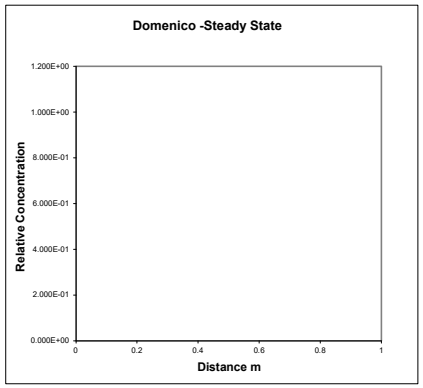
Contaminant **ᴵH - n-Eicosane**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.000E-02	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

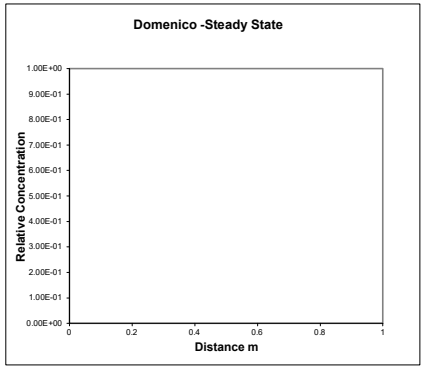


Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	25/06/2022
Version:	1

DOMENICO (TIME VARIANT)

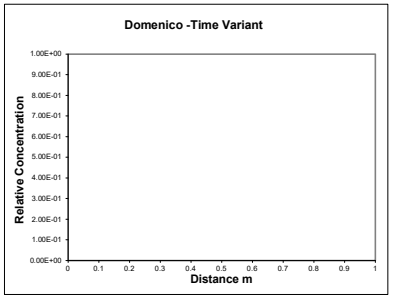
Contaminant **²H - n-Eicosane**

Input	Value	Units
C_T	0.01	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

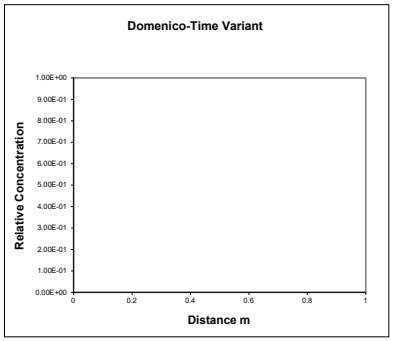
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!



Date:	25/06/2022
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OGATA BANKS SOLUTION

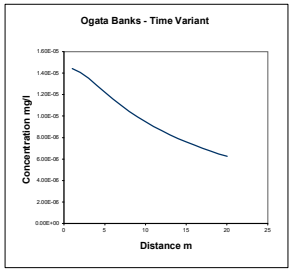
Contaminant **'PH - n-Eicosane**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.01	mg/l
Co	1.47E-05	mg/l
λ	7.42E-14	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.51E+07	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

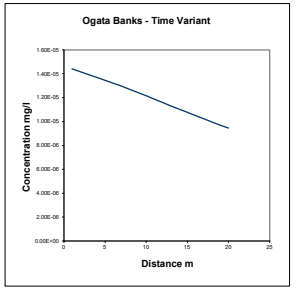
X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1.8E-06	-1.7E-02	9.8E-01	-7.8E+43	2.000	5.2E-01	1.7E+00	7.8E+43	0.000	2.8E+02	1	-2.8E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	1.44E-05
2	1.8E-06	-3.4E-02	9.7E-01	-7.8E+43	2.000	1.0E+00	2.8E+00	7.8E+43	0.000	2.0E+02	1	-2.0E+02	-1	1.9E+00	0.992	-1.9E+00	-0.99199	1.41E-05
3	1.8E-06	-5.1E-02	9.5E-01	-7.8E+43	2.000	1.6E+00	4.7E+00	7.8E+43	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	1.35E-05
4	1.8E-06	-6.8E-02	9.3E-01	-7.8E+43	2.000	2.1E+00	7.9E+00	7.8E+43	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	1.29E-05
5	1.8E-06	-8.5E-02	9.2E-01	-7.8E+43	2.000	2.6E+00	1.3E+01	7.8E+43	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	1.22E-05
6	1.8E-06	-1.0E-01	9.0E-01	-7.8E+43	2.000	3.1E+00	2.2E+01	7.8E+43	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8742	-1.1E+00	-0.87421	1.16E-05
7	1.8E-06	-1.2E-01	8.9E-01	-7.8E+43	2.000	3.6E+00	3.7E+01	7.8E+43	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8436	-1.0E+00	-0.84362	1.10E-05
8	1.8E-06	-1.4E-01	8.7E-01	-7.8E+43	2.000	4.1E+00	6.3E+01	7.8E+43	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8151	-9.4E-01	-0.8151	1.04E-05
9	1.8E-06	-1.5E-01	8.6E-01	-7.8E+43	2.000	4.7E+00	1.0E+02	7.8E+43	0.000	9.3E+01	1	-9.3E+01	-1	8.8E-01	0.7887	-8.8E-01	-0.7887	9.93E-06
10	1.8E-06	-1.7E-01	8.4E-01	-7.8E+43	2.000	5.2E+00	1.8E+02	7.8E+43	0.000	8.8E+01	1	-8.8E+01	-1	8.4E-01	0.7643	-8.4E-01	-0.76432	9.46E-06
11	1.8E-06	-1.9E-01	8.3E-01	-7.8E+43	2.000	5.7E+00	3.0E+02	7.8E+43	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7418	-8.0E-01	-0.7418	9.03E-06
12	1.8E-06	-2.0E-01	8.2E-01	-7.8E+43	2.000	6.2E+00	4.9E+02	7.8E+43	0.000	8.1E+01	1	-8.1E+01	-1	7.7E-01	0.721	-7.7E-01	-0.72098	8.62E-06
13	1.8E-06	-2.2E-01	8.0E-01	-7.8E+43	2.000	6.7E+00	8.3E+02	7.8E+43	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.7017	-7.4E-01	-0.70169	8.25E-06
14	1.8E-06	-2.4E-01	7.9E-01	-7.8E+43	2.000	7.2E+00	1.4E+03	7.8E+43	0.000	7.5E+01	1	-7.5E+01	-1	7.1E-01	0.6838	-7.1E-01	-0.68377	7.91E-06
15	1.8E-06	-2.6E-01	7.7E-01	-7.8E+43	2.000	7.8E+00	2.3E+03	7.8E+43	0.000	7.2E+01	1	-7.2E+01	-1	6.8E-01	0.6671	-6.8E-01	-0.66708	7.58E-06
16	1.8E-06	-2.7E-01	7.6E-01	-7.8E+43	2.000	8.3E+00	3.9E+03	7.8E+43	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6515	-6.6E-01	-0.6515	7.28E-06
17	1.8E-06	-2.9E-01	7.5E-01	-7.8E+43	2.000	8.8E+00	6.6E+03	7.8E+43	0.000	6.8E+01	1	-6.8E+01	-1	6.4E-01	0.6369	-6.4E-01	-0.63692	7.00E-06
18	1.8E-06	-3.1E-01	7.4E-01	-7.8E+43	2.000	9.3E+00	1.1E+04	7.8E+43	0.000	6.6E+01	1	-6.6E+01	-1	6.3E-01	0.6232	-6.3E-01	-0.62324	6.73E-06
19	1.8E-06	-3.2E-01	7.2E-01	-7.8E+43	2.000	9.8E+00	1.8E+04	7.8E+43	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6104	-6.1E-01	-0.61038	6.48E-06
20	1.8E-06	-3.4E-01	7.1E-01	-7.8E+43	2.000	1.0E+01	3.1E+04	7.8E+43	0.000	6.3E+01	1	-6.3E+01	-1	5.9E-01	0.5983	-5.9E-01	-0.59826	6.25E-06



Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

Calc	Value	Units
v	1.08E-03	m/d
Rc	2.56E+08	
u	4.22E-12	m/d

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1.8E-06	-1.7E-02	9.8E-01	-7.8E+43	2.000	5.2E-01	1.7E+00	7.8E+43	0.000	2.8E+02	1	-2.8E+02	-1	5.3E+00	1	-5.3E+00	-1	1.44E-05
2	1.8E-06	-3.4E-02	9.7E-01	-7.8E+43	2.000	1.0E+00	2.8E+00	7.8E+43	0.000	2.0E+02	1	-2.0E+02	-1	3.8E+00	1	-3.8E+00	-1	1.42E-05
3	1.8E-06	-5.1E-02	9.5E-01	-7.8E+43	2.000	1.6E+00	4.7E+00	7.8E+43	0.000	1.6E+02	1	-1.6E+02	-1	3.1E+00	1	-3.1E+00	-0.99999	1.39E-05
4	1.8E-06	-6.8E-02	9.3E-01	-7.8E+43	2.000	2.1E+00	7.9E+00	7.8E+43	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	1.37E-05
5	1.8E-06	-8.5E-02	9.2E-01	-7.8E+43	2.000	2.6E+00	1.3E+01	7.8E+43	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9992	-2.4E+00	-0.9992	1.35E-05
6	1.8E-06	-1.0E-01	9.0E-01	-7.8E+43	2.000	3.1E+00	2.2E+01	7.8E+43	0.000	1.1E+02	1	-1.1E+02	-1	2.2E+00	0.9978	-2.2E+00	-0.9978	1.32E-05
7	1.8E-06	-1.2E-01	8.9E-01	-7.8E+43	2.000	3.6E+00	3.7E+01	7.8E+43	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9954	-2.0E+00	-0.99541	1.30E-05
8	1.8E-06	-1.4E-01	8.7E-01	-7.8E+43	2.000	4.1E+00	6.3E+01	7.8E+43	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.992	-1.9E+00	-0.99199	1.27E-05
9	1.8E-06	-1.5E-01	8.6E-01	-7.8E+43	2.000	4.7E+00	1.0E+02	7.8E+43	0.000	9.3E+01	1	-9.3E+01	-1	1.8E+00	0.9876	-1.8E+00	-0.98758	1.24E-05
10	1.8E-06	-1.7E-01	8.4E-01	-7.8E+43	2.000	5.2E+00	1.8E+02	7.8E+43	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9823	-1.7E+00	-0.98229	1.22E-05
11	1.8E-06	-1.9E-01	8.3E-01	-7.8E+43	2.000	5.7E+00	3.0E+02	7.8E+43	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9763	-1.6E+00	-0.97626	1.19E-05
12	1.8E-06	-2.0E-01	8.2E-01	-7.8E+43	2.000	6.2E+00	4.9E+02	7.8E+43	0.000	8.1E+01	1	-8.1E+01	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	1.16E-05
13	1.8E-06	-2.2E-01	8.0E-01	-7.8E+43	2.000	6.7E+00	8.3E+02	7.8E+43	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9625	-1.5E+00	-0.96249	1.13E-05
14	1.8E-06	-2.4E-01	7.9E-01	-7.8E+43	2.000	7.2E+00	1.4E+03	7.8E+43	0.000	7.5E+01	1	-7.5E+01	-1	1.4E+00	0.955	-1.4E+00	-0.95498	1.10E-05
15	1.8E-06	-2.6E-01	7.7E-01	-7.8E+43	2.000	7.8E+00	2.3E+03	7.8E+43	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9472	-1.4E+00	-0.94719	1.08E-05
16	1.8E-06	-2.7E-01	7.6E-01	-7.8E+43	2.000	8.3E+00	3.9E+03	7.8E+43	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	1.05E-05
17	1.8E-06	-2.9E-01	7.5E-01	-7.8E+43	2.000	8.8E+00	6.6E+03	7.8E+43	0.000	6.8E+01	1	-6.8E+01	-1	1.3E+00	0.9311	-1.3E+00	-0.93109	1.02E-05
18	1.8E-06	-3.1E-01	7.4E-01	-7.8E+43	2.000	9.3E+00	1.1E+04	7.8E+43	0.000	6.6E+01	1	-6.6E+01	-1	1.3E+00	0.9229	-1.3E+00	-0.9229	9.97E-06
19	1.8E-06	-3.2E-01	7.2E-01	-7.8E+43	2.000	9.8E+00	1.8E+04	7.8E+43	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9147	-1.2E+00	-0.91468	9.71E-06
20	1.8E-06	-3.4E-01	7.1E-01	-7.8E+43	2.000	1.0E+01	3.1E+04	7.8E+43	0.000	6.3E+01	1	-6.3E+01	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	9.46E-06



Date:	25/06/2022
Version:	1

Contaminant **ᵇH - n-Eicosane**

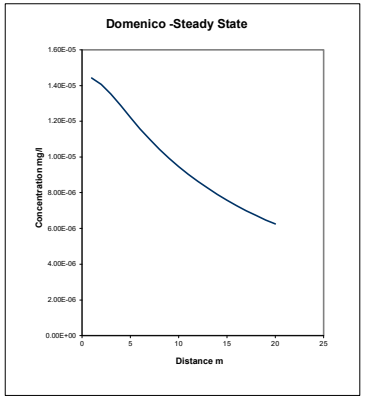
DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.01	mg/l
Co	1.47E-05	mg/l
λ	7.42E-14	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.51E+07	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

		X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1		3.7E-06	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	1.44E-05
2	2		3.7E-06	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	1.41E-05
3	3		3.7E-06	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	1.35E-05
4	4		3.7E-06	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	1.29E-05
5	5		3.7E-06	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	1.22E-05
6	6		3.7E-06	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.8742	1.16E-05
7	7		3.7E-06	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.8436	1.10E-05
8	8		3.7E-06	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.8151	1.04E-05
9	9		3.7E-06	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.7887	9.93E-06
10	10		3.7E-06	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.7643	9.46E-06
11	11		3.7E-06	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.7418	9.03E-06
12	12		3.7E-06	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	8.62E-06
13	13		3.7E-06	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.7017	8.25E-06
14	14		3.7E-06	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.6838	7.91E-06
15	15		3.7E-06	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.6671	7.58E-06
16	16		3.7E-06	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.6515	7.28E-06
17	17		3.7E-06	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.6369	7.00E-06
18	18		3.7E-06	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.6232	6.73E-06
19	19		3.7E-06	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.6104	6.48E-06
20	20		3.7E-06	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.5983	6.25E-06

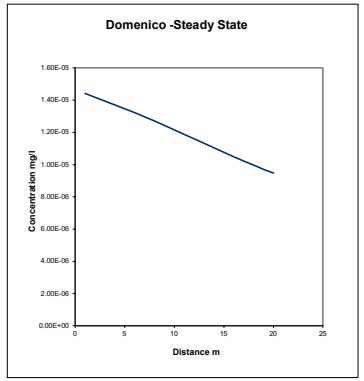


Calc	Value	Units
v	1.08E-03	m/d
Rc	2.56E+08	
u	4.22E-12	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

		X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1		3.7E-06	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	1.44E-05
2	2		3.7E-06	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	1.42E-05
3	3		3.7E-06	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	1.39E-05
4	4		3.7E-06	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	1.37E-05
5	5		3.7E-06	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.9992	1.35E-05
6	6		3.7E-06	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.9978	1.32E-05
7	7		3.7E-06	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.9954	1.30E-05
8	8		3.7E-06	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	1.27E-05
9	9		3.7E-06	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.9876	1.24E-05
10	10		3.7E-06	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.9823	1.22E-05
11	11		3.7E-06	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.9763	1.19E-05
12	12		3.7E-06	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	1.16E-05
13	13		3.7E-06	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.9625	1.13E-05
14	14		3.7E-06	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	1.10E-05
15	15		3.7E-06	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.9472	1.08E-05
16	16		3.7E-06	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	1.05E-05
17	17		3.7E-06	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.9311	1.02E-05
18	18		3.7E-06	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.9229	9.97E-06
19	19		3.7E-06	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.9147	9.71E-06
20	20		3.7E-06	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	9.46E-06



Date:	25/06/2022
Version:	1

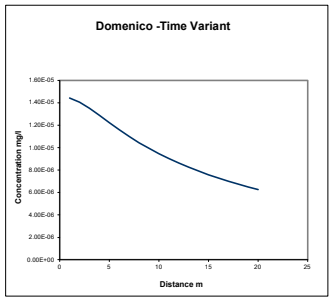
DOMENICO (TIME VARIANT)

Contaminant **²H - n-Eicosane**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.01	mg/l
Co	1.47E-05	mg/l
λ	7.42E-14	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.51E+07	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	1.8E-06	-1.70E-02	9.83E-01	-7.75E+43	2	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	1.44E-05
2	2	1.8E-06	-3.40E-02	9.67E-01	-7.75E+43	2	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	1.41E-05
3	3	1.8E-06	-5.10E-02	9.50E-01	-7.75E+43	2	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.97	1.35E-05
4	4	1.8E-06	-6.80E-02	9.34E-01	-7.75E+43	2	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.939	1.29E-05
5	5	1.8E-06	-8.50E-02	9.18E-01	-7.75E+43	2	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.906	1.22E-05
6	6	1.8E-06	-1.02E-01	9.03E-01	-7.75E+43	2	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.874	1.16E-05
7	7	1.8E-06	-1.19E-01	8.88E-01	-7.75E+43	2	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.844	1.10E-05
8	8	1.8E-06	-1.36E-01	8.73E-01	-7.75E+43	2	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.815	1.04E-05
9	9	1.8E-06	-1.53E-01	8.58E-01	-7.75E+43	2	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.789	9.93E-06
10	10	1.8E-06	-1.70E-01	8.44E-01	-7.75E+43	2	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.764	9.46E-06
11	11	1.8E-06	-1.87E-01	8.29E-01	-7.75E+43	2	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.742	9.03E-06
12	12	1.8E-06	-2.04E-01	8.15E-01	-7.75E+43	2	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	8.62E-06
13	13	1.8E-06	-2.21E-01	8.02E-01	-7.75E+43	2	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.702	8.25E-06
14	14	1.8E-06	-2.38E-01	7.88E-01	-7.75E+43	2	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.684	7.91E-06
15	15	1.8E-06	-2.55E-01	7.75E-01	-7.75E+43	2	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.667	7.58E-06
16	16	1.8E-06	-2.72E-01	7.62E-01	-7.75E+43	2	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.651	7.28E-06
17	17	1.8E-06	-2.89E-01	7.49E-01	-7.75E+43	2	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.637	7.00E-06
18	18	1.8E-06	-3.06E-01	7.36E-01	-7.75E+43	2	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.623	6.73E-06
19	19	1.8E-06	-3.23E-01	7.24E-01	-7.75E+43	2	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.61	6.48E-06
20	20	1.8E-06	-3.40E-01	7.12E-01	-7.75E+43	2	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.598	6.25E-06

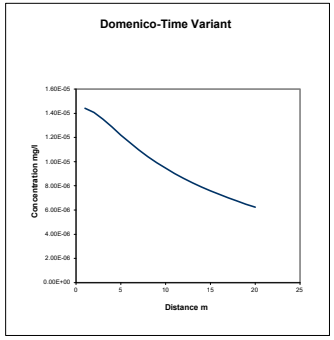


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	2.56E+08	
u	4.22E-12	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	1.8E-06	-1.70E-02	9.83E-01	-7.75E+43	2	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	1.44E-05
2	2	1.8E-06	-3.40E-02	9.67E-01	-7.75E+43	2	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	1.42E-05
3	3	1.8E-06	-5.10E-02	9.50E-01	-7.75E+43	2	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	1.39E-05
4	4	1.8E-06	-6.80E-02	9.34E-01	-7.75E+43	2	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	1.37E-05
5	5	1.8E-06	-8.50E-02	9.18E-01	-7.75E+43	2	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.999	1.35E-05
6	6	1.8E-06	-1.02E-01	9.03E-01	-7.75E+43	2	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.998	1.32E-05
7	7	1.8E-06	-1.19E-01	8.88E-01	-7.75E+43	2	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.995	1.30E-05
8	8	1.8E-06	-1.36E-01	8.73E-01	-7.75E+43	2	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	1.27E-05
9	9	1.8E-06	-1.53E-01	8.58E-01	-7.75E+43	2	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.988	1.24E-05
10	10	1.8E-06	-1.70E-01	8.44E-01	-7.75E+43	2	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.982	1.22E-05
11	11	1.8E-06	-1.87E-01	8.29E-01	-7.75E+43	2	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.976	1.19E-05
12	12	1.8E-06	-2.04E-01	8.15E-01	-7.75E+43	2	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.97	1.16E-05
13	13	1.8E-06	-2.21E-01	8.02E-01	-7.75E+43	2	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.962	1.13E-05
14	14	1.8E-06	-2.38E-01	7.88E-01	-7.75E+43	2	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	1.10E-05
15	15	1.8E-06	-2.55E-01	7.75E-01	-7.75E+43	2	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.947	1.08E-05
16	16	1.8E-06	-2.72E-01	7.62E-01	-7.75E+43	2	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.939	1.05E-05
17	17	1.8E-06	-2.89E-01	7.49E-01	-7.75E+43	2	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.931	1.02E-05
18	18	1.8E-06	-3.06E-01	7.36E-01	-7.75E+43	2	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.923	9.97E-06
19	19	1.8E-06	-3.23E-01	7.24E-01	-7.75E+43	2	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.915	9.71E-06
20	20	1.8E-06	-3.40E-01	7.12E-01	-7.75E+43	2	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.906	9.46E-06



Date:	25/06/2022
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	27-Apr-22		Version:	1
Contaminant	Naphthalene			
Target Concentration (C_T)	0.002	mg/l	Origin of C_T:	Proposed Water Framework Directive EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

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		**Naphthalene**		
Target concentration	C_T	**0.002**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
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	

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.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.69E-01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.002	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Naphthalene**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**0.002** mg/l	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters	Variable	Value	Unit	Source
Contaminant		Naphthalene		from Level 1
Target Concentration	C_T	0.002	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		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 pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	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	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target		**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**#DIV/0!**	**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 ionic organic chemicals (acids)

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 — fraction
Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

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

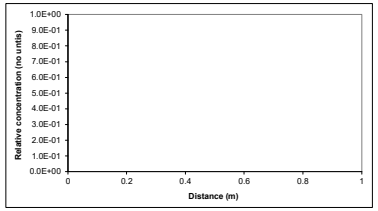
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	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 desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation 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.

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:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

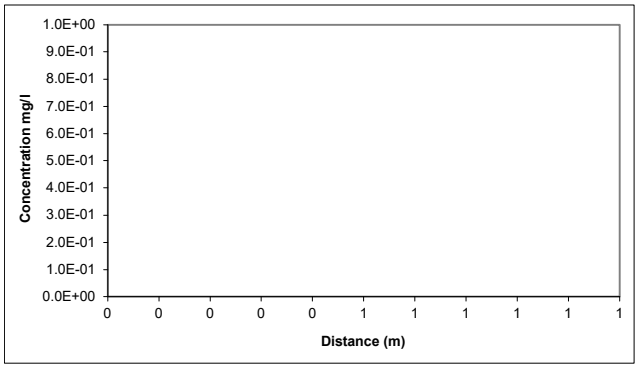
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_W	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Naphthalene		from Level 1
Target Concentration	C_T	2.00E-03	mg/l	from Level 1

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

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

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

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	1.65E-01	mg/l	*Based on 95 percentile soil conc of 6.018mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+02	days	*100 day half life estimation*
Calculated decay rate	λ	6.93E-03	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
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	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	3.60E+01	l/kg	*see options*
Longitudinal dispersivity	ax	2.00E+00	m	*see options*
Transverse dispersivity	az	2.00E-01	m	*see options*
Vertical dispersivity	ay	2.00E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	6.13E+02	fraction
Decay rate used	λ	1.13E-05	d^{-1}
Rate of contaminant flow due to retardation	u	1.76E-06	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	4.32E-15	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**3.82E+13**	

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 3.60E+01 l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — 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 — 3.60E+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	2.00E+00	1.57E+00 m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01 m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02

Note values of dispersivity must be > 0

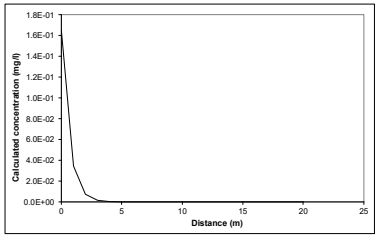
For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

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

Remedial Targets

Remedial Target		**7.64E+10**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	C_{ED}/C_0	**4.32E-15**	**mg/l**	Domenico - Steady state

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.



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, 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 it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater 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 9.0E+99.

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

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	1.7E-01
1.0	3.47E-02
2.0	7.30E-03
3.0	1.54E-03
4.0	3.23E-04
5.0	6.80E-05
6.0	1.43E-05
7.0	3.00E-06
8.0	6.28E-07
9.0	1.32E-07
10.0	2.75E-08
11.0	5.76E-09
12.0	1.20E-09
13.0	2.51E-10
14.0	5.25E-11
15.0	1.10E-11
16.0	2.28E-12
17.0	4.77E-13
18.0	9.94E-14
19.0	2.07E-14
20.0	4.32E-15

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Naphthalene**

Parameter	Value	Units
(carried over from input sheet)		
C_T	2.00E-03	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

calc calc Calc Kd l/kg

Calculation of partition coefficient for ionic organic chemical

Partition coefficient used in Level 1 Assessment 1.34E+02 l/kg

Calculated Remedial Target 2.69E-01 mg/kg for Naphthalene

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27/04/2022
Version:	1

Level 2 Calculation Sheet

Contaminant **Naphthalene**

Site assessed:	Glan Llyn
Date:	27/04/2022
Version:	1

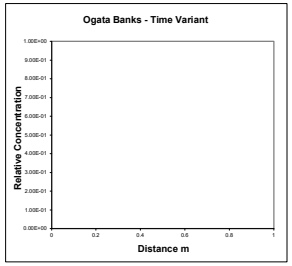
Parameter	Value	Units		
(carried over from input sheet)				
Mz	0.00E+00	m		
L	0.00E+00	m		
da	0.00E+00	m		Calculated
Inf	0.00E+00	m/d		Dilution Factor
K	0.00E+00	m/d		
i	0.00E+00		Calculation based on target concentration	#DIV/0!
		m3/d		
A	0.00E+00	m2	Calculation based on observed contaminant concentration	#DIV/0!
		m3/d		
Cc	0.00E+00	mg/l		
C_T	2.00E-03	mg/l		
Cu	0.00E+00	mg/l		
w	0.00E+00	m		

OGATA BANKS SOLUTION

Contaminant	Naphthalene	
Input	**Value**	**Units**
C_T	2.000E-03	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

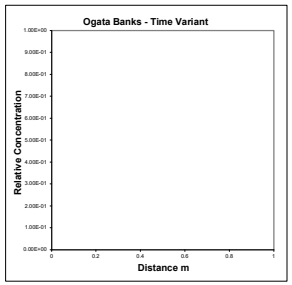
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	27/04/2022
Version:	1

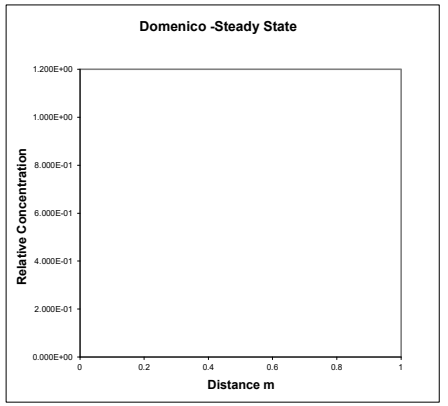
Contaminant **Naphthalene**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	2.000E-03	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



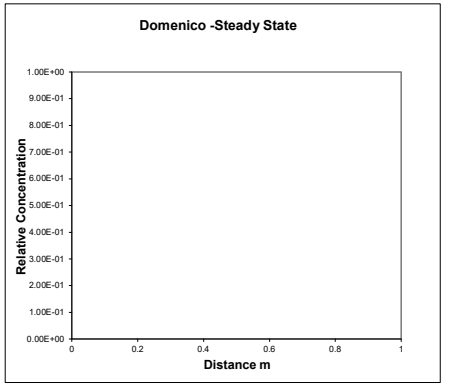
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



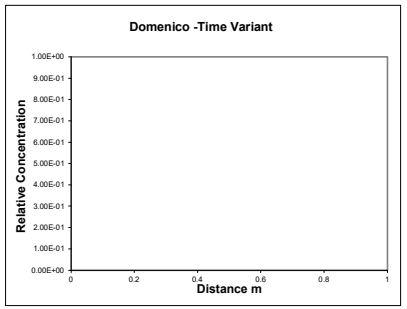
Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

Contaminant **Naphthalene**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

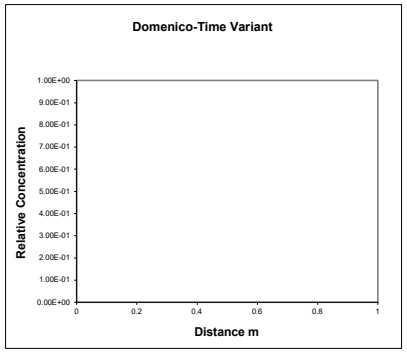
Input	Value	Units		X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
				m														
C_T	0.002	mg/l	1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DF	#DIV/0!		2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
λ	6.931E-101	$days^{-1}$	5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sz	0.000E+00	m	6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sy	0.000E+00	m	7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Kd	0.000E+00	l/kg	8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ρ	0.000E+00	g/cm3	9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
n	0.000E+00		10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
i	#DIV/0!		11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
K	0.000E+00	m/d	12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
x	0.000E+00	m	13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
z	0.000E+00	m	14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
y	0.000E+00	m	15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
t	1.000E+99	days	16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ax	0.000E+00	m	17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
az	0.000E+00	m	18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ay	0.000E+00	m	19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc **Value**

v	#DIV/0!	m/d		X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
				m														
Rc	#DIV/0!		1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
u	#DIV/0!	m/d	2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT



Date:	27/04/2022
Version:	1

OGATA BANKS SOLUTION

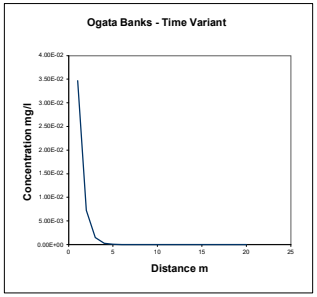
Contaminant	Naphthalene	
Input	**Value**	**Units**
C_T	0.002	mg/l
Co	1.65E-01	mg/l
λ	1.13E-05	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	3.60E+01	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	6.13E+02	
u	1.76E-06	m/d

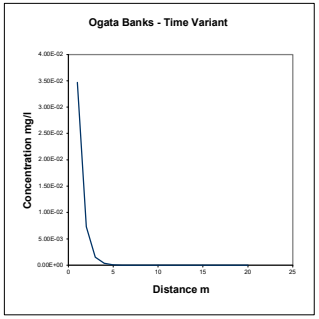
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.02063	-1.6E+00	2.1E-01	-3.4E+47	2.000	2.1E+00	7.8E+00	3.4E+47	0.000	2.8E+02	1	-2.8E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	3.47E-02
2	0.02063	-3.1E+00	4.4E-02	-3.4E+47	2.000	4.1E+00	6.1E+01	3.4E+47	0.000	2.0E+02	1	-2.0E+02	-1	1.9E+00	0.992	-1.9E+00	-0.99199	7.25E-03
3	0.02063	-4.7E+00	9.3E-03	-3.4E+47	2.000	6.2E+00	4.8E+02	3.4E+47	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	1.49E-03
4	0.02063	-6.2E+00	2.0E-03	-3.4E+47	2.000	8.2E+00	3.8E+03	3.4E+47	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	3.04E-04
5	0.02063	-7.8E+00	4.1E-04	-3.4E+47	2.000	1.0E+01	3.0E+04	3.4E+47	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	6.17E-05
6	0.02063	-9.4E+00	8.7E-05	-3.4E+47	2.000	1.2E+01	2.3E+05	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8742	-1.1E+00	-0.87421	1.25E-05
7	0.02063	-1.1E+01	1.8E-05	-3.4E+47	2.000	1.4E+01	1.8E+06	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8436	-1.0E+00	-0.84362	2.54E-06
8	0.02063	-1.2E+01	3.8E-06	-3.4E+47	2.000	1.6E+01	1.4E+07	3.4E+47	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8151	-9.4E-01	-0.8151	5.16E-07
9	0.02063	-1.4E+01	8.1E-07	-3.4E+47	2.000	1.9E+01	1.1E+08	3.4E+47	0.000	9.3E+01	1	-9.3E+01	-1	8.8E-01	0.7887	-8.8E-01	-0.7887	1.05E-07
10	0.02063	-1.6E+01	1.7E-07	-3.4E+47	2.000	2.1E+01	8.7E+08	3.4E+47	0.000	8.8E+01	1	-8.8E+01	-1	8.4E-01	0.7643	-8.4E-01	-0.76432	2.14E-08
11	0.02063	-1.7E+01	3.6E-08	-3.4E+47	2.000	2.3E+01	6.8E+09	3.4E+47	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7418	-8.0E-01	-0.7418	4.38E-09
12	0.02063	-1.9E+01	7.5E-09	-3.4E+47	2.000	2.5E+01	5.4E+10	3.4E+47	0.000	8.1E+01	1	-8.1E+01	-1	7.7E-01	0.721	-7.7E-01	-0.72098	8.95E-10
13	0.02063	-2.0E+01	1.6E-09	-3.4E+47	2.000	2.7E+01	4.2E+11	3.4E+47	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.7017	-7.4E-01	-0.70169	1.83E-10
14	0.02063	-2.2E+01	3.3E-10	-3.4E+47	2.000	2.9E+01	3.3E+12	3.4E+47	0.000	7.5E+01	1	-7.5E+01	-1	7.1E-01	0.6838	-7.1E-01	-0.68377	3.76E-11
15	0.02063	-2.3E+01	7.0E-11	-3.4E+47	2.000	3.1E+01	2.6E+13	3.4E+47	0.000	7.2E+01	1	-7.2E+01	-1	6.8E-01	0.6671	-6.8E-01	-0.66708	7.71E-12
16	0.02063	-2.5E+01	1.5E-11	-3.4E+47	2.000	3.3E+01	2.0E+14	3.4E+47	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6515	-6.6E-01	-0.6515	1.58E-12
17	0.02063	-2.6E+01	3.1E-12	-3.4E+47	2.000	3.5E+01	1.6E+15	3.4E+47	0.000	6.8E+01	1	-6.8E+01	-1	6.4E-01	0.6369	-6.4E-01	-0.63692	3.26E-13
18	0.02063	-2.8E+01	6.5E-13	-3.4E+47	2.000	3.7E+01	1.2E+16	3.4E+47	0.000	6.6E+01	1	-6.6E+01	-1	6.3E-01	0.6232	-6.3E-01	-0.62324	6.71E-14
19	0.02063	-3.0E+01	1.4E-13	-3.4E+47	2.000	3.9E+01	9.7E+16	3.4E+47	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6104	-6.1E-01	-0.61038	1.38E-14
20	0.02063	-3.1E+01	2.9E-14	-3.4E+47	2.000	4.1E+01	7.6E+17	3.4E+47	0.000	6.3E+01	1	-6.3E+01	-1	5.9E-01	0.5983	-5.9E-01	-0.59826	2.85E-15



Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.02063	-1.6E+00	2.1E-01	-3.4E+47	2.000	2.1E+00	7.8E+00	3.4E+47	0.000	2.8E+02	1	-2.8E+02	-1	5.3E+00	1	-5.3E+00	-1	3.47E-02
2	0.02063	-3.1E+00	4.4E-02	-3.4E+47	2.000	4.1E+00	6.1E+01	3.4E+47	0.000	2.0E+02	1	-2.0E+02	-1	3.8E+00	1	-3.8E+00	-1	7.30E-03
3	0.02063	-4.7E+00	9.3E-03	-3.4E+47	2.000	6.2E+00	4.8E+02	3.4E+47	0.000	1.6E+02	1	-1.6E+02	-1	3.1E+00	1	-3.1E+00	-0.99999	1.54E-03
4	0.02063	-6.2E+00	2.0E-03	-3.4E+47	2.000	8.2E+00	3.8E+03	3.4E+47	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	3.23E-04
5	0.02063	-7.8E+00	4.1E-04	-3.4E+47	2.000	1.0E+01	3.0E+04	3.4E+47	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9992	-2.4E+00	-0.9992	6.80E-05
6	0.02063	-9.4E+00	8.7E-05	-3.4E+47	2.000	1.2E+01	2.3E+05	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	2.2E+00	0.9978	-2.2E+00	-0.9978	1.43E-05
7	0.02063	-1.1E+01	1.8E-05	-3.4E+47	2.000	1.4E+01	1.8E+06	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9954	-2.0E+00	-0.99541	3.00E-06
8	0.02063	-1.2E+01	3.8E-06	-3.4E+47	2.000	1.6E+01	1.4E+07	3.4E+47	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.992	-1.9E+00	-0.99199	6.28E-07
9	0.02063	-1.4E+01	8.1E-07	-3.4E+47	2.000	1.9E+01	1.1E+08	3.4E+47	0.000	9.3E+01	1	-9.3E+01	-1	1.8E+00	0.9876	-1.8E+00	-0.98758	1.32E-07
10	0.02063	-1.6E+01	1.7E-07	-3.4E+47	2.000	2.1E+01	8.7E+08	3.4E+47	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9823	-1.7E+00	-0.98229	2.75E-08
11	0.02063	-1.7E+01	3.6E-08	-3.4E+47	2.000	2.3E+01	6.8E+09	3.4E+47	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9763	-1.6E+00	-0.97626	5.76E-09
12	0.02063	-1.9E+01	7.5E-09	-3.4E+47	2.000	2.5E+01	5.4E+10	3.4E+47	0.000	8.1E+01	1	-8.1E+01	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	1.20E-09
13	0.02063	-2.0E+01	1.6E-09	-3.4E+47	2.000	2.7E+01	4.2E+11	3.4E+47	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9625	-1.5E+00	-0.96249	2.51E-10
14	0.02063	-2.2E+01	3.3E-10	-3.4E+47	2.000	2.9E+01	3.3E+12	3.4E+47	0.000	7.5E+01	1	-7.5E+01	-1	1.4E+00	0.955	-1.4E+00	-0.95498	5.25E-11
15	0.02063	-2.3E+01	7.0E-11	-3.4E+47	2.000	3.1E+01	2.6E+13	3.4E+47	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9472	-1.4E+00	-0.94719	1.10E-11
16	0.02063	-2.5E+01	1.5E-11	-3.4E+47	2.000	3.3E+01	2.0E+14	3.4E+47	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	2.28E-12
17	0.02063	-2.6E+01	3.1E-12	-3.4E+47	2.000	3.5E+01	1.6E+15	3.4E+47	0.000	6.8E+01	1	-6.8E+01	-1	1.3E+00	0.9311	-1.3E+00	-0.93109	4.77E-13
18	0.02063	-2.8E+01	6.5E-13	-3.4E+47	2.000	3.7E+01	1.2E+16	3.4E+47	0.000	6.6E+01	1	-6.6E+01	-1	1.3E+00	0.9229	-1.3E+00	-0.9229	9.94E-14
19	0.02063	-3.0E+01	1.4E-13	-3.4E+47	2.000	3.9E+01	9.7E+16	3.4E+47	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9147	-1.2E+00	-0.91468	2.07E-14
20	0.02063	-3.1E+01	2.9E-14	-3.4E+47	2.000	4.1E+01	7.6E+17	3.4E+47	0.000	6.3E+01	1	-6.3E+01	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	4.32E-15



Date:	27/04/2022
Version:	1

Contaminant **Naphthalene**

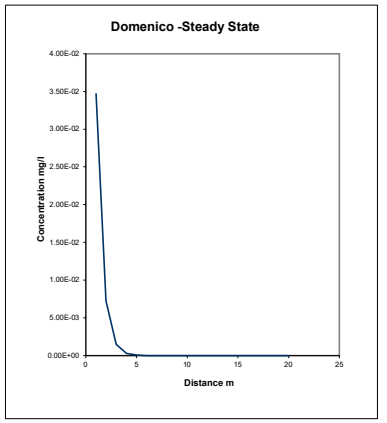
Input	Value	Units
C_T	0.002	mg/l
Co	1.65E-01	mg/l
λ	1.13E-05	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	3.60E+01	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.04125	-1.56E+00	2.10E-01	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	3.47E-02
2	2	0.04125	-3.12E+00	4.43E-02	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	7.25E-03
3	3	0.04125	-4.68E+00	9.31E-03	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	1.49E-03
4	4	0.04125	-6.24E+00	1.96E-03	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	3.04E-04
5	5	0.04125	-7.79E+00	4.12E-04	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	6.17E-05
6	6	0.04125	-9.35E+00	8.67E-05	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.8742	1.25E-05
7	7	0.04125	-1.09E+01	1.82E-05	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.8436	2.54E-06
8	8	0.04125	-1.25E+01	3.84E-06	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.8151	5.16E-07
9	9	0.04125	-1.40E+01	8.08E-07	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.7887	1.05E-07
10	10	0.04125	-1.56E+01	1.70E-07	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.7643	2.14E-08
11	11	0.04125	-1.71E+01	3.58E-08	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.7418	4.38E-09
12	12	0.04125	-1.87E+01	7.52E-09	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	8.95E-10
13	13	0.04125	-2.03E+01	1.58E-09	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.7017	1.83E-10
14	14	0.04125	-2.18E+01	3.33E-10	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.6838	3.76E-11
15	15	0.04125	-2.34E+01	7.01E-11	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.6671	7.71E-12
16	16	0.04125	-2.49E+01	1.47E-11	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.6515	1.58E-12
17	17	0.04125	-2.65E+01	3.10E-12	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.6369	3.26E-13
18	18	0.04125	-2.81E+01	6.53E-13	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.6232	6.71E-14
19	19	0.04125	-2.96E+01	1.37E-13	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.6104	1.38E-14
20	20	0.04125	-3.12E+01	2.89E-14	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.5983	2.85E-15



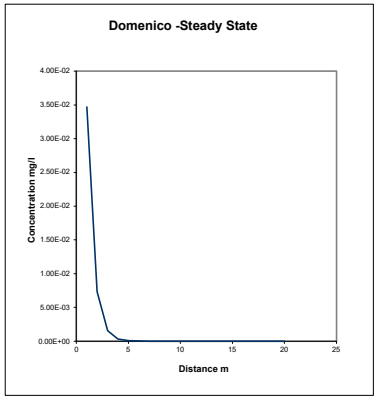
Calc **Value**

v	1.08E-03	m/d
Rc	6.13E+02	
u	1.76E-06	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.04125	-1.56E+00	2.10E-01	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	3.47E-02
2	2	0.04125	-3.12E+00	4.43E-02	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	7.30E-03
3	3	0.04125	-4.68E+00	9.31E-03	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	1.54E-03
4	4	0.04125	-6.24E+00	1.96E-03	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	3.23E-04
5	5	0.04125	-7.79E+00	4.12E-04	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.9992	6.80E-05
6	6	0.04125	-9.35E+00	8.67E-05	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.9978	1.43E-05
7	7	0.04125	-1.09E+01	1.82E-05	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.9954	3.00E-06
8	8	0.04125	-1.25E+01	3.84E-06	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	6.28E-07
9	9	0.04125	-1.40E+01	8.08E-07	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.9876	1.32E-07
10	10	0.04125	-1.56E+01	1.70E-07	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.9823	2.75E-08
11	11	0.04125	-1.71E+01	3.58E-08	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.9763	5.76E-09
12	12	0.04125	-1.87E+01	7.52E-09	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	1.20E-09
13	13	0.04125	-2.03E+01	1.58E-09	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.9625	2.51E-10
14	14	0.04125	-2.18E+01	3.33E-10	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	5.25E-11
15	15	0.04125	-2.34E+01	7.01E-11	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.9472	1.10E-11
16	16	0.04125	-2.49E+01	1.47E-11	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	2.28E-12
17	17	0.04125	-2.65E+01	3.10E-12	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.9311	4.77E-13
18	18	0.04125	-2.81E+01	6.53E-13	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.9229	9.94E-14
19	19	0.04125	-2.96E+01	1.37E-13	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.9147	2.07E-14
20	20	0.04125	-3.12E+01	2.89E-14	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	4.32E-15



Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

Contaminant **Naphthalene**

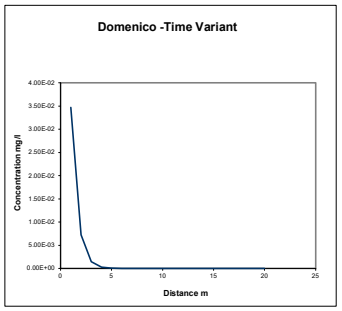
Input	Value	Units
C_T	0.002	mg/l
Co	1.65E-01	mg/l
λ	1.13E-05	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	3.60E+01	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	Units
v	1.08E-03	m/d
Rc	6.13E+02	
u	1.76E-06	m/d

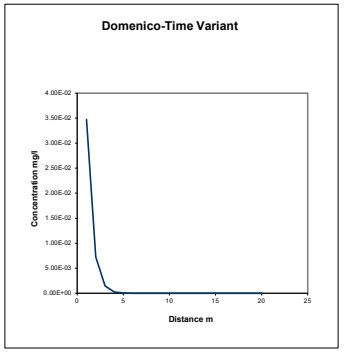
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.02063	-1.56E+00	2.10E-01	-3.40E+47	2	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	3.47E-02
2	2	0.02063	-3.12E+00	4.43E-02	-3.40E+47	2	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	7.25E-03
3	3	0.02063	-4.68E+00	9.31E-03	-3.40E+47	2	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.97	1.49E-03
4	4	0.02063	-6.24E+00	1.96E-03	-3.40E+47	2	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.939	3.04E-04
5	5	0.02063	-7.79E+00	4.12E-04	-3.40E+47	2	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.906	6.17E-05
6	6	0.02063	-9.35E+00	8.67E-05	-3.40E+47	2	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.874	1.25E-05
7	7	0.02063	-1.09E+01	1.82E-05	-3.40E+47	2	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.844	2.54E-06
8	8	0.02063	-1.25E+01	3.84E-06	-3.40E+47	2	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.815	5.16E-07
9	9	0.02063	-1.40E+01	8.08E-07	-3.40E+47	2	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.789	1.05E-07
10	10	0.02063	-1.56E+01	1.70E-07	-3.40E+47	2	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.764	2.14E-08
11	11	0.02063	-1.71E+01	3.58E-08	-3.40E+47	2	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.742	4.38E-09
12	12	0.02063	-1.87E+01	7.52E-09	-3.40E+47	2	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	8.95E-10
13	13	0.02063	-2.03E+01	1.58E-09	-3.40E+47	2	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.702	1.83E-10
14	14	0.02063	-2.18E+01	3.33E-10	-3.40E+47	2	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.684	3.76E-11
15	15	0.02063	-2.34E+01	7.01E-11	-3.40E+47	2	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.667	7.71E-12
16	16	0.02063	-2.49E+01	1.47E-11	-3.40E+47	2	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.651	1.58E-12
17	17	0.02063	-2.65E+01	3.10E-12	-3.40E+47	2	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.637	3.26E-13
18	18	0.02063	-2.81E+01	6.53E-13	-3.40E+47	2	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.623	6.71E-14
19	19	0.02063	-2.96E+01	1.37E-13	-3.40E+47	2	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.61	1.38E-14
20	20	0.02063	-3.12E+01	2.89E-14	-3.40E+47	2	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.598	2.85E-15



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.02063	-1.56E+00	2.10E-01	-3.40E+47	2	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	3.47E-02
2	2	0.02063	-3.12E+00	4.43E-02	-3.40E+47	2	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	7.30E-03
3	3	0.02063	-4.68E+00	9.31E-03	-3.40E+47	2	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	1.54E-03
4	4	0.02063	-6.24E+00	1.96E-03	-3.40E+47	2	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	3.23E-04
5	5	0.02063	-7.79E+00	4.12E-04	-3.40E+47	2	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.999	6.80E-05
6	6	0.02063	-9.35E+00	8.67E-05	-3.40E+47	2	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.998	1.43E-05
7	7	0.02063	-1.09E+01	1.82E-05	-3.40E+47	2	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.995	3.00E-06
8	8	0.02063	-1.25E+01	3.84E-06	-3.40E+47	2	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	6.28E-07
9	9	0.02063	-1.40E+01	8.08E-07	-3.40E+47	2	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.988	1.32E-07
10	10	0.02063	-1.56E+01	1.70E-07	-3.40E+47	2	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.982	2.75E-08
11	11	0.02063	-1.71E+01	3.58E-08	-3.40E+47	2	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.976	5.76E-09
12	12	0.02063	-1.87E+01	7.52E-09	-3.40E+47	2	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.97	1.20E-09
13	13	0.02063	-2.03E+01	1.58E-09	-3.40E+47	2	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.962	2.51E-10
14	14	0.02063	-2.18E+01	3.33E-10	-3.40E+47	2	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	5.25E-11
15	15	0.02063	-2.34E+01	7.01E-11	-3.40E+47	2	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.947	1.10E-11
16	16	0.02063	-2.49E+01	1.47E-11	-3.40E+47	2	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.939	2.28E-12
17	17	0.02063	-2.65E+01	3.10E-12	-3.40E+47	2	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.931	4.77E-13
18	18	0.02063	-2.81E+01	6.53E-13	-3.40E+47	2	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.923	9.94E-14
19	19	0.02063	-2.96E+01	1.37E-13	-3.40E+47	2	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.915	2.07E-14
20	20	0.02063	-3.12E+01	2.89E-14	-3.40E+47	2	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.906	4.32E-15



Date:	27/04/2022
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	27-Apr-22		Version:	1
Contaminant	Manganese			
Target Concentration (C_T)	0.123	mg/l	Origin of C_T:	Water Framework Directive (EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Environment Agency

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		**Manganese**		
Target concentration	C_T	**0.123**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
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	

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.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**1.66E+01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.123	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Manganese**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**0.123** mg/l	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	Variable	Value	Unit	Source of parameter value	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters	Variable	Value	Unit	Source
Contaminant		Manganese		from Level 1
Target Concentration	C_T	0.123	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		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 pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	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	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target		**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**#DIV/0!**	**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 ionic organic chemicals (acids)

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		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

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

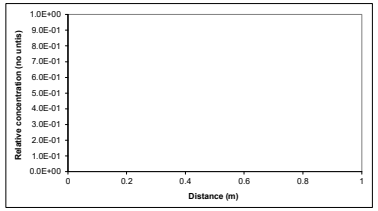
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	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 desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation 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.

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:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

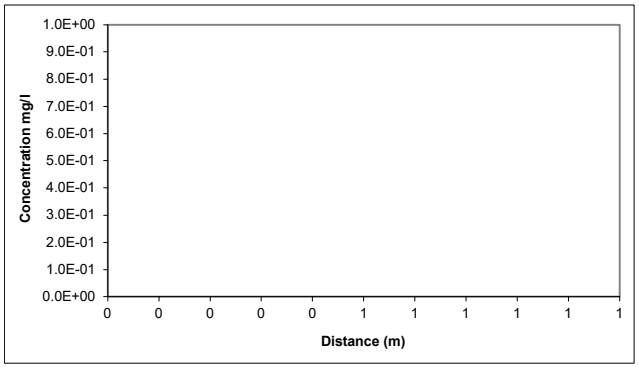
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_W	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Environment Agency

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Manganese		from Level 1
Target Concentration	C_T	1.23E-01	mg/l	from Level 1

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

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

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

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	4.47E+01	mg/l	*Based on 95 percentile soil conc of 32200mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Estimation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
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	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	7.20E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	1.22E+04	fraction
Decay rate used	λ	6.29E-105	d^{-1}
Rate of contaminant flow due to retardation	u	8.82E-08	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	4.21E+01	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.06E+00**	

Remedial Targets

Remedial Target		**1.31E-01**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**4.21E+01**	**mg/l**	Domenico - Steady state

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.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	7.20E+02	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		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	7.20E+02	l/kg

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

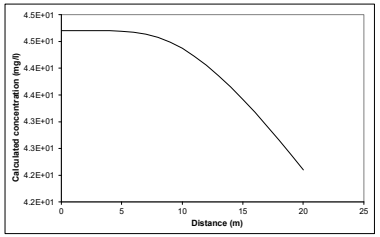
Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

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



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, 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 it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater 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 9.0E+99.

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

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	4.5E+01
1.0	4.47E+01
2.0	4.47E+01
3.0	4.47E+01
4.0	4.47E+01
5.0	4.47E+01
6.0	4.47E+01
7.0	4.46E+01
8.0	4.46E+01
9.0	4.45E+01
10.0	4.44E+01
11.0	4.42E+01
12.0	4.41E+01
13.0	4.39E+01
14.0	4.36E+01
15.0	4.34E+01
16.0	4.32E+01
17.0	4.29E+01
18.0	4.27E+01
19.0	4.24E+01
20.0	4.21E+01

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Manganese**

Parameter	Value	Units
(carried over from input sheet)		
C_T	1.23E-01	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **1.66E+01 mg/kg** **for Manganese**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27/04/2022
Version:	1

Level 2 Calculation Sheet

Contaminant **Manganese**

Site assessed:	Glan Llyn
Date:	27/04/2022
Version:	1

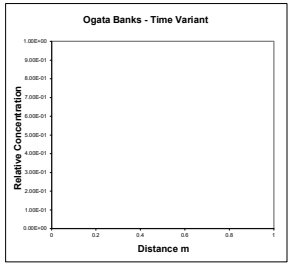
Parameter	Value	Units		
(carried over from input sheet)				
Mz	0.00E+00	m		
L	0.00E+00	m		
da	0.00E+00	m		Calculated
Inf	0.00E+00	m/d		Dilution Factor
K	0.00E+00	m/d		
i	0.00E+00		Calculation based on target concentration	#DIV/0!
		m3/d		
A	0.00E+00	m2	Calculation based on observed contaminant concentration	#DIV/0!
		m3/d		
Cc	0.00E+00	mg/l		
C_T	1.23E-01	mg/l		
Cu	0.00E+00	mg/l		
w	0.00E+00	m		

OGATA BANKS SOLUTION

Contaminant	Manganese	
Input	**Value**	**Units**
C_T	1.230E-01	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

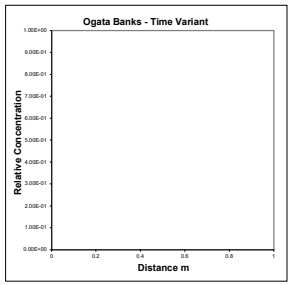
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	27/04/2022
Version:	1

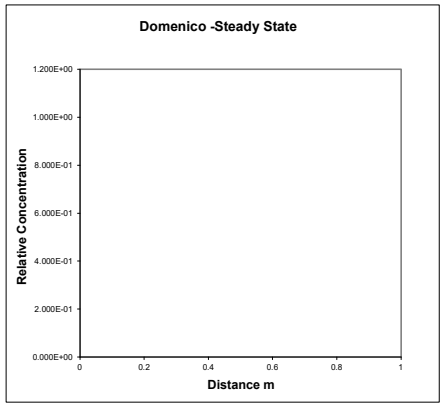
Contaminant **Manganese**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.230E-01	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



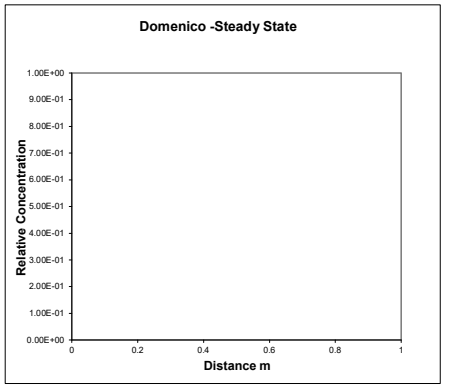
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

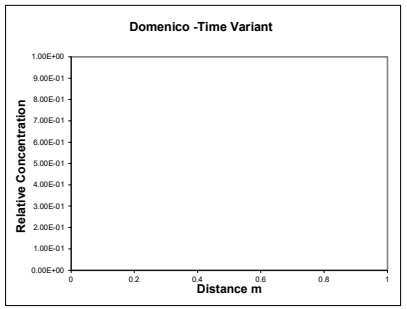
	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



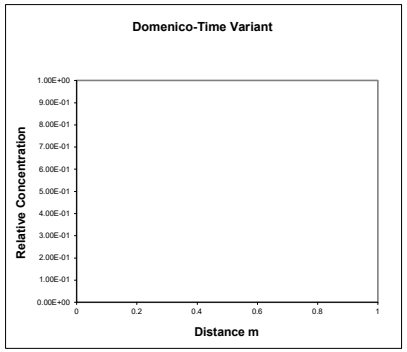
Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

Contaminant	Manganese																	
			Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)															
				X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
Input	**Value**	**Units**		m														
C_T	0.123	mg/l	1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DF	#DIV/0!		2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
λ	6.931E-101	$days^{-1}$	5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sz	0.000E+00	m	6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sy	0.000E+00	m	7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Kd	0.000E+00	l/kg	8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ρ	0.000E+00	g/cm3	9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
n	0.000E+00		10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
i	#DIV/0!		11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
K	0.000E+00	m/d	12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
x	0.000E+00	m	13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
z	0.000E+00	m	14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
y	0.000E+00	m	15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
t	1.000E+99	days	16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ax	0.000E+00	m	17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
az	0.000E+00	m	18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ay	0.000E+00	m	19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value																	
			Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT															
				X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
v	#DIV/0!	m/d		m														
Rc	#DIV/0!		1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
u	#DIV/0!	m/d	2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



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OGATA BANKS SOLUTION

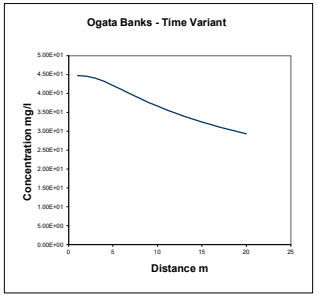
Contaminant	Manganese	
Input	**Value**	**Units**
C_T	0.123	mg/l
Co	4.47E+01	mg/l
λ	6.29E-105	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	7.20E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.22E+04	
u	8.82E-08	m/d

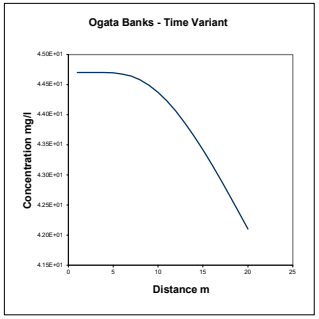
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	6.4E-01	1.9E+00	1.2E+46	0.000	3.2E+02	1	-3.2E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	4.47E+01
2	2	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.3E+00	3.6E+00	1.2E+46	0.000	2.2E+02	1	-2.2E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	4.46E+01
3	3	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.9E+00	6.8E+00	1.2E+46	0.000	1.8E+02	1	-1.8E+02	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	4.41E+01
4	4	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	2.6E+00	1.3E+01	1.2E+46	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	4.32E+01
5	5	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	3.2E+00	2.4E+01	1.2E+46	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	4.21E+01
6	6	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	3.8E+00	4.6E+01	1.2E+46	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9163	-1.2E+00	-0.91633	4.10E+01
7	7	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	4.5E+00	8.7E+01	1.2E+46	0.000	1.2E+02	1	-1.2E+02	-1	1.1E+00	0.8907	-1.1E+00	-0.89072	3.98E+01
8	8	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	5.1E+00	1.7E+02	1.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8659	-1.1E+00	-0.86587	3.87E+01
9	9	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	5.7E+00	3.1E+02	1.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8422	-1.0E+00	-0.84215	3.76E+01
10	10	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	6.4E+00	5.9E+02	1.2E+46	0.000	1.0E+02	1	-1.0E+02	-1	9.5E-01	0.8197	-9.5E-01	-0.81971	3.66E+01
11	11	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	7.0E+00	1.1E+03	1.2E+46	0.000	9.5E+01	1	-9.5E+01	-1	9.0E-01	0.7986	-9.0E-01	-0.79858	3.57E+01
12	12	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	7.7E+00	2.1E+03	1.2E+46	0.000	9.1E+01	1	-9.1E+01	-1	8.6E-01	0.7787	-8.6E-01	-0.77872	3.48E+01
13	13	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	8.3E+00	4.0E+03	1.2E+46	0.000	8.8E+01	1	-8.8E+01	-1	8.3E-01	0.7601	-8.3E-01	-0.76006	3.40E+01
14	14	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	8.9E+00	7.6E+03	1.2E+46	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7425	-8.0E-01	-0.74253	3.32E+01
15	15	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	9.6E+00	1.4E+04	1.2E+46	0.000	8.2E+01	1	-8.2E+01	-1	7.7E-01	0.726	-7.7E-01	-0.72604	3.25E+01
16	16	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.0E+01	2.7E+04	1.2E+46	0.000	7.9E+01	1	-7.9E+01	-1	7.5E-01	0.7105	-7.5E-01	-0.71052	3.18E+01
17	17	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.1E+01	5.2E+04	1.2E+46	0.000	7.7E+01	1	-7.7E+01	-1	7.3E-01	0.6959	-7.3E-01	-0.69588	3.11E+01
18	18	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.1E+01	9.8E+04	1.2E+46	0.000	7.4E+01	1	-7.4E+01	-1	7.1E-01	0.6821	-7.1E-01	-0.68205	3.05E+01
19	19	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.2E+01	1.8E+05	1.2E+46	0.000	7.2E+01	1	-7.2E+01	-1	6.9E-01	0.669	-6.9E-01	-0.66897	2.99E+01
20	20	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.3E+01	3.5E+05	1.2E+46	0.000	7.1E+01	1	-7.1E+01	-1	6.7E-01	0.6566	-6.7E-01	-0.65658	2.93E+01



Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	6.4E-01	1.9E+00	1.2E+46	0.000	3.2E+02	1	-3.2E+02	-1	6.0E+00	1	-6.0E+00	-1	4.47E+01
2	2	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.3E+00	3.6E+00	1.2E+46	0.000	2.2E+02	1	-2.2E+02	-1	4.2E+00	1	-4.2E+00	-1	4.47E+01
3	3	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.9E+00	6.8E+00	1.2E+46	0.000	1.8E+02	1	-1.8E+02	-1	3.5E+00	1	-3.5E+00	-1	4.47E+01
4	4	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	2.6E+00	1.3E+01	1.2E+46	0.000	1.6E+02	1	-1.6E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	4.47E+01
5	5	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	3.2E+00	2.4E+01	1.2E+46	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99985	4.47E+01
6	6	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	3.8E+00	4.6E+01	1.2E+46	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9995	-2.4E+00	-0.99946	4.47E+01
7	7	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	4.5E+00	8.7E+01	1.2E+46	0.000	1.2E+02	1	-1.2E+02	-1	2.3E+00	0.9986	-2.3E+00	-0.99864	4.46E+01
8	8	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	5.1E+00	1.7E+02	1.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	4.46E+01
9	9	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	5.7E+00	3.1E+02	1.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9953	-2.0E+00	-0.99527	4.45E+01
10	10	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	6.4E+00	5.9E+02	1.2E+46	0.000	1.0E+02	1	-1.0E+02	-1	1.9E+00	0.9926	-1.9E+00	-0.99263	4.44E+01
11	11	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	7.0E+00	1.1E+03	1.2E+46	0.000	9.5E+01	1	-9.5E+01	-1	1.8E+00	0.9894	-1.8E+00	-0.98938	4.42E+01
12	12	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	7.7E+00	2.1E+03	1.2E+46	0.000	9.1E+01	1	-9.1E+01	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	4.41E+01
13	13	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	8.3E+00	4.0E+03	1.2E+46	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9812	-1.7E+00	-0.98124	4.39E+01
14	14	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	8.9E+00	7.6E+03	1.2E+46	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9765	-1.6E+00	-0.97647	4.36E+01
15	15	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	9.6E+00	1.4E+04	1.2E+46	0.000	8.2E+01	1	-8.2E+01	-1	1.5E+00	0.9713	-1.5E+00	-0.97133	4.34E+01
16	16	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.0E+01	2.7E+04	1.2E+46	0.000	7.9E+01	1	-7.9E+01	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	4.32E+01
17	17	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.1E+01	5.2E+04	1.2E+46	0.000	7.7E+01	1	-7.7E+01	-1	1.5E+00	0.9601	-1.5E+00	-0.96015	4.29E+01
18	18	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.1E+01	9.8E+04	1.2E+46	0.000	7.4E+01	1	-7.4E+01	-1	1.4E+00	0.9542	-1.4E+00	-0.95421	4.27E+01
19	19	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.2E+01	1.8E+05	1.2E+46	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9481	-1.4E+00	-0.94812	4.24E+01
20	20	5.5875	0.0E+00	1.0E+00	-1.2E+46	2.000	1.3E+01	3.5E+05	1.2E+46	0.000	7.1E+01	1	-7.1E+01	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	4.21E+01



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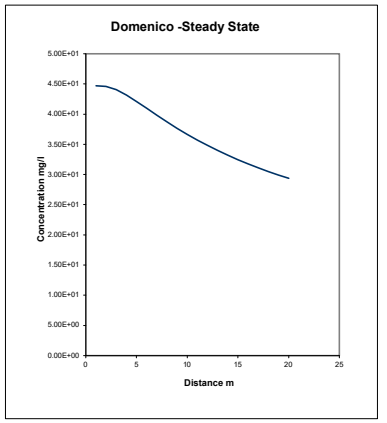
DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Contaminant	Manganese	
Input	**Value**	**Units**
C_T	0.123	mg/l
Co	4.47E+01	mg/l
λ	6.29E-105	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	7.20E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	11.175	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	4.47E+01
2	2	11.175	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.9973	4.46E+01
3	3	11.175	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.9856	4.41E+01
4	4	11.175	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.9659	4.32E+01
5	5	11.175	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.9419	4.21E+01
6	6	11.175	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.9163	4.10E+01
7	7	11.175	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.8907	3.98E+01
8	8	11.175	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.8659	3.87E+01
9	9	11.175	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.8422	3.76E+01
10	10	11.175	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.8197	3.66E+01
11	11	11.175	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.7986	3.57E+01
12	12	11.175	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.7787	3.48E+01
13	13	11.175	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.7601	3.40E+01
14	14	11.175	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.7425	3.32E+01
15	15	11.175	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	3.25E+01
16	16	11.175	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.7105	3.18E+01
17	17	11.175	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.6959	3.11E+01
18	18	11.175	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.6821	3.05E+01
19	19	11.175	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	2.99E+01
20	20	11.175	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.6566	2.93E+01

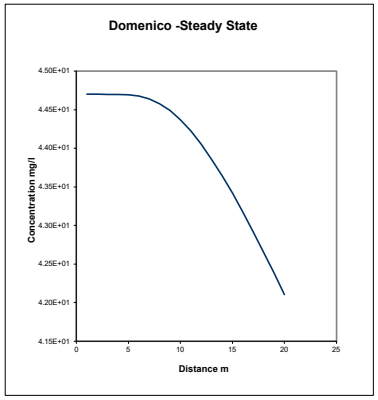


DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

Calc	Value	
v	1.08E-03	m/d
Rc	1.22E+04	
u	8.82E-08	m/d

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	11.175	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	4.47E+01
2	2	11.175	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	4.47E+01
3	3	11.175	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	4.47E+01
4	4	11.175	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	4.47E+01
5	5	11.175	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-0.9998	4.47E+01
6	6	11.175	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.9995	4.47E+01
7	7	11.175	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.9986	4.46E+01
8	8	11.175	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.9973	4.46E+01
9	9	11.175	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.9953	4.45E+01
10	10	11.175	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.9926	4.44E+01
11	11	11.175	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.9894	4.42E+01
12	12	11.175	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.9856	4.41E+01
13	13	11.175	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.9812	4.39E+01
14	14	11.175	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.9765	4.36E+01
15	15	11.175	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.9713	4.34E+01
16	16	11.175	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.9659	4.32E+01
17	17	11.175	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.9601	4.29E+01
18	18	11.175	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.9542	4.27E+01
19	19	11.175	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.9481	4.24E+01
20	20	11.175	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.9419	4.21E+01



Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

Contaminant **Manganese**

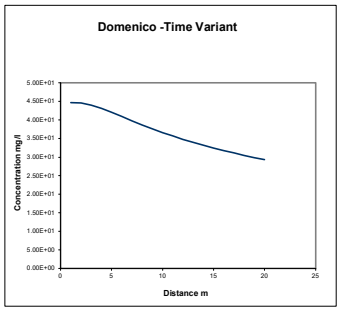
Input	Value	Units
C_T	0.123	mg/l
Co	4.47E+01	mg/l
λ	6.29E-105	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	7.20E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	Units
v	1.08E-03	m/d
Rc	1.22E+04	
u	8.82E-08	m/d

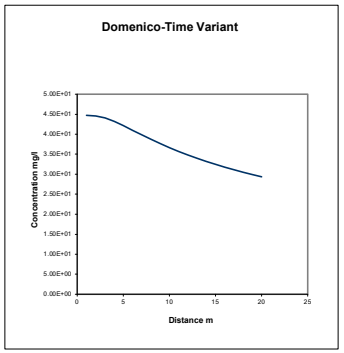
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	4.47E+01
2	2	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	4.46E+01
3	3	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.986	4.41E+01
4	4	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.966	4.32E+01
5	5	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.942	4.21E+01
6	6	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.916	4.10E+01
7	7	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.891	3.98E+01
8	8	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.866	3.87E+01
9	9	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.842	3.76E+01
10	10	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.82	3.66E+01
11	11	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.799	3.57E+01
12	12	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.779	3.48E+01
13	13	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.76	3.40E+01
14	14	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.743	3.32E+01
15	15	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	3.25E+01
16	16	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.711	3.18E+01
17	17	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.696	3.11E+01
18	18	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.682	3.05E+01
19	19	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	2.99E+01
20	20	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.657	2.93E+01



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	4.47E+01
2	2	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	4.47E+01
3	3	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	4.47E+01
4	4	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	4.47E+01
5	5	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-1	4.47E+01
6	6	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.999	4.47E+01
7	7	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.999	4.46E+01
8	8	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	4.46E+01
9	9	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.995	4.45E+01
10	10	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.993	4.44E+01
11	11	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.989	4.42E+01
12	12	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.986	4.41E+01
13	13	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.981	4.39E+01
14	14	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.976	4.36E+01
15	15	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.971	4.34E+01
16	16	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.966	4.32E+01
17	17	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.96	4.29E+01
18	18	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.954	4.27E+01
19	19	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.948	4.24E+01
20	20	5.5875	0.00E+00	1.00E+00	-1.19E+46	2	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.942	4.21E+01



Date:	27/04/2022
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	27-Apr-22		Version:	1
Contaminant	Iron			
Target Concentration (C_T)	1	mg/l	Origin of C_T:	Water Framework Directive EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Environment Agency

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		**Iron**		
Target concentration	C_T	**1**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
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**	**1.34E+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	**1.35E+02**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	1	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Iron**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**1** mg/l	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	Variable	Value	Unit	Source of parameter value	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters	Variable	Value	Unit	Source
Contaminant		Iron		from Level 1
Target Concentration	C_T	1	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		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 pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	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	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target		**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**#DIV/0!**	**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 ionic organic chemicals (acids)

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		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

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

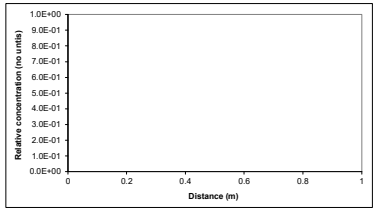
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	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 desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation 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.

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:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

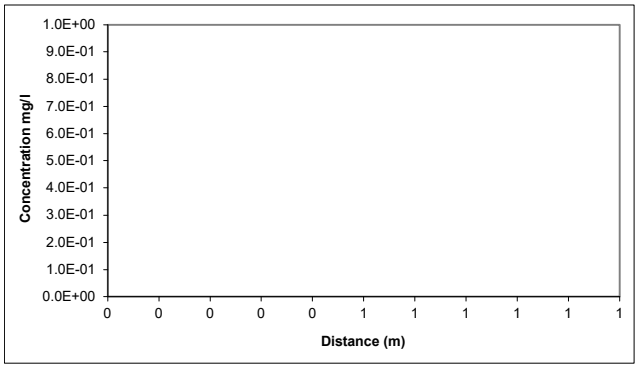
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_W	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu) | Variable | Value | Unit | Source

Contaminant		Iron		from Level 1
Target Concentration	C_T	1.00E+00	mg/l	from Level 1

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

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

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

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	3.15E+02	mg/l	*Based on 95 percentile soil conc of 255000mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*100 day half life estimation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
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	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	8.10E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Calculated Parameters | Variable

Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	1.38E+04	fraction
Decay rate used	λ	5.59E-105	d^{-1}
Rate of contaminant flow due to retardation	u	7.84E-08	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	2.96E+02	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.06E+00**	

Remedial Targets

Remedial Target		**1.06E+00**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	C_{ED}/C_0	**2.96E+02**	**mg/l**	Domenico - Steady state

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.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	8.10E+02	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		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	8.10E+02	l/kg

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

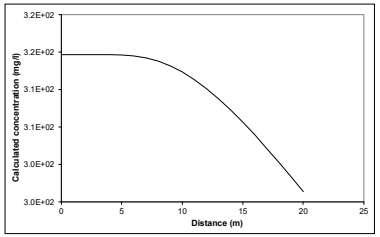
Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00 m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01 m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

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



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, 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 it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater 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 9.0E+99.

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

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	3.1E+02
1.0	3.15E+02
2.0	3.15E+02
3.0	3.15E+02
4.0	3.15E+02
5.0	3.15E+02
6.0	3.14E+02
7.0	3.14E+02
8.0	3.14E+02
9.0	3.13E+02
10.0	3.12E+02
11.0	3.11E+02
12.0	3.10E+02
13.0	3.09E+02
14.0	3.07E+02
15.0	3.06E+02
16.0	3.04E+02
17.0	3.02E+02
18.0	3.00E+02
19.0	2.98E+02
20.0	2.96E+02

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Iron**

Parameter	Value	Units
(carried over from input sheet)		
C_T	1.00E+00	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

calc calc Calc Kd l/kg

Calculation of partition coefficient for ionic organic chemical

Partition coefficient used in Level 1 Assessment 1.34E+02 l/kg

Calculated Remedial Target **1.35E+02 mg/kg** **for Iron**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27/04/2022
Version:	1

Level 2 Calculation Sheet

Contaminant **Iron**

Site assessed:	Glan Llyn
Date:	27/04/2022
Version:	1

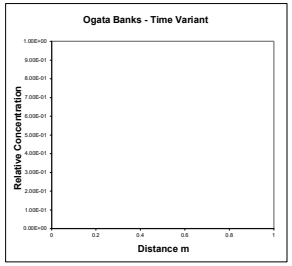
Parameter	Value	Units		
(carried over from input sheet)				
Mz	0.00E+00	m		
L	0.00E+00	m		
da	0.00E+00	m		Calculated
Inf	0.00E+00	m/d		Dilution Factor
K	0.00E+00	m/d		
i	0.00E+00		Calculation based on target concentration	#DIV/0!
		m3/d		
A	0.00E+00	m2	Calculation based on observed contaminant concentration	#DIV/0!
		m3/d		
Cc	0.00E+00	mg/l		
C_T	1.00E+00	mg/l		
Cu	0.00E+00	mg/l		
w	0.00E+00	m		

OGATA BANKS SOLUTION

Contaminant	Iron	
Input	**Value**	**Units**
C_T	1.000E+00	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

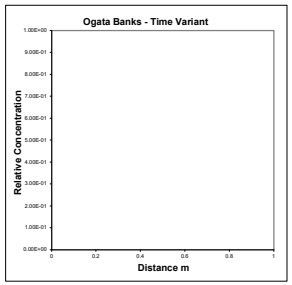
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



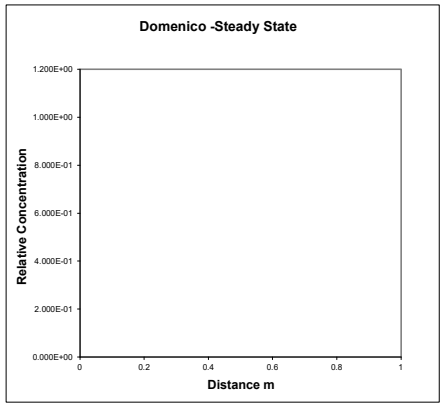
Date:	27/04/2022
Version:	1

DOMENICO (STEADY STATE)

Contaminant	Iron	
Input	**Value**	**Units**
C_T	1.000E+00	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!

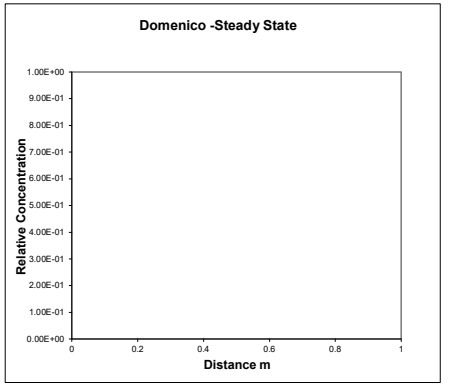


DOMENICO (STEADY STATE)

Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



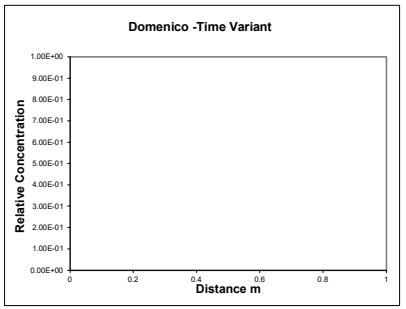
Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

Contaminant	Iron	
Input	**Value**	**Units**
C_T	1	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

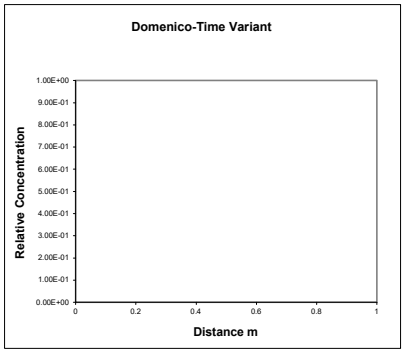
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	27/04/2022
Version:	1

OGATA BANKS SOLUTION

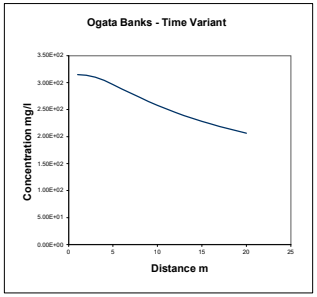
Contaminant	Iron	
Input	**Value**	**Units**
C_T	1	mg/l
Co	3.15E+02	mg/l
λ	5.59E-105	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	8.10E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.38E+04	
u	7.84E-08	m/d

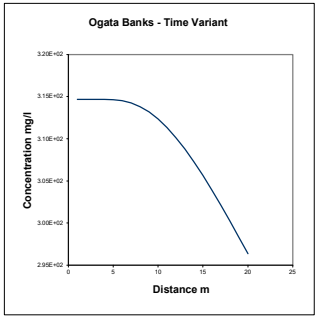
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E-01	1.9E+00	1.1E+46	0.000	3.2E+02	1	-3.2E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	3.15E+02
2	2	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+00	3.6E+00	1.1E+46	0.000	2.2E+02	1	-2.2E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	3.14E+02
3	3	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.9E+00	6.8E+00	1.1E+46	0.000	1.8E+02	1	-1.8E+02	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	3.10E+02
4	4	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	2.6E+00	1.3E+01	1.1E+46	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	3.04E+02
5	5	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	3.2E+00	2.4E+01	1.1E+46	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	2.96E+02
6	6	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	3.8E+00	4.6E+01	1.1E+46	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9163	-1.2E+00	-0.91633	2.88E+02
7	7	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	4.5E+00	8.7E+01	1.1E+46	0.000	1.2E+02	1	-1.2E+02	-1	1.1E+00	0.8907	-1.1E+00	-0.89072	2.80E+02
8	8	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	5.1E+00	1.7E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8659	-1.1E+00	-0.86587	2.72E+02
9	9	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	5.7E+00	3.1E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8422	-1.0E+00	-0.84215	2.65E+02
10	10	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E+00	5.9E+02	1.1E+46	0.000	1.0E+02	1	-1.0E+02	-1	9.5E-01	0.8197	-9.5E-01	-0.81971	2.58E+02
11	11	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	7.0E+00	1.1E+03	1.1E+46	0.000	9.5E+01	1	-9.5E+01	-1	9.0E-01	0.7986	-9.0E-01	-0.79858	2.51E+02
12	12	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	7.7E+00	2.1E+03	1.1E+46	0.000	9.1E+01	1	-9.1E+01	-1	8.6E-01	0.7787	-8.6E-01	-0.77872	2.45E+02
13	13	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	8.3E+00	4.0E+03	1.1E+46	0.000	8.8E+01	1	-8.8E+01	-1	8.3E-01	0.7601	-8.3E-01	-0.76006	2.39E+02
14	14	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	8.9E+00	7.6E+03	1.1E+46	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7425	-8.0E-01	-0.74253	2.34E+02
15	15	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	9.6E+00	1.4E+04	1.1E+46	0.000	8.2E+01	1	-8.2E+01	-1	7.7E-01	0.726	-7.7E-01	-0.72604	2.28E+02
16	16	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.0E+01	2.7E+04	1.1E+46	0.000	7.9E+01	1	-7.9E+01	-1	7.5E-01	0.7105	-7.5E-01	-0.71052	2.24E+02
17	17	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	5.2E+04	1.1E+46	0.000	7.7E+01	1	-7.7E+01	-1	7.3E-01	0.6959	-7.3E-01	-0.69588	2.19E+02
18	18	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	9.8E+04	1.1E+46	0.000	7.4E+01	1	-7.4E+01	-1	7.1E-01	0.6821	-7.1E-01	-0.68205	2.15E+02
19	19	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.2E+01	1.8E+05	1.1E+46	0.000	7.2E+01	1	-7.2E+01	-1	6.9E-01	0.669	-6.9E-01	-0.66897	2.11E+02
20	20	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+01	3.5E+05	1.1E+46	0.000	7.1E+01	1	-7.1E+01	-1	6.7E-01	0.6566	-6.7E-01	-0.65658	2.07E+02



Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E-01	1.9E+00	1.1E+46	0.000	3.2E+02	1	-3.2E+02	-1	6.0E+00	1	-6.0E+00	-1	3.15E+02
2	2	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+00	3.6E+00	1.1E+46	0.000	2.2E+02	1	-2.2E+02	-1	4.2E+00	1	-4.2E+00	-1	3.15E+02
3	3	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.9E+00	6.8E+00	1.1E+46	0.000	1.8E+02	1	-1.8E+02	-1	3.5E+00	1	-3.5E+00	-1	3.15E+02
4	4	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	2.6E+00	1.3E+01	1.1E+46	0.000	1.6E+02	1	-1.6E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	3.15E+02
5	5	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	3.2E+00	2.4E+01	1.1E+46	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99985	3.15E+02
6	6	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	3.8E+00	4.6E+01	1.1E+46	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9995	-2.4E+00	-0.99946	3.14E+02
7	7	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	4.5E+00	8.7E+01	1.1E+46	0.000	1.2E+02	1	-1.2E+02	-1	2.3E+00	0.9986	-2.3E+00	-0.99864	3.14E+02
8	8	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	5.1E+00	1.7E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	3.14E+02
9	9	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	5.7E+00	3.1E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9953	-2.0E+00	-0.99527	3.13E+02
10	10	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E+00	5.9E+02	1.1E+46	0.000	1.0E+02	1	-1.0E+02	-1	1.9E+00	0.9926	-1.9E+00	-0.99263	3.12E+02
11	11	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	7.0E+00	1.1E+03	1.1E+46	0.000	9.5E+01	1	-9.5E+01	-1	1.8E+00	0.9894	-1.8E+00	-0.98938	3.11E+02
12	12	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	7.7E+00	2.1E+03	1.1E+46	0.000	9.1E+01	1	-9.1E+01	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	3.10E+02
13	13	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	8.3E+00	4.0E+03	1.1E+46	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9812	-1.7E+00	-0.98124	3.09E+02
14	14	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	8.9E+00	7.6E+03	1.1E+46	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9765	-1.6E+00	-0.97647	3.07E+02
15	15	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	9.6E+00	1.4E+04	1.1E+46	0.000	8.2E+01	1	-8.2E+01	-1	1.5E+00	0.9713	-1.5E+00	-0.97133	3.06E+02
16	16	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.0E+01	2.7E+04	1.1E+46	0.000	7.9E+01	1	-7.9E+01	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	3.04E+02
17	17	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	5.2E+04	1.1E+46	0.000	7.7E+01	1	-7.7E+01	-1	1.5E+00	0.9601	-1.5E+00	-0.96015	3.02E+02
18	18	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	9.8E+04	1.1E+46	0.000	7.4E+01	1	-7.4E+01	-1	1.4E+00	0.9542	-1.4E+00	-0.95421	3.00E+02
19	19	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.2E+01	1.8E+05	1.1E+46	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9481	-1.4E+00	-0.94812	2.98E+02
20	20	39.3338	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+01	3.5E+05	1.1E+46	0.000	7.1E+01	1	-7.1E+01	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	2.96E+02



Date:	27/04/2022
Version:	1

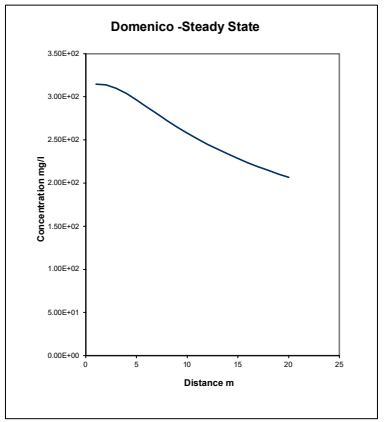
DOMENICO (STEADY STATE)

Contaminant	Iron	
Input	**Value**	**Units**
C_T	1	mg/l
Co	3.15E+02	mg/l
λ	5.59E-105	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	8.10E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	78.6675	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	3.15E+02
2	2	78.6675	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.9973	3.14E+02
3	3	78.6675	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.9856	3.10E+02
4	4	78.6675	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.9659	3.04E+02
5	5	78.6675	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.9419	2.96E+02
6	6	78.6675	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.9163	2.88E+02
7	7	78.6675	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.8907	2.80E+02
8	8	78.6675	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.8659	2.72E+02
9	9	78.6675	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.8422	2.65E+02
10	10	78.6675	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.8197	2.58E+02
11	11	78.6675	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.7986	2.51E+02
12	12	78.6675	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.7787	2.45E+02
13	13	78.6675	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.7601	2.39E+02
14	14	78.6675	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.7425	2.34E+02
15	15	78.6675	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	2.28E+02
16	16	78.6675	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.7105	2.24E+02
17	17	78.6675	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.6959	2.19E+02
18	18	78.6675	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.6821	2.15E+02
19	19	78.6675	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	2.11E+02
20	20	78.6675	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.6566	2.07E+02

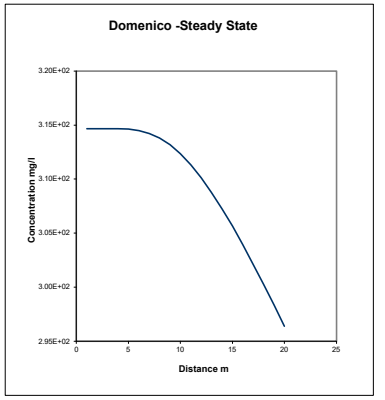


DOMENICO (STEADY STATE)

Calc	Value	
v	1.08E-03	m/d
Rc	1.38E+04	
u	7.84E-08	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	78.6675	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	3.15E+02
2	2	78.6675	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	3.15E+02
3	3	78.6675	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	3.15E+02
4	4	78.6675	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	3.15E+02
5	5	78.6675	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-0.9998	3.15E+02
6	6	78.6675	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.9995	3.14E+02
7	7	78.6675	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.9986	3.14E+02
8	8	78.6675	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.9973	3.14E+02
9	9	78.6675	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.9953	3.13E+02
10	10	78.6675	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.9926	3.12E+02
11	11	78.6675	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.9894	3.11E+02
12	12	78.6675	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.9856	3.10E+02
13	13	78.6675	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.9812	3.09E+02
14	14	78.6675	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.9765	3.07E+02
15	15	78.6675	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.9713	3.06E+02
16	16	78.6675	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.9659	3.04E+02
17	17	78.6675	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.9601	3.02E+02
18	18	78.6675	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.9542	3.00E+02
19	19	78.6675	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.9481	2.98E+02
20	20	78.6675	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.9419	2.96E+02



Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

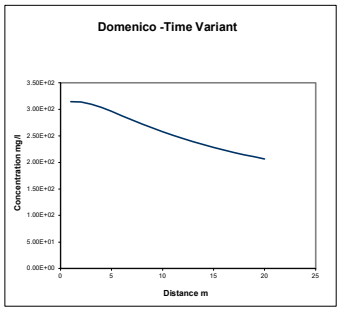
Contaminant	Iron	
Input	**Value**	**Units**
C_T	1	mg/l
Co	3.15E+02	mg/l
λ	5.59E-105	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	8.10E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option: Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.38E+04	
u	7.84E-08	m/d

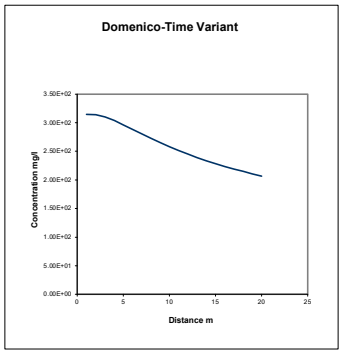
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	3.15E+02
2	2	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	3.14E+02
3	3	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.986	3.10E+02
4	4	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.966	3.04E+02
5	5	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.942	2.96E+02
6	6	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.916	2.88E+02
7	7	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.891	2.80E+02
8	8	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.866	2.72E+02
9	9	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.842	2.65E+02
10	10	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.82	2.58E+02
11	11	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.799	2.51E+02
12	12	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.779	2.45E+02
13	13	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.76	2.39E+02
14	14	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.743	2.34E+02
15	15	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	2.28E+02
16	16	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.711	2.24E+02
17	17	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.696	2.19E+02
18	18	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.682	2.15E+02
19	19	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	2.11E+02
20	20	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.657	2.07E+02



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	3.15E+02
2	2	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	3.15E+02
3	3	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	3.15E+02
4	4	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	3.15E+02
5	5	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-1	3.15E+02
6	6	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.999	3.14E+02
7	7	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.999	3.14E+02
8	8	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	3.14E+02
9	9	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.995	3.13E+02
10	10	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.993	3.12E+02
11	11	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.989	3.11E+02
12	12	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.986	3.10E+02
13	13	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.981	3.09E+02
14	14	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.976	3.07E+02
15	15	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.971	3.06E+02
16	16	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.966	3.04E+02
17	17	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.96	3.02E+02
18	18	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.954	3.00E+02
19	19	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.948	2.98E+02
20	20	39.3338	0.00E+00	1.00E+00	-1.12E+46	2	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.942	2.96E+02



Date:	27/04/2022
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	24-Jun-22		Version:	1
Contaminant	Cyanide			
Target Concentration (C_T)	0.001	mg/l	Origin of C_T:	Water Framework Directive (DEFRA/Ministers 2015)

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

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		Cyanide		
Target concentration	C_T	0.001	mg/l	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
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	

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.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**1.35E-01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.001	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Jun-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Cyanide**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**0.001** **mg/l**	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Infiltration	Inf	0.00E+00	m/d	
Area of contaminant source	A	0.00E+00	m^2	Not used in calculation
Entry for groundwater flow below site				
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m	
Saturated aquifer thickness	da	0.00E+00	m	
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d	
Hydraulic gradient of water table	i	0.00E+00	fraction	
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m	Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**		
Enter mixing zone thickness	Mz	0.00E+00	m	
Calculated mixing zone thickness	Mz		m	

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentr**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Jun-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Cyanide		from Level 1
Target Concentration	C_T	0.001	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		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 pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	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	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point	**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction** partitioning equation. 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 ionic organic chemicals (acids)

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		fraction
Organic carbon partition coefficient	Koc		l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

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

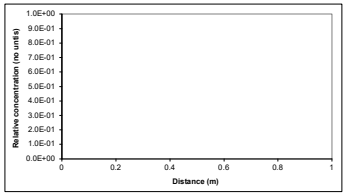
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	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 desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation 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.

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:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	**1.0E+00**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

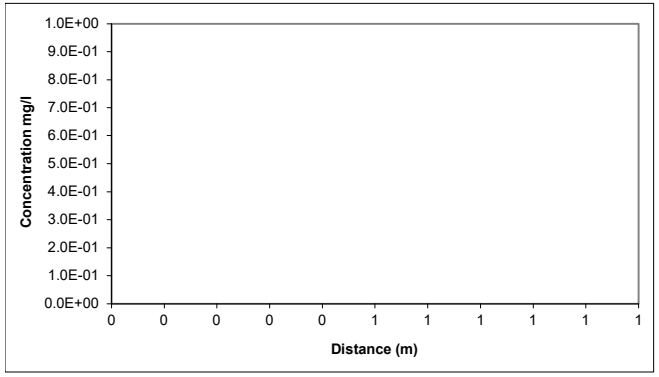
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_W	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Cyanide		from Level 1
Target Concentration	C_T	1.00E-03	mg/l	from Level 1

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

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

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
Initial contaminant concentration in groundwater at plume core	C_0	5.26E+00	mg/l	*Based on 95th percentile soil conc of 28.23*
Half life for degradation of contaminant in water	$t_{1/2}$	1.50E+01	days	*WFD UKTechnical Advisory Group*
Calculated decay rate	λ	4.62E-02	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappir*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
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	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	5.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	8.60E+01	fraction
Decay rate used	λ	5.37E-04	d^{-1}
Rate of contaminant flow due to retardation	u	1.26E-05	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	9.74E-43	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**5.39E+42**	

Remedial Targets

Remedial Target		**5.39E+39**	**mg/l**
Domenico - Steady state			
Distance to compliance point		**20**	**m**
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**9.74E-43**	**mg/l**

For comparison with measured groundwater concentration.

Domenico - Steady state

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.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 5.00E+00 l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — 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	5.00E+00	l/kg

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

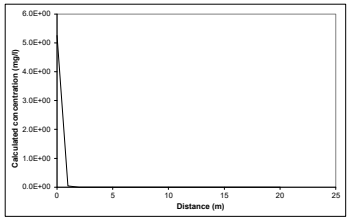
Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

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



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, 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 it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater 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 9.0E+99.

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

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	5.3E+00
1.0	3.85E-02
2.0	2.82E-04
3.0	2.06E-06
4.0	1.51E-08
5.0	1.11E-10
6.0	8.10E-13
7.0	5.93E-15
8.0	4.34E-17
9.0	3.17E-19
10.0	2.31E-21
11.0	1.69E-23
12.0	1.23E-25
13.0	8.99E-28
14.0	6.55E-30
15.0	4.77E-32
16.0	3.47E-34
17.0	2.53E-36
18.0	1.84E-38
19.0	1.34E-40
20.0	9.74E-43

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Cyanide**

Parameter (carried over from input sheet)	**Value**	**Units**
C_T	1.00E-03	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **1.35E-01 mg/kg** **for Cyanide**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24/06/2022
Version:	1

Level 2 Calculation Sheet

Contaminant **Cyanide**

Site assessed:	Glan Llyn
Date:	24/06/2022
Version:	1

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	
		m3/d
A	0.00E+00	m2
		m3/d
Cc	0.00E+00	mg/l
C_T	1.00E-03	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

Calculation based on target concentration #DIV/0!

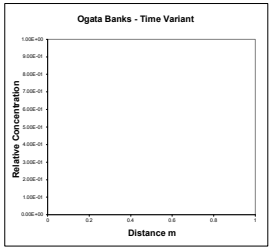
Calculation based on observed contaminant concentration #DIV/0!



OGATA BANKS SOLUTION

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Contaminant	Cyanide			X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
Input	**Value**	**Units**																				
C_T	1.000E-03	mg/l	1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DF	#DIV/0!		2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
λ	6.931E-101	$days^{-1}$	5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sz	0.000E+00	m	6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sy	0.000E+00	m	7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Kd	0.000E+00	l/kg	8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ρ	0.000E+00	g/cm3	9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
n	0.000E+00		10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
i	#DIV/0!		11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
K	0.000E+00	m/d	12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
x	0.000E+00	m	13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
z	0.000E+00	m	14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
y	0.000E+00	m	15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
t	1.000E+99	days	16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ax	0.000E+00	m	17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
az	0.000E+00	m	18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ay	0.000E+00	m	19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

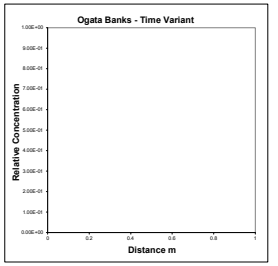


Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



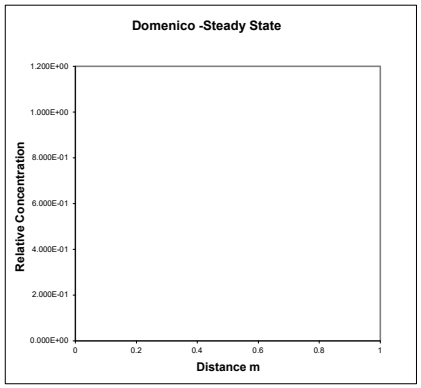
Date:	24/06/2022
Version:	1

DOMENICO (STEADY STATE)

Contaminant	Cyanide	
Input	**Value**	**Units**
C_T	1.000E-03	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!

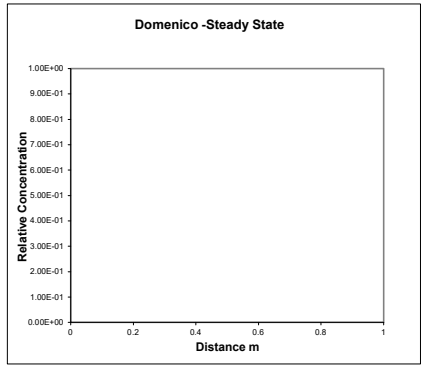


DOMENICO (STEADY STATE)

Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!



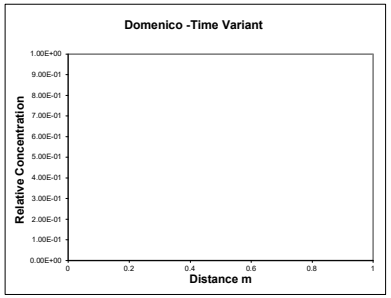
Date:	24/06/2022
Version:	1

DOMENICO (TIME VARIANT)

Contaminant	Cyanide	
Input	**Value**	**Units**
C_T	0.001	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

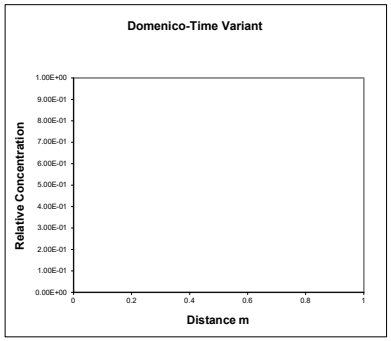
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/06/2022
Version:	1

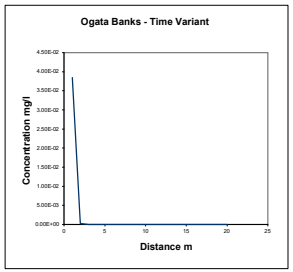
OGATA BANKS SOLUTION

Contaminant	Cyanide	
Input	**Value**	**Units**
C_T	0.001	mg/l
Co	5.26E+00	mg/l
λ	5.37E-04	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	5.00E+00	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option: Simulate vertical dispersion in 1 direction

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

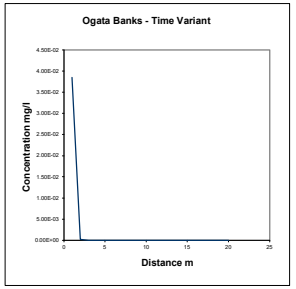
X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.657	-4.9E+00	7.3E-03	-2.3E+48	2.000	5.6E+00	2.6E+02	2.3E+48	0.000	3.2E+02	1	-3.2E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	3.85E-02
2	0.657	-9.8E+00	5.4E-05	-2.3E+48	2.000	1.1E+01	6.7E+04	2.3E+48	0.000	2.2E+02	1	-2.2E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	2.81E-04
3	0.657	-1.5E+01	3.9E-07	-2.3E+48	2.000	1.7E+01	1.7E+07	2.3E+48	0.000	1.8E+02	1	-1.8E+02	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	2.03E-06
4	0.657	-2.0E+01	2.9E-09	-2.3E+48	2.000	2.2E+01	4.5E+09	2.3E+48	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	1.46E-08
5	0.657	-2.5E+01	2.1E-11	-2.3E+48	2.000	2.8E+01	1.2E+12	2.3E+48	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	1.04E-10
6	0.657	-3.0E+01	1.5E-13	-2.3E+48	2.000	3.3E+01	3.0E+14	2.3E+48	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9163	-1.2E+00	-0.91633	7.43E-13
7	0.657	-3.4E+01	1.1E-15	-2.3E+48	2.000	3.9E+01	7.7E+16	2.3E+48	0.000	1.2E+02	1	-1.2E+02	-1	1.1E+00	0.8907	-1.1E+00	-0.89072	5.29E-15
8	0.657	-3.9E+01	8.3E-18	-2.3E+48	2.000	4.4E+01	2.0E+19	2.3E+48	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8659	-1.1E+00	-0.86587	3.76E-17
9	0.657	-4.4E+01	6.1E-20	-2.3E+48	2.000	5.0E+01	5.2E+21	2.3E+48	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8422	-1.0E+00	-0.84215	2.68E-19
10	0.657	-4.9E+01	4.4E-22	-2.3E+48	2.000	5.6E+01	1.3E+24	2.3E+48	0.000	1.0E+02	1	-1.0E+02	-1	9.5E-01	0.8197	-9.5E-01	-0.81971	1.91E-21
11	0.657	-5.4E+01	3.2E-24	-2.3E+48	2.000	6.1E+01	3.4E+26	2.3E+48	0.000	9.5E+01	1	-9.5E+01	-1	9.0E-01	0.7986	-9.0E-01	-0.79858	1.36E-23
12	0.657	-5.9E+01	2.4E-26	-2.3E+48	2.000	6.7E+01	8.9E+28	2.3E+48	0.000	9.1E+01	1	-9.1E+01	-1	8.6E-01	0.7787	-8.6E-01	-0.77872	9.74E-26
13	0.657	-6.4E+01	1.7E-28	-2.3E+48	2.000	7.2E+01	2.3E+31	2.3E+48	0.000	8.8E+01	1	-8.8E+01	-1	8.3E-01	0.7601	-8.3E-01	-0.76006	6.96E-28
14	0.657	-6.9E+01	1.3E-30	-2.3E+48	2.000	7.8E+01	6.0E+33	2.3E+48	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7425	-8.0E-01	-0.74253	4.98E-30
15	0.657	-7.4E+01	9.3E-33	-2.3E+48	2.000	8.3E+01	1.5E+36	2.3E+48	0.000	8.2E+01	1	-8.2E+01	-1	7.7E-01	0.726	-7.7E-01	-0.72604	3.57E-32
16	0.657	-7.9E+01	6.8E-35	-2.3E+48	2.000	8.9E+01	4.0E+38	2.3E+48	0.000	7.9E+01	1	-7.9E+01	-1	7.5E-01	0.7105	-7.5E-01	-0.71052	2.56E-34
17	0.657	-8.4E+01	5.0E-37	-2.3E+48	2.000	9.4E+01	1.0E+41	2.3E+48	0.000	7.7E+01	1	-7.7E+01	-1	7.3E-01	0.6959	-7.3E-01	-0.69588	1.83E-36
18	0.657	-8.9E+01	3.7E-39	-2.3E+48	2.000	1.0E+02	2.7E+43	2.3E+48	0.000	7.4E+01	1	-7.4E+01	-1	7.1E-01	0.6821	-7.1E-01	-0.68205	1.32E-38
19	0.657	-9.3E+01	2.7E-41	-2.3E+48	2.000	1.1E+02	6.9E+45	2.3E+48	0.000	7.2E+01	1	-7.2E+01	-1	6.9E-01	0.669	-6.9E-01	-0.66897	9.45E-41
20	0.657	-9.8E+01	2.0E-43	-2.3E+48	2.000	1.1E+02	1.8E+48	2.3E+48	0.000	7.1E+01	1	-7.1E+01	-1	6.7E-01	0.6566	-6.7E-01	-0.65658	6.79E-43



Calc	Value	
v	1.08E-03	m/d
Rc	8.60E+01	
u	1.26E-05	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.657	-4.9E+00	7.3E-03	-2.3E+48	2.000	5.6E+00	2.6E+02	2.3E+48	0.000	3.2E+02	1	-3.2E+02	-1	6.0E+00	1	-6.0E+00	-1	3.85E-02
2	0.657	-9.8E+00	5.4E-05	-2.3E+48	2.000	1.1E+01	6.7E+04	2.3E+48	0.000	2.2E+02	1	-2.2E+02	-1	4.2E+00	1	-4.2E+00	-1	2.82E-04
3	0.657	-1.5E+01	3.9E-07	-2.3E+48	2.000	1.7E+01	1.7E+07	2.3E+48	0.000	1.8E+02	1	-1.8E+02	-1	3.5E+00	1	-3.5E+00	-1	2.06E-06
4	0.657	-2.0E+01	2.9E-09	-2.3E+48	2.000	2.2E+01	4.5E+09	2.3E+48	0.000	1.6E+02	1	-1.6E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	1.51E-08
5	0.657	-2.5E+01	2.1E-11	-2.3E+48	2.000	2.8E+01	1.2E+12	2.3E+48	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99985	1.11E-10
6	0.657	-3.0E+01	1.5E-13	-2.3E+48	2.000	3.3E+01	3.0E+14	2.3E+48	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9995	-2.4E+00	-0.99946	8.10E-13
7	0.657	-3.4E+01	1.1E-15	-2.3E+48	2.000	3.9E+01	7.7E+16	2.3E+48	0.000	1.2E+02	1	-1.2E+02	-1	2.3E+00	0.9986	-2.3E+00	-0.99864	5.93E-15
8	0.657	-3.9E+01	8.3E-18	-2.3E+48	2.000	4.4E+01	2.0E+19	2.3E+48	0.000	1.1E+02	1	-1.1E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	4.34E-17
9	0.657	-4.4E+01	6.1E-20	-2.3E+48	2.000	5.0E+01	5.2E+21	2.3E+48	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9953	-2.0E+00	-0.99527	3.17E-19
10	0.657	-4.9E+01	4.4E-22	-2.3E+48	2.000	5.6E+01	1.3E+24	2.3E+48	0.000	1.0E+02	1	-1.0E+02	-1	1.9E+00	0.9926	-1.9E+00	-0.99263	2.31E-21
11	0.657	-5.4E+01	3.2E-24	-2.3E+48	2.000	6.1E+01	3.4E+26	2.3E+48	0.000	9.5E+01	1	-9.5E+01	-1	1.8E+00	0.9894	-1.8E+00	-0.98938	1.69E-23
12	0.657	-5.9E+01	2.4E-26	-2.3E+48	2.000	6.7E+01	8.9E+28	2.3E+48	0.000	9.1E+01	1	-9.1E+01	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	1.23E-25
13	0.657	-6.4E+01	1.7E-28	-2.3E+48	2.000	7.2E+01	2.3E+31	2.3E+48	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9812	-1.7E+00	-0.98124	8.99E-28
14	0.657	-6.9E+01	1.3E-30	-2.3E+48	2.000	7.8E+01	6.0E+33	2.3E+48	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9765	-1.6E+00	-0.97647	6.55E-30
15	0.657	-7.4E+01	9.3E-33	-2.3E+48	2.000	8.3E+01	1.5E+36	2.3E+48	0.000	8.2E+01	1	-8.2E+01	-1	1.5E+00	0.9713	-1.5E+00	-0.97133	4.77E-32
16	0.657	-7.9E+01	6.8E-35	-2.3E+48	2.000	8.9E+01	4.0E+38	2.3E+48	0.000	7.9E+01	1	-7.9E+01	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	3.47E-34
17	0.657	-8.4E+01	5.0E-37	-2.3E+48	2.000	9.4E+01	1.0E+41	2.3E+48	0.000	7.7E+01	1	-7.7E+01	-1	1.5E+00	0.9601	-1.5E+00	-0.96015	2.53E-36
18	0.657	-8.9E+01	3.7E-39	-2.3E+48	2.000	1.0E+02	2.7E+43	2.3E+48	0.000	7.4E+01	1	-7.4E+01	-1	1.4E+00	0.9542	-1.4E+00	-0.95421	1.84E-38
19	0.657	-9.3E+01	2.7E-41	-2.3E+48	2.000	1.1E+02	6.9E+45	2.3E+48	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9481	-1.4E+00	-0.94812	1.34E-40
20	0.657	-9.8E+01	2.0E-43	-2.3E+48	2.000	1.1E+02	1.8E+48	2.3E+48	0.000	7.1E+01	1	-7.1E+01	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	9.74E-43



Date:	24/06/2022
Version:	1

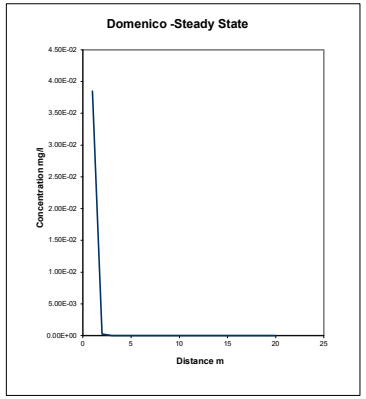
DOMENICO (STEADY STATE)

Contaminant	Cyanide	
Input	**Value**	**Units**
C_T	0.001	mg/l
Co	5.26E+00	mg/l
λ	5.37E-04	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	5.00E+00	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1.314	-4.92E+00	7.32E-03	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	3.85E-02
2	1.314	-9.83E+00	5.36E-05	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	2.81E-04
3	1.314	-1.48E+01	3.93E-07	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.986	-1.73E+00	-0.9856	2.03E-06
4	1.314	-1.97E+01	2.88E-09	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.966	-1.50E+00	-0.9659	1.46E-08
5	1.314	-2.46E+01	2.11E-11	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.942	-1.34E+00	-0.9419	1.04E-10
6	1.314	-2.95E+01	1.54E-13	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.916	-1.22E+00	-0.9163	7.43E-13
7	1.314	-3.44E+01	1.13E-15	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.891	-1.13E+00	-0.8907	5.29E-15
8	1.314	-3.93E+01	8.27E-18	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.866	-1.06E+00	-0.8659	3.76E-17
9	1.314	-4.43E+01	6.06E-20	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.842	-9.99E-01	-0.8422	2.68E-19
10	1.314	-4.92E+01	4.44E-22	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.82	-9.47E-01	-0.8197	1.91E-21
11	1.314	-5.41E+01	3.25E-24	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.799	-9.03E-01	-0.7986	1.36E-23
12	1.314	-5.90E+01	2.38E-26	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.779	-8.65E-01	-0.7787	9.74E-26
13	1.314	-6.39E+01	1.74E-28	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.76	-8.31E-01	-0.7601	6.96E-28
14	1.314	-6.88E+01	1.28E-30	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.743	-8.01E-01	-0.7425	4.98E-30
15	1.314	-7.38E+01	9.34E-33	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	3.57E-32
16	1.314	-7.87E+01	6.84E-35	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.711	-7.49E-01	-0.7105	2.56E-34
17	1.314	-8.36E+01	5.01E-37	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.696	-7.27E-01	-0.6959	1.83E-36
18	1.314	-8.85E+01	3.67E-39	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.682	-7.06E-01	-0.6821	1.32E-38
19	1.314	-9.34E+01	2.69E-41	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	9.45E-41
20	1.314	-9.83E+01	1.97E-43	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.657	-6.70E-01	-0.6566	6.79E-43

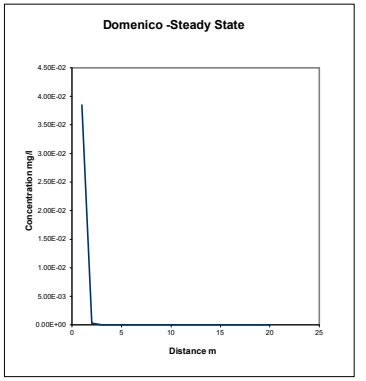


DOMENICO (STEADY STATE)

Calc	Value	
v	1.08E-03	m/d
Rc	8.60E+01	
u	1.26E-05	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1.314	-4.92E+00	7.32E-03	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	3.85E-02
2	1.314	-9.83E+00	5.36E-05	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	2.82E-04
3	1.314	-1.48E+01	3.93E-07	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	2.06E-06
4	1.314	-1.97E+01	2.88E-09	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	1.51E-08
5	1.314	-2.46E+01	2.11E-11	1.41E+02	1	-1.41E+02	-1	2.68E+00	1	-2.68E+00	-0.9998	1.11E-10
6	1.314	-2.95E+01	1.54E-13	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.999	-2.45E+00	-0.9995	8.10E-13
7	1.314	-3.44E+01	1.13E-15	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.999	-2.26E+00	-0.9986	5.93E-15
8	1.314	-3.93E+01	8.27E-18	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	4.34E-17
9	1.314	-4.43E+01	6.06E-20	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.995	-2.00E+00	-0.9953	3.17E-19
10	1.314	-4.92E+01	4.44E-22	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.993	-1.89E+00	-0.9926	2.31E-21
11	1.314	-5.41E+01	3.25E-24	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.989	-1.81E+00	-0.9894	1.69E-23
12	1.314	-5.90E+01	2.38E-26	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.986	-1.73E+00	-0.9856	1.23E-25
13	1.314	-6.39E+01	1.74E-28	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.981	-1.66E+00	-0.9812	8.99E-28
14	1.314	-6.88E+01	1.28E-30	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.976	-1.60E+00	-0.9765	6.55E-30
15	1.314	-7.38E+01	9.34E-33	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.971	-1.55E+00	-0.9713	4.77E-32
16	1.314	-7.87E+01	6.84E-35	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.966	-1.50E+00	-0.9659	3.47E-34
17	1.314	-8.36E+01	5.01E-37	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.96	-1.45E+00	-0.9601	2.53E-36
18	1.314	-8.85E+01	3.67E-39	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.954	-1.41E+00	-0.9542	1.84E-38
19	1.314	-9.34E+01	2.69E-41	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.948	-1.37E+00	-0.9481	1.34E-40
20	1.314	-9.83E+01	1.97E-43	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.942	-1.34E+00	-0.9419	9.74E-43



Date:	24/06/2022
Version:	1

DOMENICO (TIME VARIANT)

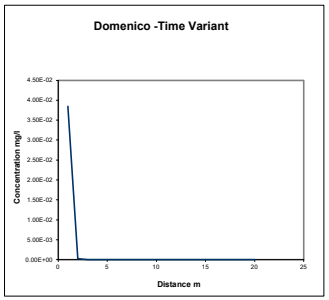
Contaminant	Cyanide	
Input	**Value**	**Units**
C_T	0.001	mg/l
Co	5.26E+00	mg/l
λ	5.37E-04	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	5.00E+00	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	8.60E+01	
u	1.26E-05	m/d

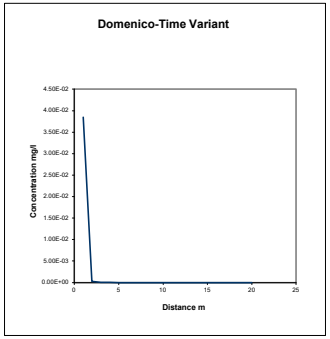
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.657	-4.92E+00	7.32E-03	-2.32E+48	2	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	3.85E-02
2	2	0.657	-9.83E+00	5.36E-05	-2.32E+48	2	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	2.81E-04
3	3	0.657	-1.48E+01	3.93E-07	-2.32E+48	2	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.986	2.03E-06
4	4	0.657	-1.97E+01	2.88E-09	-2.32E+48	2	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.966	1.46E-08
5	5	0.657	-2.46E+01	2.11E-11	-2.32E+48	2	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.942	1.04E-10
6	6	0.657	-2.95E+01	1.54E-13	-2.32E+48	2	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.916	7.43E-13
7	7	0.657	-3.44E+01	1.13E-15	-2.32E+48	2	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.891	5.29E-15
8	8	0.657	-3.93E+01	8.27E-18	-2.32E+48	2	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.866	3.76E-17
9	9	0.657	-4.43E+01	6.06E-20	-2.32E+48	2	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.842	2.68E-19
10	10	0.657	-4.92E+01	4.44E-22	-2.32E+48	2	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.82	1.91E-21
11	11	0.657	-5.41E+01	3.25E-24	-2.32E+48	2	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.799	1.36E-23
12	12	0.657	-5.90E+01	2.38E-26	-2.32E+48	2	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.779	9.74E-26
13	13	0.657	-6.39E+01	1.74E-28	-2.32E+48	2	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.76	6.96E-28
14	14	0.657	-6.88E+01	1.28E-30	-2.32E+48	2	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.743	4.98E-30
15	15	0.657	-7.38E+01	9.34E-33	-2.32E+48	2	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	3.57E-32
16	16	0.657	-7.87E+01	6.84E-35	-2.32E+48	2	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.711	2.56E-34
17	17	0.657	-8.36E+01	5.01E-37	-2.32E+48	2	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.696	1.83E-36
18	18	0.657	-8.85E+01	3.67E-39	-2.32E+48	2	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.682	1.32E-38
19	19	0.657	-9.34E+01	2.69E-41	-2.32E+48	2	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	9.45E-41
20	20	0.657	-9.83E+01	1.97E-43	-2.32E+48	2	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.657	6.79E-43



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.657	-4.92E+00	7.32E-03	-2.32E+48	2	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	3.85E-02
2	2	0.657	-9.83E+00	5.36E-05	-2.32E+48	2	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	2.82E-04
3	3	0.657	-1.48E+01	3.93E-07	-2.32E+48	2	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	2.06E-06
4	4	0.657	-1.97E+01	2.88E-09	-2.32E+48	2	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	1.51E-08
5	5	0.657	-2.46E+01	2.11E-11	-2.32E+48	2	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-1	1.11E-10
6	6	0.657	-2.95E+01	1.54E-13	-2.32E+48	2	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.999	8.10E-13
7	7	0.657	-3.44E+01	1.13E-15	-2.32E+48	2	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.999	5.93E-15
8	8	0.657	-3.93E+01	8.27E-18	-2.32E+48	2	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	4.34E-17
9	9	0.657	-4.43E+01	6.06E-20	-2.32E+48	2	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.995	3.17E-19
10	10	0.657	-4.92E+01	4.44E-22	-2.32E+48	2	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.993	2.31E-21
11	11	0.657	-5.41E+01	3.25E-24	-2.32E+48	2	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.989	1.69E-23
12	12	0.657	-5.90E+01	2.38E-26	-2.32E+48	2	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.986	1.23E-25
13	13	0.657	-6.39E+01	1.74E-28	-2.32E+48	2	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.981	8.99E-28
14	14	0.657	-6.88E+01	1.28E-30	-2.32E+48	2	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.976	6.55E-30
15	15	0.657	-7.38E+01	9.34E-33	-2.32E+48	2	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.971	4.77E-32
16	16	0.657	-7.87E+01	6.84E-35	-2.32E+48	2	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.966	3.47E-34
17	17	0.657	-8.36E+01	5.01E-37	-2.32E+48	2	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.96	2.53E-36
18	18	0.657	-8.85E+01	3.67E-39	-2.32E+48	2	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.954	1.84E-38
19	19	0.657	-9.34E+01	2.69E-41	-2.32E+48	2	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.948	1.34E-40
20	20	0.657	-9.83E+01	1.97E-43	-2.32E+48	2	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.942	9.74E-43



Date:	24/06/2022
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions

Details to be completed for each assessment

Site Name:	**Glan Llyn**			
Site Address:	**Llanwern**			
Completed by:	**Ross Cameron**			
Date:	**27-Apr-22**		**Version:**	**1**
Contaminant	**Benzo(b)fluoranthene**			
Target Concentration (C_T)	**0.00000017**	**mg/l**	**Origin of C_T:**	**Proposed Water Framework Directive EQS**

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

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		**Benzo(b)fluoranthene**		
Target concentration	C_T	**0.00000017**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
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	

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.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.29E-05**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.00000017	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Benzo(b)fluoranthene**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**0.00000017** mg/l	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	Variable	Value	Unit	Source of parameter value	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters	Variable	Value	Unit	Source
Contaminant		Benzo(b)fluoranthene		from Level 1
Target Concentration	C_T	0.00000017	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		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 pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	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	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target		**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**#DIV/0!**	**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 ionic organic chemicals (acids)

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 — fraction

Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

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

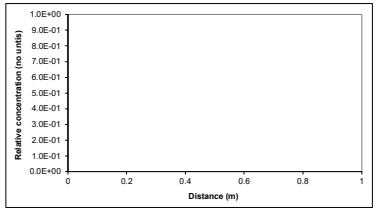
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	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 desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation 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.

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:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

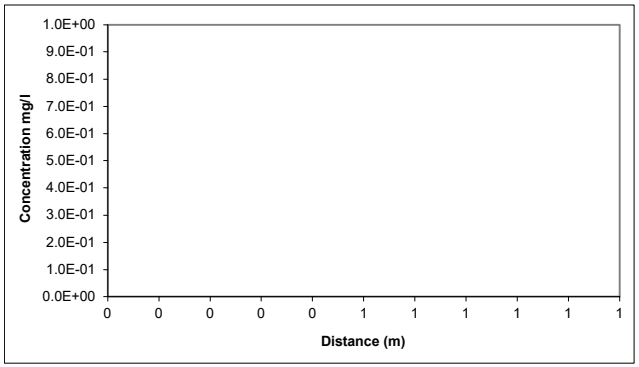
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_W	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)	Variable	Value	Unit	Source
Contaminant		Benzo(b)fluoranthene		from Level 1
Target Concentration	C_T	1.70E-07	mg/l	from Level 1

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

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

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

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	2.80E-01	mg/l	*Based on 95 percentile soil conc of 15.2mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+04	days	*10 year half life estimation*
Calculated decay rate	λ	1.90E-05	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
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	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	5.34E+04	l/kg	*see options*
Longitudinal dispersivity	ax	2.00E+00	m	*see options*
Transverse dispersivity	az	2.00E-01	m	*see options*
Vertical dispersivity	ay	2.00E-02	m	*see options*

Calculated Parameters	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	9.09E+05	fraction
Decay rate used	λ	2.09E-11	d^{-1}
Rate of contaminant flow due to retardation	u	1.19E-09	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	1.81E-01	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.55E+00**	

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	5.34E+04	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		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	5.34E+04	l/kg

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

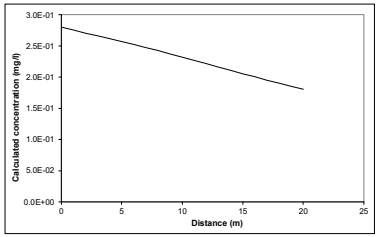
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00 m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01 m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

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



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, 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 it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater 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 9.0E+99.

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

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	2.8E-01
1.0	2.75E-01
2.0	2.71E-01
3.0	2.66E-01
4.0	2.62E-01
5.0	2.57E-01
6.0	2.52E-01
7.0	2.47E-01
8.0	2.42E-01
9.0	2.37E-01
10.0	2.32E-01
11.0	2.27E-01
12.0	2.21E-01
13.0	2.16E-01
14.0	2.11E-01
15.0	2.06E-01
16.0	2.00E-01
17.0	1.95E-01
18.0	1.90E-01
19.0	1.85E-01
20.0	1.81E-01

Remedial Targets

Remedial Target		**2.64E-07**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	C_{ED}/C_0	**1.81E-01**	**mg/l**	Domenico - Steady state

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.

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant nzo(b)fluoranthene

Parameter	Value	Units
(carried over from input sheet)		
C_T	1.70E-07	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **2.29E-05 mg/kg** **for Benzo(b)fluoranthene**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27/04/2022
Version:	1

Level 2 Calculation Sheet

Contaminant **enzo(b)fluoranthene**

Site assessed:	Glan Llyn
Date:	27/04/2022
Version:	1

Parameter	Value	Units		
(carried over from input sheet)				
Mz	0.00E+00	m		
L	0.00E+00	m		
da	0.00E+00	m		Calculated
Inf	0.00E+00	m/d		Dilution Factor
K	0.00E+00	m/d		
i	0.00E+00		Calculation based on target concentration	#DIV/0!
		m3/d		
A	0.00E+00	m2	Calculation based on observed contaminant concentration	#DIV/0!
		m3/d		
Cc	0.00E+00	mg/l		
C_T	1.70E-07	mg/l		
Cu	0.00E+00	mg/l		
w	0.00E+00	m		

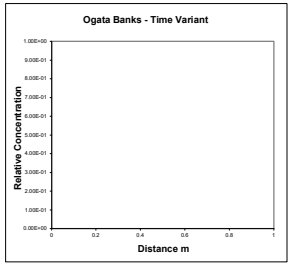
Contaminant **nzo(b)fluoranthene**

OGATA BANKS SOLUTION

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

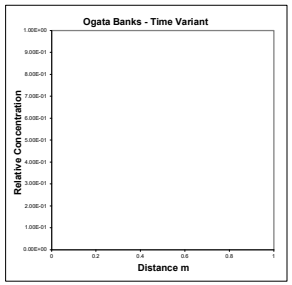
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	Units
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



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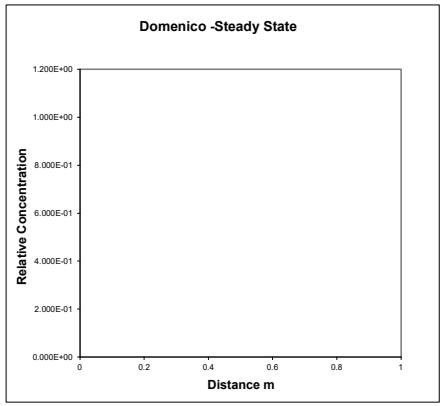
Contaminant **zo(b)fluoranthene**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



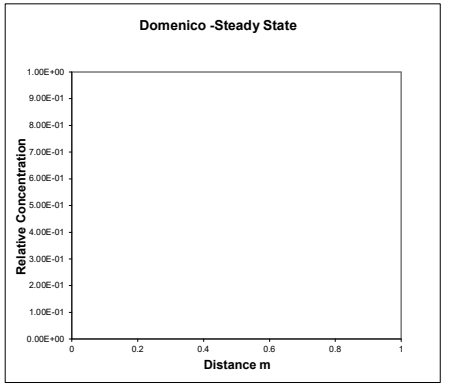
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



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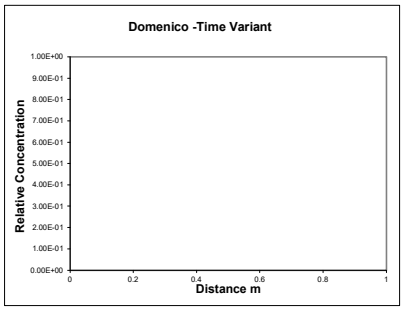
DOMENICO (TIME VARIANT)

Contaminant **zo(b)fluoranthene**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

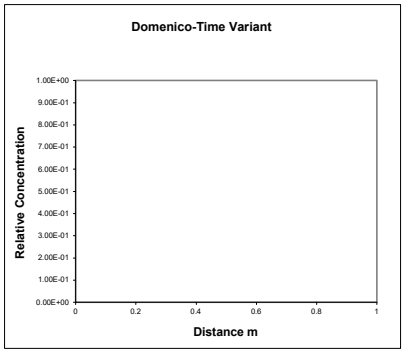
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	27/04/2022
Version:	1

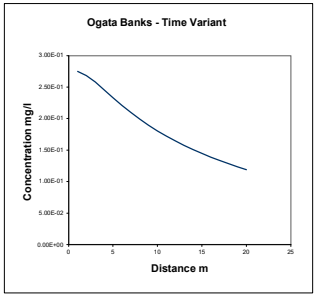
OGATA BANKS SOLUTION

Contaminant nzo(b)fluoranthene

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
Co	2.80E-01	mg/l
λ	2.09E-11	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	5.34E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	0.035	-1.7E-02	9.8E-01	-1.3E+45	2.000	5.2E-01	1.7E+00	1.3E+45	0.000	2.8E+02	1	-2.8E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	2.75E-01
2	2	0.035	-3.4E-02	9.7E-01	-1.3E+45	2.000	1.0E+00	2.8E+00	1.3E+45	0.000	2.0E+02	1	-2.0E+02	-1	1.9E+00	0.992	-1.9E+00	-0.99199	2.68E-01
3	3	0.035	-5.1E-02	9.5E-01	-1.3E+45	2.000	1.6E+00	4.7E+00	1.3E+45	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	2.58E-01
4	4	0.035	-6.8E-02	9.3E-01	-1.3E+45	2.000	2.1E+00	7.9E+00	1.3E+45	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	2.46E-01
5	5	0.035	-8.5E-02	9.2E-01	-1.3E+45	2.000	2.6E+00	1.3E+01	1.3E+45	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	2.33E-01
6	6	0.035	-1.0E-01	9.0E-01	-1.3E+45	2.000	3.1E+00	2.2E+01	1.3E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8742	-1.1E+00	-0.87421	2.21E-01
7	7	0.035	-1.2E-01	8.9E-01	-1.3E+45	2.000	3.6E+00	3.7E+01	1.3E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8436	-1.0E+00	-0.84362	2.10E-01
8	8	0.035	-1.4E-01	8.7E-01	-1.3E+45	2.000	4.1E+00	6.3E+01	1.3E+45	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8151	-9.4E-01	-0.8151	1.99E-01
9	9	0.035	-1.5E-01	8.6E-01	-1.3E+45	2.000	4.7E+00	1.0E+02	1.3E+45	0.000	9.3E+01	1	-9.3E+01	-1	8.8E-01	0.7887	-8.8E-01	-0.7887	1.89E-01
10	10	0.035	-1.7E-01	8.4E-01	-1.3E+45	2.000	5.2E+00	1.8E+02	1.3E+45	0.000	8.8E+01	1	-8.8E+01	-1	8.4E-01	0.7643	-8.4E-01	-0.76432	1.81E-01
11	11	0.035	-1.9E-01	8.3E-01	-1.3E+45	2.000	5.7E+00	3.0E+02	1.3E+45	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7418	-8.0E-01	-0.7418	1.72E-01
12	12	0.035	-2.0E-01	8.2E-01	-1.3E+45	2.000	6.2E+00	4.9E+02	1.3E+45	0.000	8.1E+01	1	-8.1E+01	-1	7.7E-01	0.721	-7.7E-01	-0.72098	1.65E-01
13	13	0.035	-2.2E-01	8.0E-01	-1.3E+45	2.000	6.7E+00	8.3E+02	1.3E+45	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.7017	-7.4E-01	-0.70169	1.58E-01
14	14	0.035	-2.4E-01	7.9E-01	-1.3E+45	2.000	7.2E+00	1.4E+03	1.3E+45	0.000	7.5E+01	1	-7.5E+01	-1	7.1E-01	0.6838	-7.1E-01	-0.68377	1.51E-01
15	15	0.035	-2.6E-01	7.7E-01	-1.3E+45	2.000	7.8E+00	2.3E+03	1.3E+45	0.000	7.2E+01	1	-7.2E+01	-1	6.8E-01	0.6671	-6.8E-01	-0.66708	1.45E-01
16	16	0.035	-2.7E-01	7.6E-01	-1.3E+45	2.000	8.3E+00	3.9E+03	1.3E+45	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6515	-6.6E-01	-0.6515	1.39E-01
17	17	0.035	-2.9E-01	7.5E-01	-1.3E+45	2.000	8.8E+00	6.6E+03	1.3E+45	0.000	6.8E+01	1	-6.8E+01	-1	6.4E-01	0.6369	-6.4E-01	-0.63692	1.34E-01
18	18	0.035	-3.1E-01	7.4E-01	-1.3E+45	2.000	9.3E+00	1.1E+04	1.3E+45	0.000	6.6E+01	1	-6.6E+01	-1	6.3E-01	0.6232	-6.3E-01	-0.62324	1.28E-01
19	19	0.035	-3.2E-01	7.2E-01	-1.3E+45	2.000	9.8E+00	1.8E+04	1.3E+45	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6104	-6.1E-01	-0.61038	1.24E-01
20	20	0.035	-3.4E-01	7.1E-01	-1.3E+45	2.000	1.0E+01	3.1E+04	1.3E+45	0.000	6.3E+01	1	-6.3E+01	-1	5.9E-01	0.5983	-5.9E-01	-0.59826	1.19E-01

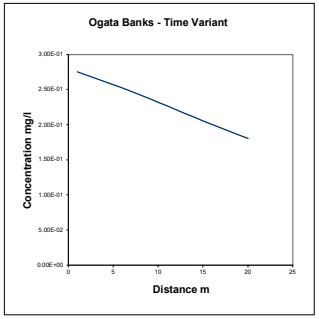


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	9.09E+05	
u	1.19E-09	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	0.035	-1.7E-02	9.8E-01	-1.3E+45	2.000	5.2E-01	1.7E+00	1.3E+45	0.000	2.8E+02	1	-2.8E+02	-1	5.3E+00	1	-5.3E+00	-1	2.75E-01
2	2	0.035	-3.4E-02	9.7E-01	-1.3E+45	2.000	1.0E+00	2.8E+00	1.3E+45	0.000	2.0E+02	1	-2.0E+02	-1	3.8E+00	1	-3.8E+00	-1	2.71E-01
3	3	0.035	-5.1E-02	9.5E-01	-1.3E+45	2.000	1.6E+00	4.7E+00	1.3E+45	0.000	1.6E+02	1	-1.6E+02	-1	3.1E+00	1	-3.1E+00	-0.99999	2.66E-01
4	4	0.035	-6.8E-02	9.3E-01	-1.3E+45	2.000	2.1E+00	7.9E+00	1.3E+45	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	2.62E-01
5	5	0.035	-8.5E-02	9.2E-01	-1.3E+45	2.000	2.6E+00	1.3E+01	1.3E+45	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9992	-2.4E+00	-0.9992	2.57E-01
6	6	0.035	-1.0E-01	9.0E-01	-1.3E+45	2.000	3.1E+00	2.2E+01	1.3E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.2E+00	0.9978	-2.2E+00	-0.9978	2.52E-01
7	7	0.035	-1.2E-01	8.9E-01	-1.3E+45	2.000	3.6E+00	3.7E+01	1.3E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9954	-2.0E+00	-0.99541	2.47E-01
8	8	0.035	-1.4E-01	8.7E-01	-1.3E+45	2.000	4.1E+00	6.3E+01	1.3E+45	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.992	-1.9E+00	-0.99199	2.42E-01
9	9	0.035	-1.5E-01	8.6E-01	-1.3E+45	2.000	4.7E+00	1.0E+02	1.3E+45	0.000	9.3E+01	1	-9.3E+01	-1	1.8E+00	0.9876	-1.8E+00	-0.98758	2.37E-01
10	10	0.035	-1.7E-01	8.4E-01	-1.3E+45	2.000	5.2E+00	1.8E+02	1.3E+45	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9823	-1.7E+00	-0.98229	2.32E-01
11	11	0.035	-1.9E-01	8.3E-01	-1.3E+45	2.000	5.7E+00	3.0E+02	1.3E+45	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9763	-1.6E+00	-0.97626	2.27E-01
12	12	0.035	-2.0E-01	8.2E-01	-1.3E+45	2.000	6.2E+00	4.9E+02	1.3E+45	0.000	8.1E+01	1	-8.1E+01	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	2.21E-01
13	13	0.035	-2.2E-01	8.0E-01	-1.3E+45	2.000	6.7E+00	8.3E+02	1.3E+45	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9625	-1.5E+00	-0.96249	2.16E-01
14	14	0.035	-2.4E-01	7.9E-01	-1.3E+45	2.000	7.2E+00	1.4E+03	1.3E+45	0.000	7.5E+01	1	-7.5E+01	-1	1.4E+00	0.955	-1.4E+00	-0.95498	2.11E-01
15	15	0.035	-2.6E-01	7.7E-01	-1.3E+45	2.000	7.8E+00	2.3E+03	1.3E+45	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9472	-1.4E+00	-0.94719	2.06E-01
16	16	0.035	-2.7E-01	7.6E-01	-1.3E+45	2.000	8.3E+00	3.9E+03	1.3E+45	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	2.00E-01
17	17	0.035	-2.9E-01	7.5E-01	-1.3E+45	2.000	8.8E+00	6.6E+03	1.3E+45	0.000	6.8E+01	1	-6.8E+01	-1	1.3E+00	0.9311	-1.3E+00	-0.93109	1.95E-01
18	18	0.035	-3.1E-01	7.4E-01	-1.3E+45	2.000	9.3E+00	1.1E+04	1.3E+45	0.000	6.6E+01	1	-6.6E+01	-1	1.3E+00	0.9229	-1.3E+00	-0.9229	1.90E-01
19	19	0.035	-3.2E-01	7.2E-01	-1.3E+45	2.000	9.8E+00	1.8E+04	1.3E+45	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9147	-1.2E+00	-0.91468	1.85E-01
20	20	0.035	-3.4E-01	7.1E-01	-1.3E+45	2.000	1.0E+01	3.1E+04	1.3E+45	0.000	6.3E+01	1	-6.3E+01	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	1.81E-01



Date:	27/04/2022
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Contaminant **zo(b)fluoranthene**

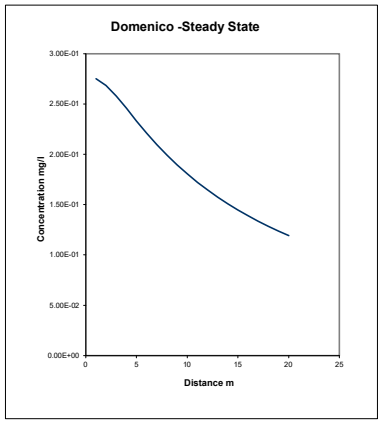
DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
Co	2.80E-01	mg/l
λ	2.09E-11	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	5.34E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.07	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	2.75E-01
2	2	0.07	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	2.68E-01
3	3	0.07	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	2.58E-01
4	4	0.07	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	2.46E-01
5	5	0.07	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	2.33E-01
6	6	0.07	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.8742	2.21E-01
7	7	0.07	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.8436	2.10E-01
8	8	0.07	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.8151	1.99E-01
9	9	0.07	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.7887	1.89E-01
10	10	0.07	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.7643	1.81E-01
11	11	0.07	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.7418	1.72E-01
12	12	0.07	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	1.65E-01
13	13	0.07	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.7017	1.58E-01
14	14	0.07	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.6838	1.51E-01
15	15	0.07	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.6671	1.45E-01
16	16	0.07	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.6515	1.39E-01
17	17	0.07	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.6369	1.34E-01
18	18	0.07	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.6232	1.28E-01
19	19	0.07	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.6104	1.24E-01
20	20	0.07	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.5983	1.19E-01



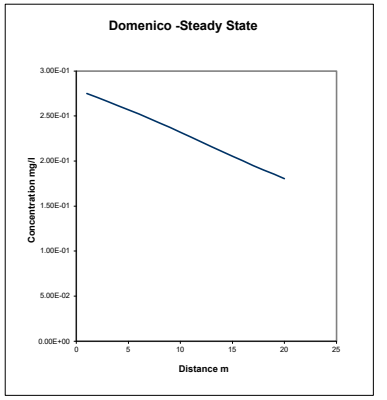
Calc **Value**

v	1.08E-03	m/d
Rc	9.09E+05	
u	1.19E-09	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.07	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	2.75E-01
2	2	0.07	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	2.71E-01
3	3	0.07	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	2.66E-01
4	4	0.07	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	2.62E-01
5	5	0.07	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.9992	2.57E-01
6	6	0.07	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.9978	2.52E-01
7	7	0.07	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.9954	2.47E-01
8	8	0.07	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	2.42E-01
9	9	0.07	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.9876	2.37E-01
10	10	0.07	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.9823	2.32E-01
11	11	0.07	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.9763	2.27E-01
12	12	0.07	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	2.21E-01
13	13	0.07	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.9625	2.16E-01
14	14	0.07	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	2.11E-01
15	15	0.07	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.9472	2.06E-01
16	16	0.07	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	2.00E-01
17	17	0.07	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.9311	1.95E-01
18	18	0.07	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.9229	1.90E-01
19	19	0.07	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.9147	1.85E-01
20	20	0.07	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	1.81E-01



Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

Contaminant **zo(b)fluoranthene**

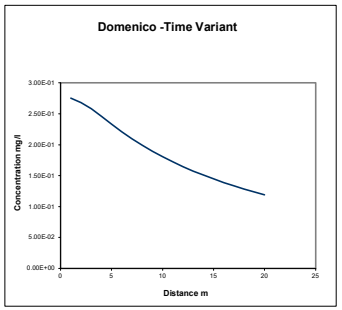
Input	Value	Units
C_T	0.00000017	mg/l
Co	2.80E-01	mg/l
λ	2.09E-11	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	5.34E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	9.09E+05	
u	1.19E-09	m/d

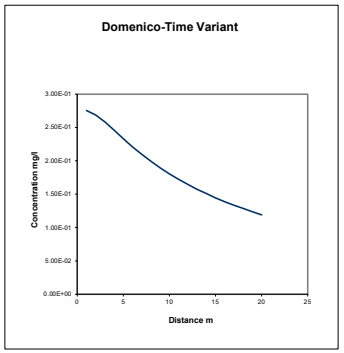
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.035	-1.70E-02	9.83E-01	-1.30E+45	2	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	2.75E-01
2	2	0.035	-3.40E-02	9.67E-01	-1.30E+45	2	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	2.68E-01
3	3	0.035	-5.10E-02	9.50E-01	-1.30E+45	2	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.97	2.58E-01
4	4	0.035	-6.80E-02	9.34E-01	-1.30E+45	2	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.939	2.46E-01
5	5	0.035	-8.50E-02	9.18E-01	-1.30E+45	2	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.906	2.33E-01
6	6	0.035	-1.02E-01	9.03E-01	-1.30E+45	2	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.874	2.21E-01
7	7	0.035	-1.19E-01	8.88E-01	-1.30E+45	2	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.844	2.10E-01
8	8	0.035	-1.36E-01	8.73E-01	-1.30E+45	2	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.815	1.99E-01
9	9	0.035	-1.53E-01	8.58E-01	-1.30E+45	2	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.789	1.89E-01
10	10	0.035	-1.70E-01	8.44E-01	-1.30E+45	2	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.764	1.81E-01
11	11	0.035	-1.87E-01	8.29E-01	-1.30E+45	2	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.742	1.72E-01
12	12	0.035	-2.04E-01	8.15E-01	-1.30E+45	2	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	1.65E-01
13	13	0.035	-2.21E-01	8.02E-01	-1.30E+45	2	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.702	1.58E-01
14	14	0.035	-2.38E-01	7.88E-01	-1.30E+45	2	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.684	1.51E-01
15	15	0.035	-2.55E-01	7.75E-01	-1.30E+45	2	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.667	1.45E-01
16	16	0.035	-2.72E-01	7.62E-01	-1.30E+45	2	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.651	1.39E-01
17	17	0.035	-2.89E-01	7.49E-01	-1.30E+45	2	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.637	1.34E-01
18	18	0.035	-3.06E-01	7.36E-01	-1.30E+45	2	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.623	1.28E-01
19	19	0.035	-3.23E-01	7.24E-01	-1.30E+45	2	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.61	1.24E-01
20	20	0.035	-3.40E-01	7.12E-01	-1.30E+45	2	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.598	1.19E-01



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.035	-1.70E-02	9.83E-01	-1.30E+45	2	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	2.75E-01
2	2	0.035	-3.40E-02	9.67E-01	-1.30E+45	2	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	2.71E-01
3	3	0.035	-5.10E-02	9.50E-01	-1.30E+45	2	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	2.66E-01
4	4	0.035	-6.80E-02	9.34E-01	-1.30E+45	2	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	2.62E-01
5	5	0.035	-8.50E-02	9.18E-01	-1.30E+45	2	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.999	2.57E-01
6	6	0.035	-1.02E-01	9.03E-01	-1.30E+45	2	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.998	2.52E-01
7	7	0.035	-1.19E-01	8.88E-01	-1.30E+45	2	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.995	2.47E-01
8	8	0.035	-1.36E-01	8.73E-01	-1.30E+45	2	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	2.42E-01
9	9	0.035	-1.53E-01	8.58E-01	-1.30E+45	2	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.988	2.37E-01
10	10	0.035	-1.70E-01	8.44E-01	-1.30E+45	2	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.982	2.32E-01
11	11	0.035	-1.87E-01	8.29E-01	-1.30E+45	2	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.976	2.27E-01
12	12	0.035	-2.04E-01	8.15E-01	-1.30E+45	2	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.97	2.21E-01
13	13	0.035	-2.21E-01	8.02E-01	-1.30E+45	2	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.962	2.16E-01
14	14	0.035	-2.38E-01	7.88E-01	-1.30E+45	2	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	2.11E-01
15	15	0.035	-2.55E-01	7.75E-01	-1.30E+45	2	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.947	2.06E-01
16	16	0.035	-2.72E-01	7.62E-01	-1.30E+45	2	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.939	2.00E-01
17	17	0.035	-2.89E-01	7.49E-01	-1.30E+45	2	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.931	1.95E-01
18	18	0.035	-3.06E-01	7.36E-01	-1.30E+45	2	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.923	1.90E-01
19	19	0.035	-3.23E-01	7.24E-01	-1.30E+45	2	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.915	1.85E-01
20	20	0.035	-3.40E-01	7.12E-01	-1.30E+45	2	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.906	1.81E-01



Date:	27/04/2022
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	27-Apr-22		Version:	1
Contaminant	Benzo(a)pyrene			
Target Concentration (C_T)	0.00000017	mg/l	Origin of C_T:	Proposed Water Framework Directive EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Environment Agency

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		**Benzo(a)pyrene**		
Target concentration	**C_T**	**0.00000017**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
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	

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.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.29E-05**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.00000017	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Benzo(a)pyrene**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**0.00000017** mg/l	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27-Apr-22
Version:	1

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	0.00000017	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		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 pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	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	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target		**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**#DIV/0!**	**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 ionic organic chemicals (acids)

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		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

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

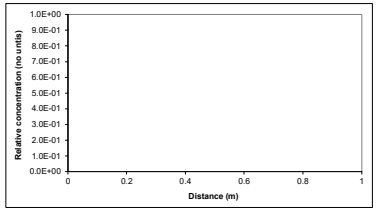
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	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 desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation 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.

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:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

Only input required is Soil Contaminant Concentration

Input Parameters			
Soil contaminant concentration	C_0	0.00E+00	mg/kg

Level 1 Parameters

Water filled soil porosity	θ_W	5.00E-01	fraction
Air filled soil porosity	θa	3.70E-01	fraction
Bulk density	ρ	1.36E+00	g/cm^3
Henry's Law constant	H	1.00E+00	dimensionless
Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
Factor (partitioning between soil and water)		1.35E+02	dimensionless

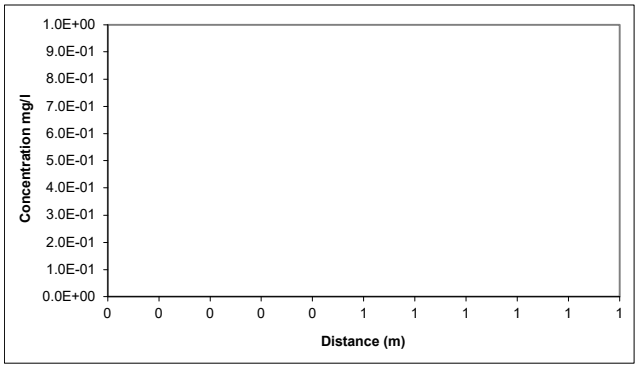
Level 2 Parameters **Dilution Factor** DF #DIV/0!

Level 3 Parameters **Attenuation factor (C_O/C_{ED})** AF #DIV/0!

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Benzo(a)pyrene		from Level 1
Target Concentration	C_T	1.70E-07	mg/l	from Level 1

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

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

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

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	1.13E-03	mg/l	*Based on 95 percentile soil conc of 11.55mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+04	days	*10 year half life estimation*
Calculated decay rate	λ	1.90E-05	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	*Estimate*
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
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	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	1.02E+04	l/kg	*see options*
Longitudinal dispersivity	ax	2.00E+00	m	*see options*
Transverse dispersivity	az	2.00E-01	m	*see options*
Vertical dispersivity	ay	2.00E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	1.73E+05	fraction
Decay rate used	λ	1.10E-10	d^{-1}
Rate of contaminant flow due to retardation	u	6.24E-09	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	7.29E-04	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.55E+00**	

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 1.02E+04 l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — 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 — 1.02E+04 l/kg

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

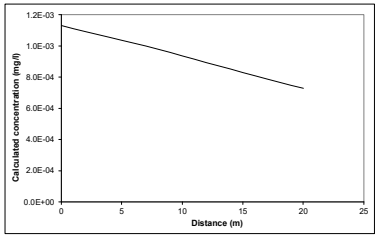
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00 m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01 m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

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



Note graph assumes plume disperses vertically in one direction only. 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 concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	1.1E-03
1.0	1.11E-03
2.0	1.09E-03
3.0	1.07E-03
4.0	1.06E-03
5.0	1.04E-03
6.0	1.02E-03
7.0	9.99E-04
8.0	9.78E-04
9.0	9.58E-04
10.0	9.36E-04
11.0	9.15E-04
12.0	8.93E-04
13.0	8.72E-04
14.0	8.50E-04
15.0	8.29E-04
16.0	8.08E-04
17.0	7.88E-04
18.0	7.68E-04
19.0	7.48E-04
20.0	7.29E-04

Note

This sheet calculates the Level 3 remedial target for groundwater, 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 it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater 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 9.0E+99.

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

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Remedial Targets

Remedial Target		**2.64E-07**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	C_{ED}/C_0	**7.29E-04**	**mg/l**	Domenico - Steady state

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.

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Benzo(a)pyrene**

Parameter	Value	Units
(carried over from input sheet)		
C_T	1.70E-07	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **2.29E-05 mg/kg** **for Benzo(a)pyrene**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	27/04/2022
Version:	1

Level 2 Calculation Sheet

Contaminant **Benzo(a)pyrene**

Site assessed:	Glan Llyn
Date:	27/04/2022
Version:	1

Parameter	Value	Units		
(carried over from input sheet)				
Mz	0.00E+00	m		
L	0.00E+00	m		
da	0.00E+00	m		Calculated
Inf	0.00E+00	m/d		Dilution Factor
K	0.00E+00	m/d		
i	0.00E+00		Calculation based on target concentration	#DIV/0!
		m3/d		
A	0.00E+00	m2	Calculation based on observed contaminant concentration	#DIV/0!
		m3/d		
Cc	0.00E+00	mg/l		
C_T	1.70E-07	mg/l		
Cu	0.00E+00	mg/l		
w	0.00E+00	m		

OGATA BANKS SOLUTION

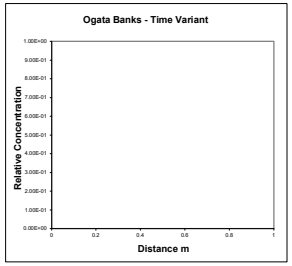
Contaminant	Benzo(a)pyrene

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

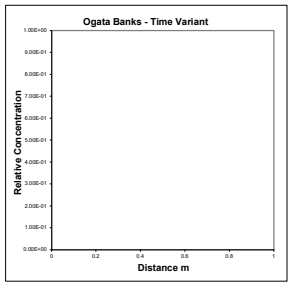
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	27/04/2022
Version:	1

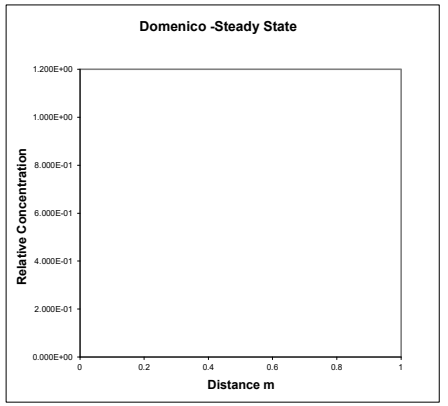
Contaminant enzo(a)pyrene

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!

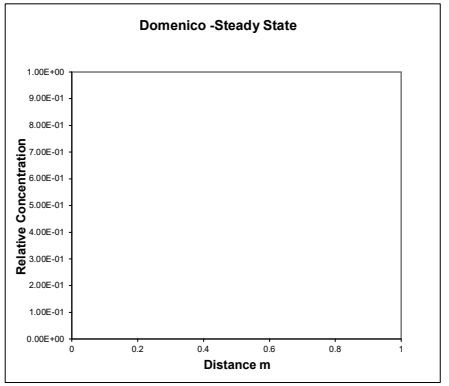


Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



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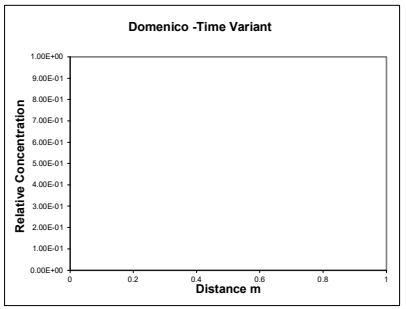
DOMENICO (TIME VARIANT)

Contaminant Benzo(a)pyrene

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

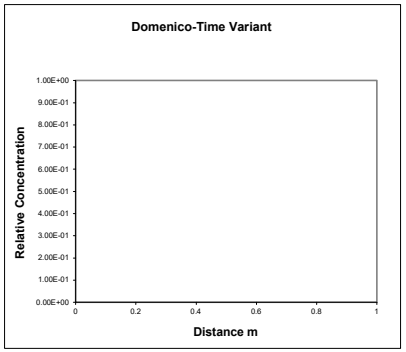
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	27/04/2022
Version:	1

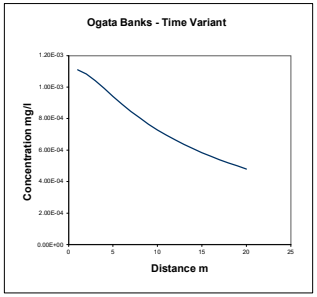
OGATA BANKS SOLUTION

Contaminant **Benzo(a)pyrene**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
Co	1.13E-03	mg/l
λ	1.10E-10	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.02E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.00014	-1.7E-02	9.8E-01	-3.0E+45	2.000	5.2E-01	1.7E+00	3.0E+45	0.000	2.8E+02	1	-2.8E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	1.11E-03
2	0.00014	-3.4E-02	9.7E-01	-3.0E+45	2.000	1.0E+00	2.8E+00	3.0E+45	0.000	2.0E+02	1	-2.0E+02	-1	1.9E+00	0.992	-1.9E+00	-0.99199	1.08E-03
3	0.00014	-5.1E-02	9.5E-01	-3.0E+45	2.000	1.6E+00	4.7E+00	3.0E+45	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	1.04E-03
4	0.00014	-6.8E-02	9.3E-01	-3.0E+45	2.000	2.1E+00	7.9E+00	3.0E+45	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	9.92E-04
5	0.00014	-8.5E-02	9.2E-01	-3.0E+45	2.000	2.6E+00	1.3E+01	3.0E+45	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	9.41E-04
6	0.00014	-1.0E-01	9.0E-01	-3.0E+45	2.000	3.1E+00	2.2E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8742	-1.1E+00	-0.87421	8.92E-04
7	0.00014	-1.2E-01	8.9E-01	-3.0E+45	2.000	3.6E+00	3.7E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8436	-1.0E+00	-0.84362	8.46E-04
8	0.00014	-1.4E-01	8.7E-01	-3.0E+45	2.000	4.1E+00	6.3E+01	3.0E+45	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8151	-9.4E-01	-0.8151	8.04E-04
9	0.00014	-1.5E-01	8.6E-01	-3.0E+45	2.000	4.7E+00	1.0E+02	3.0E+45	0.000	9.3E+01	1	-9.3E+01	-1	8.8E-01	0.7887	-8.8E-01	-0.7887	7.65E-04
10	0.00014	-1.7E-01	8.4E-01	-3.0E+45	2.000	5.2E+00	1.8E+02	3.0E+45	0.000	8.8E+01	1	-8.8E+01	-1	8.4E-01	0.7643	-8.4E-01	-0.76432	7.29E-04
11	0.00014	-1.9E-01	8.3E-01	-3.0E+45	2.000	5.7E+00	3.0E+02	3.0E+45	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7418	-8.0E-01	-0.7418	6.95E-04
12	0.00014	-2.0E-01	8.2E-01	-3.0E+45	2.000	6.2E+00	4.9E+02	3.0E+45	0.000	8.1E+01	1	-8.1E+01	-1	7.7E-01	0.721	-7.7E-01	-0.72098	6.64E-04
13	0.00014	-2.2E-01	8.0E-01	-3.0E+45	2.000	6.7E+00	8.3E+02	3.0E+45	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.7017	-7.4E-01	-0.70169	6.36E-04
14	0.00014	-2.4E-01	7.9E-01	-3.0E+45	2.000	7.2E+00	1.4E+03	3.0E+45	0.000	7.5E+01	1	-7.5E+01	-1	7.1E-01	0.6838	-7.1E-01	-0.68377	6.09E-04
15	0.00014	-2.6E-01	7.7E-01	-3.0E+45	2.000	7.8E+00	2.3E+03	3.0E+45	0.000	7.2E+01	1	-7.2E+01	-1	6.8E-01	0.6671	-6.8E-01	-0.66708	5.84E-04
16	0.00014	-2.7E-01	7.6E-01	-3.0E+45	2.000	8.3E+00	3.9E+03	3.0E+45	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6515	-6.6E-01	-0.6515	5.61E-04
17	0.00014	-2.9E-01	7.5E-01	-3.0E+45	2.000	8.8E+00	6.6E+03	3.0E+45	0.000	6.8E+01	1	-6.8E+01	-1	6.4E-01	0.6369	-6.4E-01	-0.63692	5.39E-04
18	0.00014	-3.1E-01	7.4E-01	-3.0E+45	2.000	9.3E+00	1.1E+04	3.0E+45	0.000	6.6E+01	1	-6.6E+01	-1	6.3E-01	0.6232	-6.3E-01	-0.62324	5.19E-04
19	0.00014	-3.2E-01	7.2E-01	-3.0E+45	2.000	9.8E+00	1.8E+04	3.0E+45	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6104	-6.1E-01	-0.61038	4.99E-04
20	0.00014	-3.4E-01	7.1E-01	-3.0E+45	2.000	1.0E+01	3.1E+04	3.0E+45	0.000	6.3E+01	1	-6.3E+01	-1	5.9E-01	0.5983	-5.9E-01	-0.59826	4.81E-04

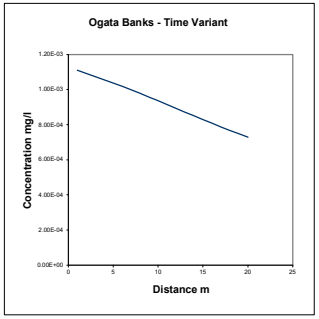


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.73E+05	
u	6.24E-09	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.00014	-1.7E-02	9.8E-01	-3.0E+45	2.000	5.2E-01	1.7E+00	3.0E+45	0.000	2.8E+02	1	-2.8E+02	-1	5.3E+00	1	-5.3E+00	-1	1.11E-03
2	0.00014	-3.4E-02	9.7E-01	-3.0E+45	2.000	1.0E+00	2.8E+00	3.0E+45	0.000	2.0E+02	1	-2.0E+02	-1	3.8E+00	1	-3.8E+00	-1	1.09E-03
3	0.00014	-5.1E-02	9.5E-01	-3.0E+45	2.000	1.6E+00	4.7E+00	3.0E+45	0.000	1.6E+02	1	-1.6E+02	-1	3.1E+00	1	-3.1E+00	-0.99999	1.07E-03
4	0.00014	-6.8E-02	9.3E-01	-3.0E+45	2.000	2.1E+00	7.9E+00	3.0E+45	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	1.06E-03
5	0.00014	-8.5E-02	9.2E-01	-3.0E+45	2.000	2.6E+00	1.3E+01	3.0E+45	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9992	-2.4E+00	-0.9992	1.04E-03
6	0.00014	-1.0E-01	9.0E-01	-3.0E+45	2.000	3.1E+00	2.2E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.2E+00	0.9978	-2.2E+00	-0.9978	1.02E-03
7	0.00014	-1.2E-01	8.9E-01	-3.0E+45	2.000	3.6E+00	3.7E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9954	-2.0E+00	-0.99541	9.99E-04
8	0.00014	-1.4E-01	8.7E-01	-3.0E+45	2.000	4.1E+00	6.3E+01	3.0E+45	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.992	-1.9E+00	-0.99199	9.78E-04
9	0.00014	-1.5E-01	8.6E-01	-3.0E+45	2.000	4.7E+00	1.0E+02	3.0E+45	0.000	9.3E+01	1	-9.3E+01	-1	1.8E+00	0.9876	-1.8E+00	-0.98758	9.58E-04
10	0.00014	-1.7E-01	8.4E-01	-3.0E+45	2.000	5.2E+00	1.8E+02	3.0E+45	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9823	-1.7E+00	-0.98229	9.36E-04
11	0.00014	-1.9E-01	8.3E-01	-3.0E+45	2.000	5.7E+00	3.0E+02	3.0E+45	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9763	-1.6E+00	-0.97626	9.15E-04
12	0.00014	-2.0E-01	8.2E-01	-3.0E+45	2.000	6.2E+00	4.9E+02	3.0E+45	0.000	8.1E+01	1	-8.1E+01	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	8.93E-04
13	0.00014	-2.2E-01	8.0E-01	-3.0E+45	2.000	6.7E+00	8.3E+02	3.0E+45	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9625	-1.5E+00	-0.96249	8.72E-04
14	0.00014	-2.4E-01	7.9E-01	-3.0E+45	2.000	7.2E+00	1.4E+03	3.0E+45	0.000	7.5E+01	1	-7.5E+01	-1	1.4E+00	0.955	-1.4E+00	-0.95498	8.50E-04
15	0.00014	-2.6E-01	7.7E-01	-3.0E+45	2.000	7.8E+00	2.3E+03	3.0E+45	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9472	-1.4E+00	-0.94719	8.29E-04
16	0.00014	-2.7E-01	7.6E-01	-3.0E+45	2.000	8.3E+00	3.9E+03	3.0E+45	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	8.08E-04
17	0.00014	-2.9E-01	7.5E-01	-3.0E+45	2.000	8.8E+00	6.6E+03	3.0E+45	0.000	6.8E+01	1	-6.8E+01	-1	1.3E+00	0.9311	-1.3E+00	-0.93109	7.88E-04
18	0.00014	-3.1E-01	7.4E-01	-3.0E+45	2.000	9.3E+00	1.1E+04	3.0E+45	0.000	6.6E+01	1	-6.6E+01	-1	1.3E+00	0.9229	-1.3E+00	-0.9229	7.68E-04
19	0.00014	-3.2E-01	7.2E-01	-3.0E+45	2.000	9.8E+00	1.8E+04	3.0E+45	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9147	-1.2E+00	-0.91468	7.48E-04
20	0.00014	-3.4E-01	7.1E-01	-3.0E+45	2.000	1.0E+01	3.1E+04	3.0E+45	0.000	6.3E+01	1	-6.3E+01	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	7.29E-04



Date:	27/04/2022
Version:	1

DOMENICO (STEADY STATE)

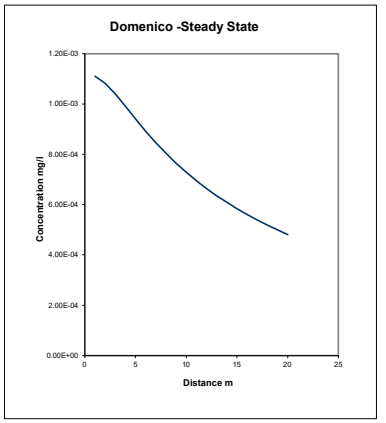
Contaminant **Benzo(a)pyrene**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
Co	1.13E-03	mg/l
λ	1.10E-10	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.02E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.00028	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	1.11E-03
2	2	0.00028	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	1.08E-03
3	3	0.00028	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	1.04E-03
4	4	0.00028	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	9.92E-04
5	5	0.00028	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	9.41E-04
6	6	0.00028	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.8742	8.92E-04
7	7	0.00028	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.8436	8.46E-04
8	8	0.00028	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.8151	8.04E-04
9	9	0.00028	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.7887	7.65E-04
10	10	0.00028	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.7643	7.29E-04
11	11	0.00028	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.7418	6.95E-04
12	12	0.00028	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	6.64E-04
13	13	0.00028	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.7017	6.36E-04
14	14	0.00028	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.6838	6.09E-04
15	15	0.00028	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.6671	5.84E-04
16	16	0.00028	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.6515	5.61E-04
17	17	0.00028	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.6369	5.39E-04
18	18	0.00028	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.6232	5.19E-04
19	19	0.00028	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.6104	4.99E-04
20	20	0.00028	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.5983	4.81E-04



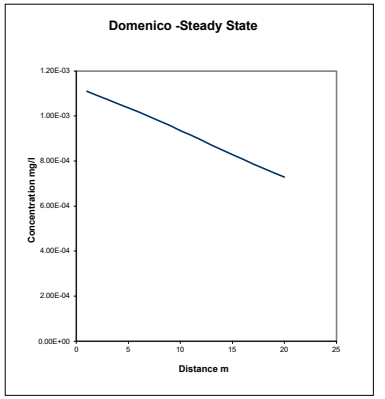
Calc **Value**

v	1.08E-03	m/d
Rc	1.73E+05	
u	6.24E-09	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.00028	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	1.11E-03
2	2	0.00028	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	1.09E-03
3	3	0.00028	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	1.07E-03
4	4	0.00028	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	1.06E-03
5	5	0.00028	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.9992	1.04E-03
6	6	0.00028	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.9978	1.02E-03
7	7	0.00028	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.9954	9.99E-04
8	8	0.00028	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	9.78E-04
9	9	0.00028	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.9876	9.58E-04
10	10	0.00028	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.9823	9.36E-04
11	11	0.00028	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.9763	9.15E-04
12	12	0.00028	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	8.93E-04
13	13	0.00028	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.9625	8.72E-04
14	14	0.00028	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	8.50E-04
15	15	0.00028	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.9472	8.29E-04
16	16	0.00028	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	8.08E-04
17	17	0.00028	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.9311	7.88E-04
18	18	0.00028	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.9229	7.68E-04
19	19	0.00028	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.9147	7.48E-04
20	20	0.00028	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	7.29E-04



Date:	27/04/2022
Version:	1

DOMENICO (TIME VARIANT)

Contaminant **Benzo(a)pyrene**

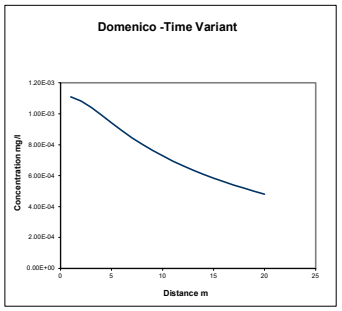
Input	Value	Units
C_T	0.00000017	mg/l
Co	1.13E-03	mg/l
λ	1.10E-10	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.02E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option: Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.73E+05	
u	6.24E-09	m/d

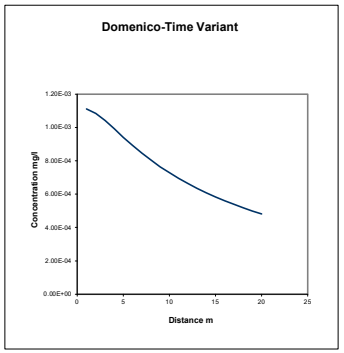
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.00014	-1.70E-02	9.83E-01	-2.98E+45	2	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	1.11E-03
2	2	0.00014	-3.40E-02	9.67E-01	-2.98E+45	2	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	1.08E-03
3	3	0.00014	-5.10E-02	9.50E-01	-2.98E+45	2	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.97	1.04E-03
4	4	0.00014	-6.80E-02	9.34E-01	-2.98E+45	2	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.939	9.92E-04
5	5	0.00014	-8.50E-02	9.18E-01	-2.98E+45	2	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.906	9.41E-04
6	6	0.00014	-1.02E-01	9.03E-01	-2.98E+45	2	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.874	8.92E-04
7	7	0.00014	-1.19E-01	8.88E-01	-2.98E+45	2	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.844	8.46E-04
8	8	0.00014	-1.36E-01	8.73E-01	-2.98E+45	2	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.815	8.04E-04
9	9	0.00014	-1.53E-01	8.58E-01	-2.98E+45	2	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.789	7.65E-04
10	10	0.00014	-1.70E-01	8.44E-01	-2.98E+45	2	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.764	7.29E-04
11	11	0.00014	-1.87E-01	8.29E-01	-2.98E+45	2	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.742	6.95E-04
12	12	0.00014	-2.04E-01	8.15E-01	-2.98E+45	2	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	6.64E-04
13	13	0.00014	-2.21E-01	8.02E-01	-2.98E+45	2	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.702	6.36E-04
14	14	0.00014	-2.38E-01	7.88E-01	-2.98E+45	2	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.684	6.09E-04
15	15	0.00014	-2.55E-01	7.75E-01	-2.98E+45	2	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.667	5.84E-04
16	16	0.00014	-2.72E-01	7.62E-01	-2.98E+45	2	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.651	5.61E-04
17	17	0.00014	-2.89E-01	7.49E-01	-2.98E+45	2	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.637	5.39E-04
18	18	0.00014	-3.06E-01	7.36E-01	-2.98E+45	2	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.623	5.19E-04
19	19	0.00014	-3.23E-01	7.24E-01	-2.98E+45	2	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.61	4.99E-04
20	20	0.00014	-3.40E-01	7.12E-01	-2.98E+45	2	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.598	4.81E-04



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.00014	-1.70E-02	9.83E-01	-2.98E+45	2	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	1.11E-03
2	2	0.00014	-3.40E-02	9.67E-01	-2.98E+45	2	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	1.09E-03
3	3	0.00014	-5.10E-02	9.50E-01	-2.98E+45	2	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	1.07E-03
4	4	0.00014	-6.80E-02	9.34E-01	-2.98E+45	2	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	1.06E-03
5	5	0.00014	-8.50E-02	9.18E-01	-2.98E+45	2	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.999	1.04E-03
6	6	0.00014	-1.02E-01	9.03E-01	-2.98E+45	2	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.998	1.02E-03
7	7	0.00014	-1.19E-01	8.88E-01	-2.98E+45	2	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.995	9.99E-04
8	8	0.00014	-1.36E-01	8.73E-01	-2.98E+45	2	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	9.78E-04
9	9	0.00014	-1.53E-01	8.58E-01	-2.98E+45	2	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.988	9.58E-04
10	10	0.00014	-1.70E-01	8.44E-01	-2.98E+45	2	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.982	9.36E-04
11	11	0.00014	-1.87E-01	8.29E-01	-2.98E+45	2	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.976	9.15E-04
12	12	0.00014	-2.04E-01	8.15E-01	-2.98E+45	2	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.97	8.93E-04
13	13	0.00014	-2.21E-01	8.02E-01	-2.98E+45	2	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.962	8.72E-04
14	14	0.00014	-2.38E-01	7.88E-01	-2.98E+45	2	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	8.50E-04
15	15	0.00014	-2.55E-01	7.75E-01	-2.98E+45	2	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.947	8.29E-04
16	16	0.00014	-2.72E-01	7.62E-01	-2.98E+45	2	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.939	8.08E-04
17	17	0.00014	-2.89E-01	7.49E-01	-2.98E+45	2	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.931	7.88E-04
18	18	0.00014	-3.06E-01	7.36E-01	-2.98E+45	2	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.923	7.68E-04
19	19	0.00014	-3.23E-01	7.24E-01	-2.98E+45	2	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.915	7.48E-04
20	20	0.00014	-3.40E-01	7.12E-01	-2.98E+45	2	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.906	7.29E-04



Date:	27/04/2022
Version:	1

Appendix L: Dilution Calculation Excel File

Formulas

$$EQS = \frac{C_{gw} + Q_{gw}}{Q}$$

$$C_{gw} = \frac{(EQS * Q)}{Q_{gw}}$$

Where:
Cgw = (total rainfall - ET - RO) x permeable surface area (m3/d)
Qol = (total rainfall - I) x impermeable surface area (m3/d)
RO = runoff: 0 permeable surface area
Qr = Qgw + Qol = ROpar (m3/d)
Cgw = concentration in groundwater (mg/l)
EQS = chemical-specific (mg/l)

Dilution factor = final volume / initial volume
Dilution factor RESI 162.3
Dilution factor COMM 642.5

Cgw (total rainfall - ET - RO)	0.013 m/a		
Qol (total rainfall - I)	0.858 m/a		
RO (runoff)	0.524 m/a		
Residential Area	**Qgw**	**Qol**	**Qr**
Permeable area	676,000.00 m2	8686.6	m3/a
Impermeable area	1,014,000.00 m2	869707.8	m3/a
			1409882.5 m3/a
Celtic Business Park	**Qgw**	**Qol**	**Qr**
Permeable area	45,000.00 m2	578.3	m3/a
Impermeable area	405,000.00 m2	347368.5	m3/a
			371533.5 m3/a

Calculation Assumptions:
No infiltration occurs across the impermeable area
Runoff from the permeable area contributes to Qtot

Statistical Assumptions:
Less than values have had the < removed and concentrations are assumed to be at LOD

Travel time calculation for water entering MG to discharge to reen

Distance (m)	100	10	1
Hydraulic gradient (-)	0.013333333	0.013333333	0.013333333
MG k (m/s)	0.0000001	0.0000001	0.0000001
Darcy flux (m/sec)	1.33333E-09	1.33333E-09	1.33333E-09
Time (seconds)	1.125E+11	7.50E+09	7.50E+08
Time (years)	3567	238	24

0.042048

$$Cs = Cl \times \left[Kdc + (\theta w + \theta a \times H) / Pc \right]$$

Where:
Cl Leachate Concentration (mg/l)
Cs Soil Concentration (mg/kg)
Kd Partition Coefficient (l/kg)
θw Water Filled Porosity (fraction)
θa Air Filled Porosity (fraction)
H Henry's Law (dimensionless)
Pc Contaminated Soil Bulk Density (g/cm3)

Leachate Samples

Determinand	EQS (mg/l)	Reference	Calculated Cgw (mg/l) Celtic Business Park	Calculated Cgw (mg/l) Residential Area	# samples above Cgw Celtic Business Park	# samples above Cgw Residential Area	% samples above Cgw Celtic Business Park	% samples above Cgw Residential Area	Comparison to Cgw (mg/l) Celtic Business Park	Comparison to Cgw (mg/l) Residential Area	Max Sampled Value (< removed sheet) mg/l	Comparison to Cgw (mg/l) Celtic Business Park	Comparison to Cgw (mg/l) Residential Area	Average Sampled Value (< removed sheet) mg/l
Metals														
Arsenic	0.05	1	**32.12588**	**8.11527**	0	0	0	0 ok	ok	ok	**0.04900** ok	ok	ok	**0.01044**
Cadmium	0.00025	1	**0.16083**	**0.04058**	0	0	0	0 ok	ok	ok	**0.00464** ok	ok	ok	**0.00022**
Chromium	0.0047	1	**3.01991**	**0.76284**	0	0	0	0 ok	ok	ok	**0.11500** ok	ok	ok	**0.00709**
Copper	0.001	1 (d)	**0.64251**	**0.16231**	0	1	0	0.9 ok	ok	Max Exceed	**0.34000** ok	ok	ok	**0.01811**
Iron	1	1	**642.91362**	**162.30945** no sample	no sample	no sample	no sample	no sample	n/a	n/a	**no sample** n/a	n/a	n/a	**no sample**
Lead	0.0012	1 (d)	**0.77102**	**0.19477**	0	0	0	0 ok	ok	ok	**0.00864** ok	ok	ok	**0.00085**
Manganese	0.123	1 (d)	**79.82918**	**19.96367** no sample	no sample	no sample	no sample	no sample	n/a	n/a	**no sample** n/a	n/a	n/a	**no sample**
Mercury	0.00007	1	**0.04498**	**0.01136**	0	0	0	0 ok	ok	ok	**0.00007** ok	ok	ok	**0.00002**
Nickel	0.004	1 (d)	**2.57005**	**0.64922**	0	0	0	0 ok	ok	ok	**0.01540** ok	ok	ok	**0.00434**
Selenium	0.01	8	**6.42514**	**1.62305**	0	0	0	0 ok	ok	ok	**0.10500** ok	ok	ok	**0.01052**
Vanadium	0.02	3	**12.85027**	**3.24611**	0	0	0	0 ok	ok	ok	**0.77900** ok	ok	ok	**0.23426**
Zinc	0.0109	1 (d)	**7.00340**	**1.76913**	0	0	0	0 ok	ok	ok	**0.45200** ok	ok	ok	**0.00785**
Other Inorganics														
Ammoniacal Nitrogen	0.3	5	**192.75409**	**48.69163** no sample	no sample	no sample	no sample	no sample	n/a	n/a	**no sample** n/a	n/a	n/a	**no sample**
Cyanide	0.001	1	**0.64251**	**0.16231** no sample	no sample	no sample	no sample	no sample	n/a	n/a	**no sample** n/a	n/a	n/a	**no sample**

Solid Samples

Determinand	Calculated Cmg (mg/kg) Celtic Business Park	Calculated Cmg (mg/kg) Residential Area	# samples above Cmg Celtic Business Park	# samples above Cmg Residential Area	% samples above Cmg (>33% samples highlighted purple) Celtic Business Park	% samples above Cmg (>33% samples highlighted purple) Residential Area	Comparison to Cmg (mg/kg) Celtic Business Park	Comparison to Cmg (mg/kg) Residential Area	Max Sampled Value (< removed sheet) mg/kg	Comparison to Cmg (mg/kg) Celtic Business Park	Comparison to Cmg (mg/kg) Residential Area	Average Sampled Value (< removed sheet) mg/kg
Metals												
Arsenic	**4328.686**	**1093.470**	0	0	0	0	ok	ok	**88.5**	ok	ok	**11.1**
Cadmium	**124.760**	**31.516**	0	0	0	0	ok	ok	**16.1**	ok	ok	**1.3**
Chromium	**16115.995**	**4071.064**	0	0	0	0	ok	ok	**622.0**	ok	ok	**148.4**
Copper	**770.811**	**194.715**	1	6	0.4	2.1	Max Exceed	Max Exceed	**1070.0**	ok	ok	**38.1**
Iron	**520673.291**	**131527.344**	no sample	no sample	no sample	no sample	no sample	no sample	**no sample**	n/a	n/a	**no sample**
Lead	**39398.452**	**9752.891**	0	0	0	0	ok	ok	**1300.0**	ok	ok	**99.9**
Manganese	**96930.188**	**14381.142** no sample	no sample	no sample	no sample	no sample	no sample	no sample	**no sample**	n/a	n/a	**no sample**
Mercury	**224.896**	**56.811**	0	0	0	0	ok	ok	**4.2**	ok	ok	**0.4**
Nickel	**19967.740**	**4968.270**	0	0	0	0	ok	ok	**77.3**	ok	ok	**24.6**
Selenium	**1199.434**	**302.989**	0	0	0	0	ok	ok	**33.8**	ok	ok	**5.9**
Vanadium	**2744.228**	**693.220**	0	7	0	2.9	ok	Max Exceed	**890.0**	ok	ok	**213.1**
Zinc	**23923.127**	**5938.222**	0	0	0	0	ok	ok	**5700.0**	ok	ok	**219.3**
Other Inorganics												
Ammoniacal Nitrogen	**263.929**	**66.671** no sample	no sample	no sample	no sample	no sample	no sample	no sample	**no sample**	n/a	n/a	**no sample**
Cyanide	**3.450**	**0.871** no sample	no sample	no sample	no sample	no sample	no sample	no sample	**no sample**	n/a	n/a	**no sample**
Organics												
Benzene	**6.499**	**1.642**	0	0	0	0	ok	ok	**0.04**	ok	ok	**0.04**
Toluene	**219.488**	**55.446**	0	0	0	0	ok	ok	**0.03**	ok	ok	**0.01**
Ethylbenzene	**137.241**	**34.668**	0	0	0	0	ok	ok	**0.01**	ok	ok	**0.01**
Xylene[2]	**126.713**	**32.009**	0	0	0	0	ok	ok	**0.03**	ok	ok	**0.01**
Phenol	**5.215**	**1.317** no sample	no sample	no sample	no sample	no sample	no sample	no sample	**no sample**	n/a	n/a	**no sample**
TPH Aliphatic >C5-C6	**124.795**	**31.517**	0	0	0	0	ok	ok	**0.10**	ok	ok	**0.04**
TPH Aliphatic >C6-C8	**813.844**	**155.663**	0	0	0	0	ok	ok	**0.18**	ok	ok	**0.04**
TPH Aliphatic >C8-C10	**4864.648**	**1228.182**	0	0	0	0	ok	ok	**0.14**	ok	ok	**0.04**
TPH Aliphatic >C10-C12	**38931.728**	**9733.595**	0	0	0	0	ok	ok	**0.53**	ok	ok	**0.05**
TPH Aliphatic >C12-C16	**768731.693**	**194169.411**	0	0	0	0	ok	ok	**37.2**	ok	ok	**3.5**
TPH Aliphatic >C16-C21	**96776235.072**	**24446857.131**	0	0	0	0	ok	ok	**184.0**	ok	ok	**20.7**
TPH Aliphatic >C21-C35	**96776235.072**	**24446857.131**	0	0	0	0	ok	ok	**5630.0**	ok	ok	**236.8**
TPH Aromatic >C5-C7	**96776235.072**	**24446857.131**	0	0	0	0	ok	ok	**2460.0**	ok	ok	**67.2**
TPH Aromatic >C7-C8	**14.542**	**3.674**	0	0	0	0	ok	ok	**0.04**	ok	ok	**0.04**
TPH Aromatic >C8-C10	**302.994**	**76.431**	0	0	0	0	ok	ok	**0.04**	ok	ok	**0.04**
TPH Aromatic >C10-C12	**245.454**	**62.004**	0	0	0	0	ok	ok	**0.10**	ok	ok	**0.04**
TPH Aromatic >C12-C16	**387.630**	**97.919**	0	0	0	0	ok	ok	**0.35**	ok	ok	**0.04**
TPH Aromatic >C16-C21	**771.676**	**194.792**	1	1	0	0	Max Exceed	Max Exceed	**786.0**	ok	ok	**5.3**
TPH Aromatic >C21-C35	**2433.262**	**614.667**	1	1	0	0	Max Exceed	Max Exceed	**7750.0**	ok	ok	**44.1**
TPH Aromatic >C5-C44	**19311.736**	**4878.340**	0	1	0	0	ok	Max Exceed	**6665.0**	ok	ok	**110.3**
TPH Aromatic >C35-C44	**19311.736**	**4878.340**	0	0	0	0	ok	ok	**725.0**	ok	ok	**45.5**
TPH Aromatic >C40-C44	**19311.735**	**4878.340**	0	0	0	0	ok	ok	**253.0**	ok	ok	**18.0**
Acenaphthene	**28.584**	**7.221**	0	1	0	0	ok	Max Exceed	**24.9**	ok	ok	**0.15**
Acenaphthylene	**58.812**	**12.830**	0	0	0	0	ok	ok	**2.1**	ok	ok	**0.09**
Anthracene	**98.337**	**14.737**	0	0	0	0	ok	ok	**5.3**	ok	ok	**0.27**
Benzo(a)anthracene	**1036.999**	**261.956**	0	0	0	0	ok	ok	**37.6**	ok	ok	**1.02**
Benzo(a)pyrene	**58.698**	**14.876**	0	1	0.0	0.4	ok	Max Exceed	**42.0**	ok	ok	**1.15**
Benzo(b)fluoranthene	**5.837**	**1.476**	9	66	3.7	27.2	Max Exceed	Max Exceed	**54.5**	ok	Av Exceed	**1.60**
Benzo(k)fluoranthene	**8.634**	**2.181**	1	9	0.4	3.7	Max Exceed	Max Exceed	**19.6**	ok	ok	**0.57**
Benzo(g,h,i)perylene	**22.710**	**5.737**	1	3	0.4	1.2	Max Exceed	Max Exceed	**26.0**	ok	ok	**0.85**
Chrysene	**1061.153**	**268.058**	0	0	0	0	ok	ok	**30.4**	ok	ok	**0.98**
Di-benz(a,h)anthracene	**1431.448**	**361.598**	0	0	0	0	ok	ok	**8.4**	ok	ok	**0.23**
Indeno(1,2,3-cd)pyrene	**43.273**	**10.931**	0	1	0	0.4	ok	Max Exceed	**24.7**	ok	ok	**0.72**
Fluoranthene	**11.594**	**2.860**	4	28	1.6	11.5	Max Exceed	Max Exceed	**40.7**	ok	ok	**1.61**
Fluorene	**46.344**	**11.707**	0	1	0	0.4	ok	Max Exceed	**30.7**	ok	ok	**0.23**
Naphthalene	**46.901**	**11.848**	0	0	0	0	ok	ok	**5.3**	ok	ok	**0.28**
Phenanthrene	**46.344**	**11.707**	0	1	0	0.4	ok	Max Exceed	**19.6**	ok	ok	**0.86**
Pyrene	**130.571**	**32.994**	0	0	0	0	ok	ok	**32.9**	ok	ok	**1.36**
Tetrachloroethene (PCE)	**35.96033**	**9.08394**										
Trichloroethene (TCE)	**21.68023**	**5.47467**										
1,1-Dichloroethene (1,1-DCE)	**56.60009**	**14.29775**										
cis-1,2-Dichloroethene (1,2-DCE)	**49.35446**	**12.46744**										
trans-1,2-Dichloroethene	**49.31514**	**12.20489**										
Vinyl Chloride (VC)	**0.50188**	**0.12678**										

Conversion from mg/l to mg/kg

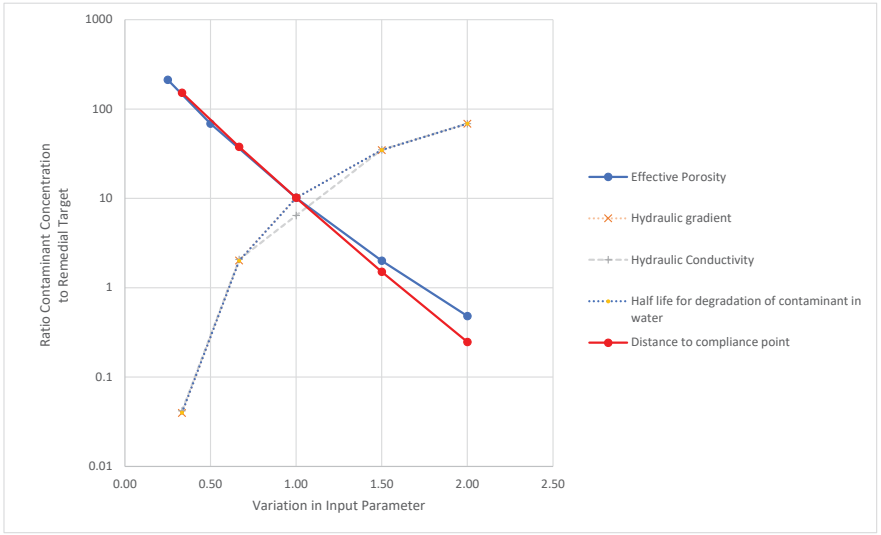
Determinand	Henrys Law Coefficient	Henrys Law ref	foc	koc	koc ref	Kd (average values)	Kd ref	Air Filled Porosity	Water Filled Porosity	Dry Bulk Density	Cgw (mg/kg) Celtic Business Park	Cgw (mg/kg) Residential Area	WQS (mg/kg)
Arsenic	-					134	11	0.00368553	0.50	1.36	4328.69	1093.47	6.74
Cadmium	-					776	11	0.00368553	0.50	1.36	124.76	31.52	0.19
Chromium	-					5336	11	0.00368553	0.50	1.36	16116.00	4071.06	25.09
Copper	-					1090	11	0.00368553	0.50	1.36	770.81	194.71	1.20
Iron	-					810	18	0.00368553	0.50	1.36	520673.28	131527.34	810.37
Lead	-					34077	11	0.00368553	0.50	1.36	39890.65	8752.89	41.80
Manganese	-					720	18	0.00368553	0.50	1.36	96930.19	14381.14	88.81
Mercury	-					5000	11	0.00368553	0.50	1.36	224.90	56.81	0.35
Nickel	-					7652	11	0.00368553	0.50	1.36	19967.74	4968.27	30.61
Selenium	-					186	11	0.00368553	0.50	1.36	1199.43	302.99	1.87
Vanadium	-					213	11	0.00368553	0.50	1.36	2744.23	693.22	4.27
Zinc	-					33658	11	0.00368553	0.50	1.36	23923.13	5938.22	36.76
											0.00	0.00	0.00
Ammoniacal Nitrogen	-						18	0.00368553	0.50	1.36	263.93	66.67	0.41
Cyanide	-						18	0.00368553	0.50	1.36	3.45	0.87	0.01
											0.00	0.00	0.00
Benzene	0.182000	17	0.0239	794	18	19.8	Env*Sec	0.00368553	0.50	1.36	6.50	1.64	0.01
Toluene	0.231000	17	0.0239	178	18	4.249188458	Env*Sec	0.00368553	0.50	1.36	219.49	55.44	0.32
Ethylbenzene	0.3	17	0.0239	432	18	10.31283716	Env*Sec	0.00368553	0.50	1.36	137.24	34.67	0.21
Xylene[2]	0.22	17	0.0239	260	18	6.2066797	Env*Sec	0.00368553	0.50	1.36	126.71	32.01	0.19
Phenol	0.000068	17	0.0239	28.8	18	0.687559144	Env*Sec	0.00368553	0.50	1.36	5.21	1.32	0.01
											0.00	0.00	0.00
TPH Aliphatic >C5-C6	33.000000	13	0.0239	794	18	19.8	Env*Sec	0.00368553	0.50	1.36	124.76	31.52	0.31
TPH Aliphatic >C6-C8	50	13	0.0239	3681	18	95.6	Env*Sec	0.00368553	0.50	1.36	813.84	155.09	1.10
TPH Aliphatic >C8-C10	90	13	0.0239	31623	18	754.1	Env*Sec	0.00368553	0.50	1.36	4854.05	1226.18	7.84
TPH Aliphatic >C10-C12	120	13	0.0239	251189	18	5996.3	Env*Sec	0.00368553	0.50	1.36	38531.73	9733.59	60.41
TPH Aliphatic >C12-C16	326	13	0.0239	5011872	18	119642.8	Env*Sec	0.00368553	0.50	1.36	768731.69	194169.41	1198.55
TPH Aliphatic >C16-C21	4900	13	0.0239	6309573447	18	15062116.1	Env*Sec	0.00368553	0.50	1.36	96776235.07	24446857.13	########
TPH Aliphatic >C21-C35	4900	13	0.0239	6309573447	18	15062116.1	Env*Sec	0.00368553	0.50	1.36	96776235.07	24446857.13	########
TPH Aromatic >C5-C7	4900	13	0.0239	6309573447	18	15062116.1	Env*Sec	0.00368553	0.50	1.36	96776235.07	24446857.13	########
TPH Aromatic >C7-C8	0.23	13	0.0239	79	18	1.9	Env*Sec	0.00368553	0.50	1.36	14.54	3.67	0.02
TPH Aromatic >C8-C10	0.27	13	0.0239	251	18	6.1	Env*Sec	0.00368553	0.50	1.36	302.94	76.43	0.46
TPH Aromatic >C10-C12	0.48	13	0.0239	1585	18	37.9	Env*Sec	0.00368553	0.50	1.36	245.45	62.00	0.38
TPH Aromatic >C12-C16	0.14	13	0.0239	2512	18	60.0	Env*Sec	0.00368553	0.50	1.36	387.63	97.92	0.60
TPH Aromatic >C16-C21	0.55	13	0.0239	5012	18	119.8	Env*Sec	0.00368553	0.50	1.36	771.68	194.79	1.20
TPH Aromatic >C21-C35	0.01	13	0.0239	15849	18	378.9	Env*Sec	0.00368553	0.50	1.36	2433.26	614.67	3.79
TPH Aromatic >C5-C44	0.00067	13	0.0239	125893	18	3005.5	Env*Sec	0.00368553	0.50	1.36	19311.74	4878.34	30.05
TPH Aromatic >C35-C44	0.00067	13	0.0239	125893	18	3005.5	Env*Sec	0.00368553	0.50	1.36	19311.74	4878.34	30.05
TPH Aromatic >C40-C44	0.00067	13	0.0239	125893	18	3005.5	Env*Sec	0.00368553	0.50	1.36	19311.74	4878.34	30.05
											0.00	0.00	0.00
Acenaphthene	0.0049	12	0.0239	18621	12	444.5	Env*Sec	0.00368553	0.50	1.36	28.58	7.22	0.04
Acenaphthylene	0.0034	12	0.0239	33113	12	790.8	Env*Sec	0.00368553	0.50	1.36	58.81	12.84	0.08
Anthracene	0.0016	12	0.0239	38019	12	907.8	Env*Sec	0.00368553	0.50	1.36	98.34	14.74	0.09
Benzo(a)anthracene	0.00024	12	0.0239	676083	12	16139.5	Env*Sec	0.00368553	0.50	1.36	1037.00	261.96	1.61
Benzo(a)pyrene	0.000019	12	0.0239	426580	12	10183.2	Env*Sec	0.00368553	0.50	1.36	58.69	14.88	0.09
Benzo(b)fluoranthene	0.0002	12	0.0239	2238721	12	53442.8	Env*Sec	0.00368553	0.50	1.36	5.84	1.47	0.01
Benzo(k)fluoranthene	0.000034	12	0.0239	3311311	12	79047.1	Env*Sec	0.00368553	0.50	1.36	8.63	2.18	0.01
Benzo(g,h,i)perylene	0.00003	12	0.0239	8709636	12	207915.1	Env*Sec	0.00368553	0.50	1.36	22.71	5.74	0.04
Chrysene	0.00026	12	0.0239	691831	12	16515.5	Env*Sec	0.00368553	0.50	1.36	1061.15	268.06	1.65
Di-benz(a,h)anthracene	0.0000006	12	0.0239	933254	12	22278.5	Env*Sec	0.00368553	0.50	1.36	1431.45	361.60	2.23
Indeno(1,2,3-cd)pyrene	0.000098	12	0.0239	16595869	12	396174.6	Env*Sec	0.00368553	0.50	1.36	43.27	10.93	0.07
Fluoranthene	0.00042	12	0.0239	117490	12	2804.7	Env*Sec	0.00368553	0.50	1.36	11.35	2.87	0.02
Fluorene	0.0032	12	0.0239	30200	12	720.9	Env*Sec	0.00368553	0.50	1.36	46.34	11.71	0.07
Naphthalene	0.017	12	0.0239	1514	12	36.1	Env*Sec	0.00368553	0.50	1.36	46.90	11.85	0.07
Phenanthrene	0.0013	12	0.0239	30200	12	720.9	Env*Sec	0.00368553	0.50	1.36	46.34	11.71	0.07
Pyrene	0.00037	12	0.0239	85114	12	2031.8	Env*Sec	0.00368553	0.50	1.36	130.57	32.99	0.20
											0.00	0.00	0.00
Tetrachloroethene (PCE)	0.865	17	0.0239	219	13	5.2	Env*Sec	0.00368553	0.50	1.36	35.96	9.08	0.06
Trichloroethene (TCE)	0.42	17	0.0239	126	13	3.0	Env*Sec	0.00368553	0.50	1.36	21.69	5.48	0.03
1,1-Dichloroethene (1,1-DCE)	1.336	17	0.0239	107.5	13	2.6	Env*Sec	0.00368553	0.50	1.36	56.60	14.30	0.09
cis-1,2-Dichloroethene (1,2-DCE)	0.2772	17	0.0239	48.97	13	1.2	Env*Sec	0.00368553	0.50	1.36	49.35	12.47	0.08
trans-1,2-Dichloroethene	0.4071	17	0.0239	47.6	13	1.1	Env*Sec	0.00368553	0.50	1.36	49.32	12.25	0.08
Vinyl Chloride (VC)	0.78	17	0.0239	50	13	1.2	Env*Sec	0.00368553	0.50	1.36	0.50	0.13	0.00

Appendix M: Sensitivity Analyses Outputs

Ammoniacal Nitrogen Sensitivity Analysis

			Sensitive?
Initial contaminant concentration in groundwater at plume core	254.78	mg/l	
Half life for degradation of contaminant in water	2190	days	Yes
Calculated decay rate	0.000317	days-1	
Width of plume in aquifer at source (perpendicular to flow)	500	m	No
Plume thickness at source	1.5	m	No
Saturated aquifer thickness	2	m	No
Bulk density of aquifer materials	1.36	g/cm3	No
Effective porosity of aquifer	0.08	fraction	Yes
Hydraulic gradient	0.01	fraction	Yes
Hydraulic conductivity of aquifer	0.00864	m/d	Yes
Distance to compliance point	20	m	Yes
Soil water partition coefficient	213	l/kg	
Remedial Target	169.00	mg/l	

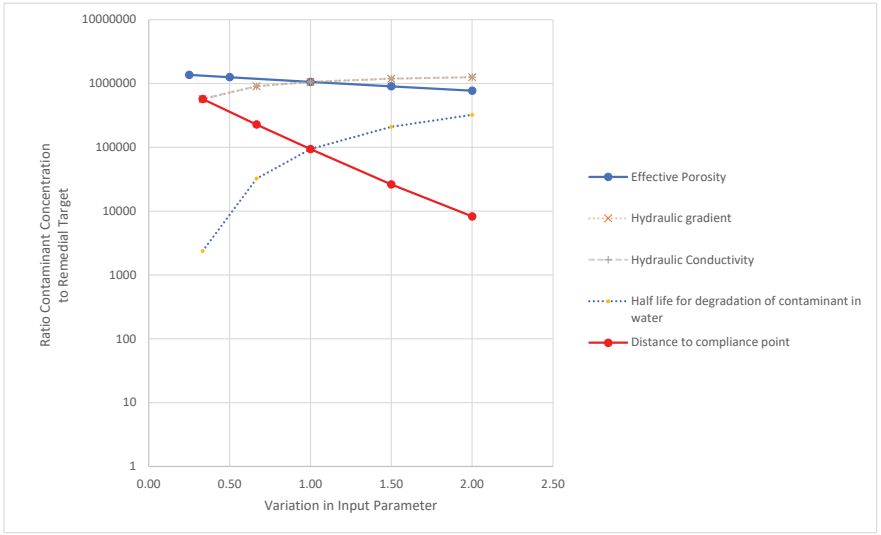
				Remedial Target	Ratio
Effective porosity of aquifer	0.02	fraction	0.25	1.200000	212.3167
	0.04	fraction	0.50	3.720000	68.48925
	0.08	fraction	1.00	25.10000	10.1506
	0.12	fraction	1.50	127.000000	2.006142
	0.16	fraction	2.00	529.000000	0.481626
Hydraulic gradient	0.00333	fraction	0.33	6410.000000	0.039747
	0.00667	fraction	0.67	126.000000	2.022063
	0.01000	fraction	1.00	25.10000	10.1506
	0.01500	fraction	1.50	7.340000	34.71117
	0.02000	fraction	2.00	3.720000	68.48925
Hydraulic conductivity of aquifer	0.0029	m/d	0.33	6070.000000	0.041974
	0.0058	m/d	0.67	123.000000	2.071382
	0.0086	m/d	1.00	39.559576	6.440413
	0.0130	m/d	1.50	7.280000	34.99725
	0.0173	m/d	2.00	3.710000	68.67385
Half life for degradation of contaminant in water	730	days	0.33	6370.000000	0.039997
	1460	days	0.67	127.000000	2.006142
	2190	days	1.00	25.100000	10.1506
	3285	days	1.50	7.340000	34.71117
	4380	days	2.00	3.720000	68.48925
Distance to compliance point	6.666667	m	0.33	1.68	151.6548
	13.33333	m	0.67	6.75	37.74519
	20	m	1.00	25.1	10.1506
	30	m	1.50	169	1.507574
	40	m	2.00	1030	0.247359



Benzo(b)fluoranthene Sensitivity Analysis

			Sensitive?
Initial contaminant concentration in groundwater at plume core	0.28	mg/l	
Half life for degradation of contaminant in water	3650	days	Yes
Calculated decay rate	0.000019	days-1	
Width of plume in aquifer at source (perpendicular to flow)	500	m	No
Plume thickness at source	1.5	m	No
Saturated aquifer thickness	2	m	No
Bulk density of aquifer materials	1.36	g/cm3	No
Effective porosity of aquifer	0.08	fraction	Yes
Hydraulic gradient	0.01	fraction	Yes
Hydraulic conductivity of aquifer	0.00864	m/d	Yes
Distance to compliance point	20	m	Yes
Soil water partition coefficient	53442	l/kg	
Remedial Target	0.00	mg/l	

				Remedial Target	Ratio
Effective porosity of aquifer	0.02	fraction	0.25	0.000000	1365854
	0.04	fraction	0.50	0.000000	1255605
	0.08	fraction	1.00	0.00000	1060606
	0.12	fraction	1.50	0.000000	903225.8
	0.16	fraction	2.00	0.000000	771349.9
Hydraulic gradient	0.00333	fraction	0.33	0.000000	570264.8
	0.00667	fraction	0.67	0.000000	903225.8
	0.01000	fraction	1.00	0.00000	1060606
	0.01500	fraction	1.50	0.000000	1186441
	0.02000	fraction	2.00	0.000000	1255605
Hydraulic conductivity of aquifer	0.0029	m/d	0.33	0.000000	573770.5
	0.0058	m/d	0.67	0.000000	906148.9
	0.0086	m/d	1.00	0.000000	1060606
	0.0130	m/d	1.50	0.000000	1186441
	0.0173	m/d	2.00	0.000000	1255605
Half life for degradation of contaminant in water	1216.667	days	0.33	0.000118	2372.881
	2433.333	days	0.67	0.000009	32332.56
	3650	days	1.00	0.000003	93645.48
	5475	days	1.50	0.000001	208955.2
	7300	days	2.00	0.000001	322580.6
Distance to compliance point	6.666667	m	0.33	4.92E-07	569105.7
	13.33333	m	0.67	1.23E-06	227642.3
	20	m	1.00	2.99E-06	93645.48
	30	m	1.50	1.07E-05	26168.22
	40	m	2.00	3.39E-05	8259.587



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Appendix D – Phase 5A & 5B CWDQRA

Appendix E – H F Consulting Soil Validation Strategy

H Fraser Consulting
Contaminated Land and Hydrogeology

Glan Llyn: Soils validation strategy for protection of controlled waters

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Contaminated Land and Hydrogeology

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Version History

Version	Author	Approved by	Issue date	Comment
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APPENDICES

Appendix A RTM modelling spreadsheet outputs (electronic)

Appendix B Example RTM spreadsheets (electronic)

1. BACKGROUND

Glan Llyn is a major residential and commercial development in Llanwern, South Wales, on the site of a former steelworks. Planning permission for the development includes planning conditions PC27 and PC28, which relate to the remediation strategy for the on-site soils and the validation of the remediation once achieved.

The initial risk assessment and remediation strategy report was produced by Atkins (2017) and this was subsequently updated by Rodgers Leask (2019-22), as described in Section 2. These documents have been accepted as satisfying PC27 for a number of development phases that are already completed or are currently being developed. Recent efforts to satisfy the requirements of PC28, which relate to the validation of the soil quality following remediation, for the protection of controlled waters, have been subject to considerable discussion with the regulator, NRW, and the planning authority, Newport City Council.

Recent meetings and discussion involving H Fraser Consulting Ltd (HFCL) resulted in agreement in principle on a revised approach to validation reporting, with regard to protection of controlled waters.

1.1 Objective

The objective of this report is to present the revised approach referred to above. This will provide a standard methodology and reference for all future phase validations and thus enable validation to proceed efficiently for all parties.

1.2 Scope of report

The report summarises the remediation work and validation at Glan Llyn to date (Section 2) and presents the updated approach and methodology (Section 3). Section 4 contains reference tables for contaminants of concern, to be applied to validation of soil quality in future validation reporting.

Additional planning conditions related to surface water are not part of the scope of this validation strategy.

This report considers only the elements of the remediation that relate to protection of controlled waters; elements of the remediation strategy that protect human health receptors (for example, placement of vapour membranes) are outside the scope of this report.

2 REMEDIATION WORKS AND VALIDATION TO DATE

2.1 Remediation strategy

The agreed remediation strategy and risk assessment for controlled waters at the site is detailed in Rodgers Leask (2019-22). The remediation strategy is briefly summarised here.

The remediation comprises excavation of Made Ground materials, removal of materials unsuitable for re-use in the development platform, and re-compaction of suitable Made Ground materials as an engineered fill. A drainage layer, formed as part of the normal construction phase, will then be installed above the engineered fill layer, to reduce infiltration to the Made Ground.

The Site has been divided into two strategies broadly responding to the division of the site between residential use and commercial use, referred to as the 'Full Turnover Specification' and the 'One Metre Turnover Specification'. The Full Turnover Specification comprises the excavation of Made Ground to a depth where the natural underlying Tidal Flat Deposits are exposed before a minimum of 2 m of suitable material is placed and reengineered. The One Meter Turnover Specification requires a trim and chase process excavating material to a depth minimum of 5.3 m aOD before approximately 2 m of suitable material is placed and reengineered to a formation level of 7.25 m aOD. Practical measures to identify, remove and validate the absence of gross contamination and known and potential obstructions extending below 5.3 m aOD shall be undertaken.

Several phases of trial pitting have been undertaken across the Site to assess and characterise the Made Ground for suitability for reuse. Material present within the proposed residential area that exceeds residential soil re-use values shall be transferred and re-used in the commercial phase of the development. Where material is not suitable for either a residential or commercial end use, the material will either be treated to allow re-use on site (at the supervising engineers discretion), or arrangements made for off-site disposal.

The remediation work and development are proceeding in phases as shown in Figure 2.1 for the residential area, and Figure 2.2 for the commercial area.



Figure 2.1 Residential phases

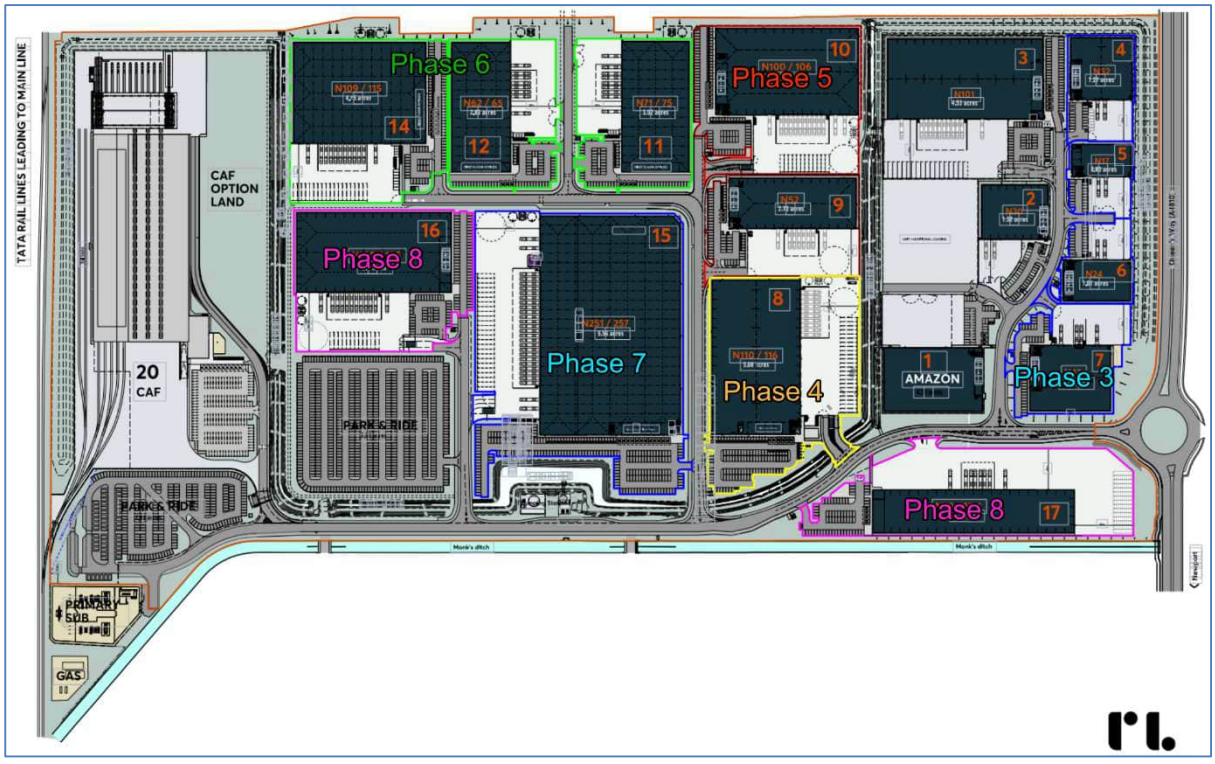


Figure 2.2 Commercial phases

Two planning conditions apply to the site remediation work.

- PC27 requires that, prior to commencement of each phase of development, a risk assessment, remediation strategy and verification plan are submitted to and approved in writing by the Local Authority.
- PC28 requires that prior to commencement of each phase of development (excluding works required for the remediation strategy) a verification report is submitted to and approved in writing by the Local Authority, to demonstrate completion of the remediation strategy and the effectiveness of the remediation.

The site is drained by a number of deep drainage ditches, referred to as reens. Soil re-use values (SRVs) for the protection of controlled waters were derived by Atkins and amended by Rodgers Leask, assuming the following conceptual model.

- 60% of the residential site surface and 95% of the commercial site surface is impermeable. 100% of incident rainfall on impermeable areas either evaporates or is routed via the drainage system directly to the reens.
- 40% of the residential site and 5% of the commercial site has soft landscaping. In these areas infiltration was calculated as 12.85 mm/a, by subtracting evapotranspiration and runoff from the total rainfall figure. Runoff from these areas also passes to the reens.
- 12.85 mm/a infiltrates the drainage layer overlying the engineered fill.
- In the soft landscaping areas, 60% of infiltration drains laterally through the drainage layer into a reen and does not enter the engineered fill.
- 40% of infiltration drains into the engineered fill and migrates through the fill to a reen, dissolving potential contaminants from the fill materials.
- The infiltration that travels through the fill is diluted on reaching the reens by runoff and infiltration through the drainage layer. The relative fluxes of water passing through the fill to clean runoff provides the dilution factor.
- SRVs are calculated by multiplying the Environmental Quality Standard (EQS) by the dilution factor and converting this water concentration into a soil concentration using a partition co-efficient.

This approach was set out originally by Atkins (2017), modified by Rogers Leask (2019-22) and approved by the Local Authority under discharge of PC27 for a number of development phases. The commercial area and the residential area have different remedial targets due to the different ratio of soft landscaping to hardstanding.

Soils re-use values (SRVs) were set out in Rogers Leask (2019-22). A minor update to correct an error in calculation for the residential area was provided by HFCL (2024). The SRVs are reproduced here in Table 2.1.

Table 2.1 Agreed soil re-use values (SRVs)

Determinand	Soil re-use values (mg/kg)	
	Commercial area	Residential area[1]
Inorganic Metals and Metalloids		
Arsenic	1.15E+4	2533
Cadmium	331	73.0
Chromium	4.27E+4	9431
Copper	2042	451
Iron	1.38E+6	3.05E+5
Lead	7.12E+4	1.57E+4
Manganese	1.51E+5	3.33E+4
Mercury	596	132
Nickel	5.21E+4	1.15E+4
Selenium	3178	702
Vanadium	7271	1606
Zinc	6.23E+5	1.38E+5
Other Inorganics		
Ammoniacal Nitrogen	699	154
Cyanide	9.14	2.02
Organics		
Benzene	17.2	3.80
Toluene	582	128
Ethylbenzene	364	80.0
Xylene	336	74.0
Phenol	13.8	3.05
TPH Criteria Working Group		
Aliphatics >C5-C6	331	73.0
Aliphatics >C6-C8	1626	359
Aliphatics >C8-C10	1.29E+4	2841
Aliphatics >C10-C12	1.02E+5	2.25E+4
Aliphatics >C12-C16	2.04E+6	4.50E+5
Aliphatics >C16-C21	2.56E+8	5.66E+7
Aliphatics >C21-C35	2.56E+8	5.66E+7
Aliphatics >C35-C44	2.56E+8	5.66E+7
Aromatics >EC5-EC7	38.5	8.51
Aromatics >EC7-EC8	802	177
Aromatics >EC8-EC10	650	144
Aromatics >EC10-EC12	1027	227
Aromatics >EC12-EC16	2043	451
Aromatics >EC16-EC21	6447	1424
Aromatics >EC21-EC35	5.12E+4	1.13E+4
Aromatics >EC35-EC44	5.12E+4	1.13E+4
Aromatics >EC40-EC44	5.12E+4	1.13E+4
Polyaromatic Hydrocarbons		
Acenaphthylene	75.7	16.7

[1] Updated per H Fraser Consulting 2024; *30937 TN1D1 Glan Llyn, Llanwern: Soil Quality Verification*

Determinand	Soil re-use values (mg/kg)	
	Commercial area	Residential area[1]
Acenaphthene	135	30.0
Anthracene	155	34.0
Benz(a)anthracene	2748	607
Benzo(a)pyrene	156	34.0
Benzo(b)fluoranthene	15.5	3.42
Benzo(k)fluoranthene	22.9	5.05
Benzo(g,h,i)perylene	60.2	13.0
Chrysene	2812	621
Dibenzo(a,h)anthracene	3793	838
Indeno(1,2,3-cd)pyrene	115	25.0
Fluoranthene	30.1	6.64
Fluorene	123	27.0
Naphthalene	124	27.0
Phenanthrene	123	27.0
Pyrene	346	76.0

2.2 Remediation

Remediation has taken place in phases as shown in Figure 2.1 (residential) and Figure 2.2 (commercial). As of October 2024, remediation has been completed across the majority of the site. Remediation has been validated and approved for Phases 1 to 3 of the residential development and Phases 1 to 3 of the commercial development. These phases were remediated and validated under the site model, risk assessment and remediation strategy developed by Atkins (2017), and therefore had different validation requirements to Phase 4 onwards.

The remediation and verification work on each of the phases includes the following:

- Complete excavation of Made Ground materials to the underlying Tidal Flat Deposits in the residential areas and to a depth minimum of 5.3 m aOD in the commercial area;
- Screening and stockpiling of the excavated material;
- Sampling of stockpile materials;
- Removal of material unsuitable for use;
- Subdivision of the site into backfill zones, generally in a 25x25 m grid;
- Placement of engineered fill in 300 mm layers, zone by zone;
- Sampling of surface materials, post-placement, to provide additional verification data.

As noted in Section 2.1, material originating from the site that was unsuitable for use in the residential area was to be re-used on the commercial area (where agreed SRVs are higher) or, if necessary, removed from site. In practice, all excavated material was stockpiled and tested, and the above criterion applied. That is, if testing of stockpiled material showed it to be unsuitable for residential area backfill, it was moved to the commercial area or removed from the site, in accordance with the stipulations of the remediation strategy (Rodgers Leask, 2019-22).

Table 2.2 shows a summary of where each phase is in the remediation and verification process. Table 2.2 also indicates whether the planning conditions for each phase have been discharged, and whether this was in accordance with the Atkins remediation strategy (RS) or the Rogers Leask RS. Note that part of the residential area that was formerly a coking works has been remediated by

Vertase FLI Ltd (Vertase); HFCL has not reviewed the remediation strategy or soil re-use values for this part of the site. The coking works area includes parts of Phases 4A, 4B, 5A and 5D, as well as the proposed school.

Table 2.2 Summary of phase progress

Phase	Remediation works complete	Discharge of planning conditions *	
		PC27	PC28
Residential			
Phase 1	Yes	Atkins RS	Atkins RS
Phase 2	Yes	Atkins RS	Atkins RS
Phase 3	Yes	Atkins RS	Atkins RS
Coking works	Yes	Vertase	Pending
Phase 4A (compound)	Yes	RL RS / Vertase	Pending
Phase 4B	Yes	Pending	Pending
Phase 4C	Yes	RL RS	Pending
Phase 4D	Yes	RL RS, parts 1 and 2	Pending
Phase 4E	Yes	Pending	Pending
Phase 4G	Yes	Pending	Pending
Phase 4H	Yes	RL RS	Pending
Phase 5A	Yes	Pending	Pending
Phase 5B	Yes	Pending	Pending
Phase 5G	Yes	Pending	Pending
Phase 5D	Yes	Pending	Pending
Phase 5E1	Yes	RL RS	Pending
Phase 5E2	Yes	Pending	Pending
Phase 5F	Ongoing	Pending	Pending
Commercial			
Phase 1 (Amazon)	Yes	Atkins RS	Atkins RS
Phase 2 (CAF)	Yes	Atkins RS	Atkins RS
Phase 3 (Units 4-7)	Yes	Atkins RS	Atkins RS
Phase 4 (Unit 8)	Yes	RL RS	Pending
Phase 5 (Units 9-10)	Yes	RL RS	Pending
Phase 6a (Units 11-14)	Yes	RL RS	Pending
Phase 6b (Units 15 and 16)	Yes	RL RS	Pending
Phase 7 (Park and Ride)	Yes	RL RS	Pending
Phase 8 (Unit 17)	Ongoing	Pending	Pending

* "Pending" indicates that the application has not yet been made.

2.3 Soil testing and validation

Soil samples are taken from each stockpile and sent to an accredited laboratory for analysis of the soil re-use determinands as listed in Table 2.1. An average soil concentration is then obtained for each stockpile. During the placement of the engineering fill each 300 mm layer is taken from a specific stockpile. Each stockpile may be used for multiple layers in one backfill zone, or across

multiple zones. Rogers Leask maintains a materials management database, so that there is a record of the soil analytical results for each stockpile and which stockpile was used for each layer in each backfill zone. A variable number of layers is laid down in each zone to achieve the desired ground surface level.

Surface verification samples may be taken upon completion of the engineered fill placement, principally for validation of human health criteria rather than controlled waters.

All samples are sent to an accredited laboratory for analysis of the determinands listed in Table 2.1. It is assumed the surface verification samples are representative of the top 100 mm of soil, since they are taken using a trowel.

Hundreds of soil samples are relevant to each backfill zone, and these can be taken as a group to represent the quality of soils used in the remediation.

A database of all the soil analytical results for each phase is developed. This includes all the surface verification samples taken across the phase, and all soil samples from any stockpiles used in the engineered fill. The 95%ile of all the analytical results is compared to the soil re-use values. Any determinands where the 95%ile exceeds the SRV is taken forward as a Contaminant of Concern (CoC) for that phase.

2.4 Issues arising

During the remediation verification for Phase 4H (residential) and Phases 4 and 5 (Units 8-10, commercial) exceedances of the SRVs were identified for certain parameters in specific areas of backfill during the verification process. It was therefore not possible to validate the remediation in those cases. An updated approach was consequently developed which combined a more detailed statistical analysis and enhanced data presentation, supplemented where needed by contaminant transport modelling. Where data presentation was unable to show that a contaminant presented no risk, modelling was applied to predict the concentration that would reach the surface water receptors. This updated approach allows for advection, dispersion, retardation and decay that act to reduce contaminant concentrations along a transport pathway.

The approach was agreed with NRW for Phase 4H and Units 8-10. This report sets out a streamlined approach to applying the same methodology, which involves the derivation of zoned reference values for all identified contaminants of concern across the site. This updated methodology, which will be applied to verification of future phases, is described in detail in Section 3.

As long as a sufficient number of robust sample analyses is available to represent the backfill material in each phase, the updated approach can be used to provide appropriate validation against the agreed soil criteria, without the need for additional consideration of subsurface water quality within the fill.

The updated SRVs derived by Rodgers Leask depend on the existence of a drainage layer above the fill. The drainage layer needs to be composed of appropriate granular material and evidence of its installation layer will form part of the requirement for the discharge of PC28.

3 UPDATED APPROACH AND METHODOLOGY

The following methodology is recommended for the future phases going forward. This methodology has been developed following discussion with NRW and agreement on the principles to be followed. An overview of the process is given here first, with further clarification of each stage in the following sub-sections.

Distance-specific reference values have been derived using Remedial Targets Methodology spreadsheets (RTM, see Environment Agency, 2006) to model the attenuation of contaminants during transport in the saturated zone. This allows for advection, dispersion, retardation and decay that act to reduce contaminant concentrations along a transport pathway. Reference values have been tabulated for three different travel distances to the compliance point. Comparison of reference values against measured soil concentrations can then determine whether contaminants are expected to reach the receptors at unacceptable concentrations. Full details of the derivation of the reference tables are provided in Sections 3.1 to 3.3.

For each development phase, a screening exercise will be carried out on all the contaminants of concern identified in the site-wide RL Remediation Strategy, as described in Section 3.4. Contaminants of Concern (CoCs) for that phase will be defined as determinands for which the 95%ile of the analytical results from the fill materials exceeded the SRV. (This maintains consistency with previous validation reporting.) The remaining CoCs will then be moved forward for further assessment.

In this further assessment a thorough statistical and spatial analysis will be carried out on the stockpile verification samples for these contaminants. This will include a calculation of the Upper Confidence Limit of the mean (UCLmean) for each backfill zone across the Phase (see Section 3.4). The UCLmean for each backfill area will then be compared to the tabulated reference values.

3.1 Development of reference tables

The agreed SRVs (Rodgers Leask, 2019-22) were calculated assuming that water infiltrates the engineered fill and travels to a reen, where it is then diluted in the volume of runoff across the site. The calculation only allows for dilution in the reen and does not allow for transport processes such as advection, dispersion, retardation and decay that act to reduce contaminant concentrations along a transport pathway. The site drainage strategy (Rodgers Leask, 2017) requires that a minimum depth of 300 mm of water always remains in the reens. This serves various purposes including dilution of groundwater from the Made Ground.

New reference values have now been derived using RTM spreadsheets to model the attenuation of contaminants during transport in the saturated zone. This allows for advection, dispersion, retardation and decay that act to reduce contaminant concentrations along a transport pathway.

Generic modelling reference tables are developed, so that modelling is not required for each individual phase. Instead, the concentration for each CoC in each backfill zone can be checked against the reference tables. Reference values in the tables are given for three specific distances (12.5 m, 37.5 m and 62.5 m)[2].

[2] 12.5 m was selected because it represents the half of the distance across a standard remediation grid square. Grid squares measure 25 m square and were used across most of the Glan Llyn site as backfill zones. 37.5 m represents the distance across one and a half grid squares, i.e. the travel distance from a backfill zone that is one removed from the

The RTM has been used to assess the attenuation of contaminant concentrations through the engineered fill. To do this a 'Level 3' groundwater assessment has been undertaken as follows.

- The target concentration at the compliance point is taken to be the pore water concentration in equilibrium with the previously calculated SRV (Table 2.1). This is representative of the groundwater concentration before dilution at the point of discharge into the reen.
- The source area has been taken as the area of a standard backfill zone (25 m by 25 m).
- A time period of 1,000 years has been used.[3]
- The reference value is calculated as the target soil concentration in equilibrium with the groundwater remedial target taken from the RTM Level 3 groundwater assessment.

Equivalent pore water concentrations for a given soil concentration, and vice versa, are calculated using the equation below.

$$C_p = \frac{C_s}{\left(K_d + \frac{\theta_w + \theta_a H}{\rho}\right)}$$

Where:

C_s = soil concentration (mg/kg)
C_p = pore water concentration (mg/l)
K_d = soil-water partition coefficient (l/kg)
θ_w = water-filled soil porosity (fraction)
θ_a = air-filled soil porosity (fraction)
ρ = bulk density (g/cm^3)
H = Henry's Law constant (dimensionless)

3.2 Input parameters

The model input parameters are shown in Table 3.1 (general parameters) and Table 3.2 (contaminant-specific input parameters). The models were run with no degradation in the sorbed phase (i.e. degradation was only allowed in the dissolved phase), which is a conservative approach.

When considering contaminant degradation, a range of values is usually provided by reference books, dependent on conditions such as the redox state of the environment. In these cases we conservatively assumed the longest given half-life, which usually corresponds to anaerobic conditions.

In general, model input parameters were based on those adopted by Atkins in the earliest derivation of soil re-use values, to provide consistency with previous approaches.

reen. 62.5 m represents the distance across 2 and a half grid squares, i.e. the travel distance from a backfill zone that is two removed from the reen.

[3] One thousand years is considered to represent a reasonably conservative time scale for any impacts to become apparent, and to allow a proportionate approach to contaminants that sorb to the extent that travel times are very long, in accordance with section 5.5 of the Remedial Targets Methodology (Environment Agency, 2006).

Table 3.1 General model parameters

Input parameters	symbol	value	Unit	Source
Plume thickness at source	Sy	1.98	m	Table 2-2 Atkins
Saturated aquifer thickness	da	2.1	m	Table 2-2 Atkins
Bulk density of aquifer materials	r	1.36	g/cm^3	Table 5-3 Atkins
Effective porosity of aquifer	n	0.08	fraction	Table 5.3.1 RL Remediation strategy
Water filled porosity	θ_w	0.5	fraction	Table 5-3 Atkins
Air filled porosity	θ_a	0.0037	fraction	Table 5-3 Atkins
Hydraulic gradient	i	0.0133	fraction	Table 5.3.1 RL Remediation strategy
Hydraulic conductivity of aquifer	K	1.00E-06	m/s	Hydraulic conductivity data given in RL, 2024[4]
Width of plume	S_z	25	m	Size of backfill zone
Distance to compliance point	x	12.5 37.5 62.5	m	
Time since pollutant entered groundwater	t	365,000	days	1,000 years

[4] Rodgers Leask, 2024, Phase 4H, Glan Llyn, Newport, Chemical Validation Report draft. Similar values have been reported from Phase 4A compound and Units 8-10 in the Commercial area.

Table 3.2 Contaminant-specific model parameters

Determinand	Commercial RL Soil re-use criteria[1]	Residential RL Soil re-use criteria[2]	Henry's Law Constant (H)[3]	Soil Organic Carbon-Water Partitioning Coefficient (koc)[3]	Solid/Liquid Partition Coefficient (Kd)[3]	Half life[4]	Commercial Compliance Target	Residential Compliance Target
Units	**mg/kg**	**mg/kg**	**(cm^3/cm^3)**	**(-)**	**l/kg**	**Days**	**mg/l**	**mg/l**
Inorganic Metals and Metalloids								
Arsenic	11,469	2,533	1	-	134	1.00E+99	85.352	18.851
Cadmium	331	73	1	-	776	1.00E+99	0.426	0.094
Chromium	42,699	9,431	1	-	5,336	1.00E+99	8.002	1.767
Copper	2,042	451	1	-	1,199	1.00E+99	1.703	0.376
Iron	1,379,516	304,690	1	-	810	1.00E+99	1,702.328	375.989
Lead	71,246	15,736	1	-	34,877	1.00E+99	2.043	0.451
Manganese	150,836	33,315	1	-	720	1.00E+99	209.386	46.247
Mercury	596	132	1	-	5,000	1.00E+99	0.119	0.026
Nickel	52,109	11,509	1	-	7,652	1.00E+99	6.810	1.504
Selenium	3,178	702	1	-	186	1.00E+99	17.051	3.767
Vanadium	7,271	1,606	1	-	213	1.00E+99	34.076	7.527
Zinc	622,690	137,532	1	-	33,558	1.00E+99	18.555	4.098
Other Inorganics								
Ammoniacal Nitrogen	699	154	1	-	1	1,095[5]	510.284	112.379
Cyanide	9	2	1	-	5	15[6]	1.702	0.372
Organics								
Benzene	17	4	0.182	27	1	720	17.081	3.769
Toluene	582	128	0.221	178	4	28	125.920	27.716
Ethylbenzene	364	80	0.300	432	10	228	34.051	7.492
Xylene	336	74	0.220	260	6	365	51.113	11.27

Determinand	Commercial RL Soil re-use criteria[1]	Residential RL Soil re-use criteria[2]	Henry's Law Constant (H)[3]	Soil Organic Carbon-Water Partitioning Coefficient (koc)[3]	Solid/Liquid Partition Coefficient (Kd)[3]	Half life[4]	Commercial Compliance Target	Residential Compliance Target
Units	**mg/kg**	**mg/kg**	**(cm^3/cm^3)**	**(-)**	**l/kg**	**Days**	**mg/l**	**mg/l**
Phenol	14	3	0.000068	29	1	28	13.063	2.836
TPH Criteria Working Group								
TPH Aliphatic C5-C6	331	73	33	794	19	8	16.989	3.752
TPH Aliphatic C6-C8	1,626	359	50	3,981	95	8	17.029	3.759
TPH Aliphatic C8-C10	12,861	2,841	80	31,623	755	8	17.021	3.760
TPH Aliphatic C10-C12	102,089	22,548	120	25,1189	5,996	365	17.024	3.760
TPH Aliphatic C12-C16	2,036,743	449,851	520	501,1872	119,643	730	17.023	3.760
TPH Aliphatic C16-C21	256,407,138	56,632,055	4,900	630,957,344	15,062,116	1.00E+99	17.023	3.760
TPH Aliphatic C21-C35	256,407,138	56,632,055	4,900	630,957,344	15,062,116	1.00E+99	17.023	3.760
TPH Aliphatic C35-C44	256,407,138	56,632,055	4,900	630,957,344	15,062,116	1.00E+99	17.023	3.760
TPH Aromatic C5-C7	39	9	0.230	79	2	730	16.269	3.589
TPH Aromatic C7-C8	802	177	0.270	251	6	28	125.878	27.79
TPH Aromatic C8-C10	650	144	0.480	1,585	38	365	16.949	3.753
TPH Aromatic C10-C12	1,027	227	0.140	2,512	60	258	17.013	3.760
TPH Aromatic C12-C16	2,043	451	0.0500	5,012	120	800	16.973	3.747
TPH Aromatic C16-C21	6,447	1,424	0.0100	15,849	378	120	17.039	3.764
TPH Aromatic C21-C35	51,166	11,301	0.000670	125,893	3,005	1,059	17.025	3.760
TPH Aromatic C35-C44	51,166	11,301	0.000670	125,893	3,005	1.00E+99	17.025	3.760
TPH Aromatic C40-C44	51,166	11,301	0.000670	125,893	3,005	1.00E+99	17.025	3.760
Polyaromatic Hydrocarbons								
Acenaphthene	76	17	0.00490	18,621	445	204	0.170	0.0375

Determinand	Commercial RL Soil re-use criteria[1]	Residential RL Soil re-use criteria[2]	Henry's Law Constant (H)[3]	Soil Organic Carbon-Water Partitioning Coefficient (koc)[3]	Solid/Liquid Partition Coefficient (Kd)[3]	Half life[4]	Commercial Compliance Target	Residential Compliance Target
Units	mg/kg	mg/kg	(cm^3/cm^3)	(-)	l/kg	Days	mg/l	mg/l
Acenaphthylene	135	30	0.00340	33,113	791	120	0.170	0.0379
Anthracene	155	34	0.00160	38,019	908	920	0.170	0.0374
Benzo(a)anthracene	2,748	607	0.000240	676,083	16,139	1,360	0.170	0.0376
Benzo(a)pyrene	156	34	0.0000190	426,580	10,183	2,120	0.0153	0.00334
Benzo(b)fluoranthene	15	3	0.000200	2,238,721	53,442	1,219	0.000289	0.0000636
Benzo(k)fluoranthene	23	5	0.0000340	3,311,311	79,047	4,280	0.000289	0.0000645
Benzo(g,h,i)perylene	60	13	0.0000300	8,709,636	207,915	1,300	0.000289	0.0000625
Chrysene	2,812	621	0.0000260	691,831	16,515	2,000	0.170	0.0376
Di-benz(a,h)anthracene	3,793	838	0.000000600	933,254	22,279	1,880	0.170	0.0376
Indeno(1,2,3-cd)pyrene	115	25	0.0000660	16,595,869	396,174	1,460	0.000289	0.0000631
Fluoranthene	30	7	0.000420	117,490	2,805	880	0.0107	0.00235
Fluorene	123	27	0.00320	30,200	721	120	0.170	0.0374
Naphthalene	124	27	0.0170	1,514	36	258	3.417	0.742
Phenanthrene	123	27	0.00130	30,200	721	402	0.170	0.0374
Pyrene	346	76	0.000370	85,114	2,032	3,796	0.170	0.0374

[1] Rodgers Leask (2019-22); [2] H Fraser Consulting (2024); [3] Rodgers Leask (2019-22), Appendix; [4] Howard et al. (1991); [5] Buss et al. (2004); [6] WFD UK Technical Advisory Group

3.3 Results

The RTM spreadsheet model can be applied to one contaminant and one transport distance at a time. With 59 contaminants and three distances, and different SRVs for the residential and commercial sites, the total number of models that were required for this report is therefore 354. The resulting reference values are given in Section 4. Appendix A provides the summarised outputs of the RTM assessments in more detail.

In both Section 4 and Appendix A, for each contaminant the remedial soil target is given at a distance of 12.5 m, 37.5 m, and 62.5 m from the compliance point. Two reference tables have been produced, one for the commercial site, and one for the residential site.

Some examples of the RTM spreadsheet calculations are provided electronically in Appendix B.

3.4 Statistical methodology

A summary of the general statistical methods referred to in the methodology is given here.

Box plots and histograms are used to present the range of data visually. Box plots show the minimum value of the data set, the range of data falling between the 25th and 75th percentile, the mean value and the maximum value. They are useful to visually assess whether the data points are evenly distributed throughout the range. Histograms show the data distributed by the number of data points within specific ranges and are useful for identifying the distribution of data across the range, and for identifying whether higher values are common or rare in the data set.

The 95th percentile of a dataset is the highest value in a set of data after removing the top 5% of values. Referred to in this report as the "95%ile".

For any data set, there is uncertainty associated with the estimate of the mean value; a conservative assessment of the mean value can be made by calculating a 95 % Upper Confidence Limit (UCL) in the mean. This will be done using Student's t-distribution method, which is appropriate for distributions with a small number of samples. The 95% upper confidence limit (UCL) is a probability statement that indicates a 95% confidence that the true population mean is less than or equal to the calculated UCL. This report refers to the 95% upper confidence limit in the mean value as "UCLmean".

For each 25x25 m backfill zone the UCLmean will be calculated by taking the average stockpile value for each 300 mm layer, and the average of any surface verification samples (taken from the top 100 mm) falling within that backfill zone. An overall weighted average and UCLmean will then be calculated for that whole soil profile in each backfill zone, with the layer and surface verification samples weighted by thickness (300 mm for each layer and 100 mm for the surface verification samples).

3.5 Summary of the approach

Generic modelling reference tables are developed in the next section, so that modelling is not required for each individual phase – rather the recorded values for each CoC can be checked against the reference tables.

Reference values in the tables are given for specific distances.

For each of the remaining site phases the following methodology will be implemented.

1. The 95%ile of all analytical results across the entire phase area (including stockpile and surface verification samples) will be calculated for all contaminants identified in the site-wide Remediation Strategy. These contaminants are as listed in Table 2.1.
2. The 95%ile value will be screened against the SRVs (Table 2.1). Any exceedances will be shortlisted as Contaminants of Concern (CoCs) for this phase and further assessment will be carried out.
3. Some CoCs are shown by the reference tables to have such slow travel times that they will not travel 12.5 m in the 1,000-year assessment period. These are marked "no impact" in the reference tables and they will be eliminated from the CoC shortlist.
4. For each remaining shortlisted CoC a thorough statistical and spatial analysis will be carried out. This will include the following:
    - Presentation of the entire data set as a box plot;
    - Presentation of the entire data set as a histogram; and
    - Spatial assessment of the data, with an average concentration and UCLmean concentration calculated for each 25x25 m backfill zone.
5. The UCLmean concentration for each 25x25 m backfill zone will be compared to the 12.5 m reference values. If any of the backfill zones exceed the reference values for 12.5 m, the UCLmean will be compared to the 37.5 m and the 62.5 m reference values tables as appropriate given the distance of the backfill zone from the nearest reen.

Table 4.1 and Table 4.2 in the following section set out the reference values for the residential and commercial parts of the site respectively. If any backfill zones are found to fail the relevant reference value checks, contingency actions will be required, as discussed in Section 3.6.

3.6 Contingency actions

Failure of backfilled soils to meet the appropriate reference values will require additional contingency action. Any such eventualities would need to be agreed on a case-by-case basis, since the appropriate actions may be different in each case.

The first contingency action would therefore be for the site owner to propose and for NRW to agree the appropriate work, given the specific circumstances of the failure. Appropriate works are likely to include one or more from the following list:

- further monitoring actions and additional soils testing to more closely define the soils in question;
- isolation of a volume of soils deemed to have failed the criteria;
- excavation and replacement of soils deemed to have failed the criteria; and
- installation of flow barriers (such as low permeability clays) to appropriately lengthen the flow pathway from such a source area to the reen system.

3.7 Validation of drainage layer

The Rogers Leask SRVs (and hence the new reference values in this report) were derived assuming that 60% of infiltration is intercepted by a drainage layer above the engineered fill. It is therefore important that the presence of a drainage layer comprising clean granular material (e.g. 6F5 or Type 1) is evidenced as follows:

- Materials import receipts including description of the materials
- Photographic evidence of the extent of the materials (e.g. aerial photographs)
- Photographic evidence of the type and depth of the materials on a 75 m x 75 m grid

The sequencing of site works is such that the drainage layer will be placed post-commencement of construction works, and will therefore need to be validated separately from the engineered fill materials.

3.8 Validation of hydraulic conductivity

The Rogers Leask SRVs assume that there is a sufficient contrast between the hydraulic conductivity of the drainage layer (high) and the engineered fill (low) that most of the infiltration travels laterally through the drainage layer. The calculations do not however specify a value for hydraulic conductivity. The reference values derived in this report assume a hydraulic conductivity of 1×10^{-6} m/d or less for the engineered fill.

It is proposed that the hydraulic conductivity of the fill is validated by taking at least three hydraulic conductivity measurements per phase, with a guide density of one test per 6.25 ha.

3.9 Groundwater sampling

Provided that there are sufficient soil samples available to have confidence in the quality of the soils materials, it is not considered necessary to provide groundwater sampling data to support discharge of PC28. [5]

[5] Note that groundwater monitoring may be required to support an application to discharge PC29, or to support an application for an environmental permit to discharge water from the reens to the wider environment. However, that is outside the scope of this report and will be dealt with separately.

4 REFERENCE TABLES FOR CONTAMINANTS OF CONCERN

In these tables the reference values shown are for comparison with UCLMean calculated soil concentrations in backfill zones at Glan Llyn.

Where a cell shows "No impact", the RTM spreadsheet predicts that the contaminant will not travel the indicated distance within the modelled time frame. (Where this occurs it results from a combination of the slow groundwater velocity, the degradation of the contaminant and its retardation (sorption) within the fill material.)

Other cell values show the remedial target for soil, calculated by the spreadsheet to meet the agreed soil reuse value at the reen margin. Where a cell shows ">1E+06" this means that the remedial target calculated is greater than 10^6 mg/kg, which cannot plausibly be reached.

4.1 Residential

Table 4.1 Residential phase reference tables, by distance from reen

	Remedial Target (Residential) mg/kg		
Contaminant	12.5 m	37.5 m	62.5 m
Metals and metalloids			
Arsenic	>1E+06	No impact	No impact
Cadmium	No impact	No impact	No impact
Chromium	No impact	No impact	No impact
Copper	No impact	No impact	No impact
Iron	No impact	No impact	No impact
Lead	No impact	No impact	No impact
Manganese	No impact	No impact	No impact
Mercury	No impact	No impact	No impact
Nickel	No impact	No impact	No impact
Selenium	>1E+06	No impact	No impact
Vanadium	No impact	No impact	No impact
Zinc	No impact	No impact	No impact
Other inorganics			
Ammoniacal Nitrogen	260.0	872.3	3,322
Cyanide	>1E+06	>1E+06	>1E+06
Organics			
Benzene	8.271	40.68	207.7
Ethylbenzene	703.5	20,947	466,939
Phenol	109,647	>1E+06	>1E+06
Toluene	>1E+06	>1E+06	>1E+06
Xylene	313.7	3,777	38,464
Petroleum hydrocarbons			
TPH Aliphatic C5-C6	>1E+06	>1E+06	>1E+06
TPH Aliphatic C6-C8	>1E+06	>1E+06	>1E+06
TPH Aliphatic C8-C10	No impact	No impact	No impact
TPH Aliphatic C10-C12	No impact	No impact	No impact
TPH Aliphatic C12-C16	No impact	No impact	No impact
TPH Aliphatic C16-C21	No impact	No impact	No impact
TPH Aliphatic C21-C35	No impact	No impact	No impact

Contaminant	Remedial Target (Residential) mg/kg		
	12.5 m	37.5 m	62.5 m
TPH Aliphatic C35-C44	No impact	No impact	No impact
TPH Aromatic C5-C7	18.32	88.80	448.6
TPH Aromatic C7-C8	>1E+06	>1E+06	>1E+06
TPH Aromatic C8-C10	1,558	>1E+06	>1E+06
TPH Aromatic C10-C12	17,730	>1E+06	No impact
TPH Aromatic C12-C16	>1E+06	No impact	No impact
TPH Aromatic C16-C21	No impact	No impact	No impact
TPH Aromatic C21-C35	No impact	No impact	No impact
TPH Aromatic C35-C44	No impact	No impact	No impact
TPH Aromatic C40-C44	No impact	No impact	No impact
Polyaromatic hydrocarbons			
Acenaphthene	No impact	No impact	No impact
Acenaphthylene	No impact	No impact	No impact
Anthracene	No impact	No impact	No impact
Benzo(a)anthracene	No impact	No impact	No impact
Benzo(a)pyrene	No impact	No impact	No impact
Benzo(b)fluoranthene	No impact	No impact	No impact
Benzo(g,h,i)perylene	No impact	No impact	No impact
Benzo(k)fluoranthene	No impact	No impact	No impact
Chrysene	No impact	No impact	No impact
Di-benz(a,h)anthracene	No impact	No impact	No impact
Fluoranthene	No impact	No impact	No impact
Fluorene	No impact	No impact	No impact
Indeno(1,2,3-cd)pyrene	No impact	No impact	No impact
Naphthalene	366.6	895,675	>1E+06
Phenanthrene	No impact	No impact	No impact
Pyrene	No impact	No impact	No impact

4.2 Commercial

Table 4.2 Commercial phase reference tables, by distance from reen

Contaminant	Remedial Target (Commercial) mg/kg		
	12.5 m	37.5 m	62.5 m
Metals and metalloids			
Arsenic	>1E+06	No impact	No impact
Cadmium	No impact	No impact	No impact
Chromium	No impact	No impact	No impact
Copper	No impact	No impact	No impact
Iron	No impact	No impact	No impact
Lead	No impact	No impact	No impact
Manganese	No impact	No impact	No impact
Mercury	No impact	No impact	No impact
Nickel	No impact	No impact	No impact
Selenium	>1E+06	No impact	No impact

Contaminant	Remedial Target (Commercial) mg/kg		
	12.5 m	37.5 m	62.5 m
Vanadium	No impact	No impact	No impact
Zinc	No impact	No impact	No impact
Other inorganics			
Ammoniacal Nitrogen	1,181	3,961	15,084
Cyanide	>1E+06	>1E+06	>1E+06
Organics			
Benzene	37.48	184.3	941.3
Toluene	>1E+06	>1E+06	>1E+06
Ethylbenzene	3,197	95,209	>1E+06
Xylene	1,423	17,137	174,505
Phenol	504,959	>1E+06	>1E+06
Petroleum hydrocarbons			
TPH Aliphatic C5-C6	>1E+06	>1E+06	>1E+06
TPH Aliphatic C6-C8	>1E+06	>1E+06	>1E+06
TPH Aliphatic C8-C10	No impact	No impact	No impact
TPH Aliphatic C10-C12	No impact	No impact	No impact
TPH Aliphatic C12-C16	No impact	No impact	No impact
TPH Aliphatic C16-C21	No impact	No impact	No impact
TPH Aliphatic C21-C35	No impact	No impact	No impact
TPH Aliphatic C35-C44	No impact	No impact	No impact
TPH Aromatic C5-C7	83.04	402.5	2,034
TPH Aromatic C7-C8	>1E+06	>1E+06	>1E+06
TPH Aromatic C8-C10	7,035	>1E+06	>1E+06
TPH Aromatic C10-C12	80,215	>1E+06	No impact
TPH Aromatic C12-C16	>1E+06	No impact	No impact
TPH Aromatic C16-C21	No impact	No impact	No impact
TPH Aromatic C21-C35	No impact	No impact	No impact
TPH Aromatic C35-C44	No impact	No impact	No impact
TPH Aromatic C40-C44	No impact	No impact	No impact
Polyaromatic hydrocarbons			
Acenaphthene	No impact	No impact	No impact
Acenaphthylene	No impact	No impact	No impact
Anthracene	No impact	No impact	No impact
Benzo(a)anthracene	No impact	No impact	No impact
Benzo(a)pyrene	No impact	No impact	No impact
Benzo(b)fluoranthene	No impact	No impact	No impact
Benzo(k)fluoranthene	No impact	No impact	No impact
Benzo(g,h,i)perylene	No impact	No impact	No impact
Chrysene	No impact	No impact	No impact
Di-benz(a,h)anthracene	No impact	No impact	No impact
Fluoranthene	No impact	No impact	No impact
Fluorene	No impact	No impact	No impact
Indeno(1,2,3-cd)pyrene	No impact	No impact	No impact
Naphthalene	1,687	>1E+06	>1E+06
Phenanthrene	No impact	No impact	No impact

Contaminant	Remedial Target (Commercial) mg/kg		
	12.5 m	37.5 m	62.5 m
Pyrene	No impact	No impact	No impact

5 VALIDATION REPORT AND DISCHARGE OF PLANNING CONDITION 28

It is proposed that, for each Phase, the discharge of PC28 is split into two parts as follows.

5.1 Discharge of PC28 Part 1

A validation report is to be submitted to demonstrate the quality of the engineered fill materials to include:

- Description of remediation activities
- Summary of soil movements (tickets for import and export of materials to be provided if relevant)
- Presentation of soils validation data (laboratory certificates and summary tables)
- Screening against RL SRVs to identify CoCs
- Statistical assessment and screening against reference values for CoCs
- Presentation of hydraulic conductivity data for the engineered fill

5.2 Discharge of PC28 Part 2

A validation report is to be submitted to demonstrate the presence, thickness and nature of the drainage layer, to include:

- A description of the works undertaken
- Materials import receipts including description of the materials (typically 6F2 or Type 1 materials)
- Photographic evidence of the extent of the materials (e.g. aerial photographs)
- Photographic evidence of the type and depth of the materials on a 75 m x 75 m grid (or finer grid as appropriate for the size of the plot)

6 REFERENCES

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HFCL, 2024. Glan Llyn, Llanwern: soil quality verification. Correction to calculated re-use criteria for soils at Glan Llyn (residential).

Howard, PH, Boethling, RS, Jarvis, WF, Meylan, WM and Michalenko, EM, 1991. Handbook of environmental degradation rates.

Rodgers Leask, 2019-2022: Glan Llyn Llanwern Sitewide: Controlled Waters DQRA 2019 Update.

Rodgers Leask, 2017: Glan Llyn surface water drainage strategy.

APPENDIX A

RTM modelling spreadsheet outputs (electronic)

APPENDIX B

Example RTM spreadsheets (electronic)

Appendix F – Glan Llyn Validation Plan

RLRE Consulting Engineers

Glan Llyn, Newport

Human Health and Controlled Waters Validation Plan

Glan Llyn, Newport

Human Health & Controlled Waters

Validation Plan

For

Brighton STM Developments Limited

DATE: May 2026

REV: P01

18669-RLL-26-XX-RP-O-0841

Document Reference & Control

Project Name:	**Glan Llyn, Newport**
Project Reference:	**P18-669**
Report Title:	**Human Health and Controlled Waters Validation Plan**
Client:	**Brighton STM Developments Limited**
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Approved by:	Howel Morris Director

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Appendices

- **Appendix A**: Drawings.
- **Appendix B**: RLL, Updated Controlled Waters Detailed Quantitative Risk Assessment.
- **Appendix C**: Atkins, Glan Llyn, Newport - Engineering Measures to Reduce Permeability & Infiltration.
- **Appendix D**: RLL, CWDQRA Validation Plan.
- **Appendix E**: H Fraser Consulting, Glan Llyn: Soils Validation Strategy for Protection of Controlled Waters.
- **Appendix F**: RLL, Glan Llyn Remediation Strategy.
- **Appendix G**: RLL, Glan Llyn, Remediation Strategy Addendum Information.

1.0 Introduction

1.1. Terms of Reference

This note has been prepared by Rodgers Leask Limited (RLL) on behalf of and for the benefit of Brighton STM Developments Limited (BSTMDL) to provide information pertaining to human health and controlled waters validation on the Glan Llyn Development (herein referred to as the Site). The Site location plan is shown on RLL Drawing 18669-RLL-22-XX-DR-O-0262, included in **Appendix A**.

In July 2024 the Client, St Modwen Developments were rebranded to be called Brighton STM Developments Limited. Any reference to the previous company names in this report should be referred to accordingly.

The site is large and has a complex history of investigation and assessment. This report acts as a signposting document for previous reports prepared to specify both the remediation and validation works required to facilitate the proposed development and mitigate identified potential risks to human health and controlled waters.

1.2. Purpose

This report has been prepared to support information presented pursuant to the discharge of Planning Condition 27 of the Outline Planning Permission Reference 06/0471 for the proposed development of residential development phases as part of a wider mixed-use development at Llanwern, Newport.

Planning Condition 27 states the following:

"(27) Prior to the commencement of each phase of development as defined by Condition 03 (or at such other date or stage in development or for such specified activities or works as may be agreed in writing with the Local Planning Authority), the following components of a scheme to deal with the risks associated with contamination relating to that phase or activity shall each be submitted to and approved, in writing, by the Local Planning Authority:

(1) A preliminary risk assessment which has identified:

(a) all previous uses;

(b) potential contaminants associated with those uses;

(c) a conceptual model of the site indicating sources, pathways and receptors;
(d) potentially unacceptable risks arising from contamination at the site.

(2) A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site.

(3) The site investigation results and the detailed risk assessment (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.

(4) A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in (3) are complete and identifying any requirements for longer term monitoring of pollutant linkages, maintenance and arrangements for contingency action. Any changes to these components require the express consent of the Local Planning Authority.

Reason: To ensure that the proposed development will not cause pollution of the environment or harm to human health."

The scope of this report is detailed in Section 1.3 below. It is considered that this report supports the reporting requirements for Condition 27 part 3 and part 4. Part 1 and part 2 will have been addressed in phase-specific Desk Study & Ground Investigation Reporting.

1.3. Objectives

The objective of this document is to outline the validation plan for residential phases within the Glan Llyn development. The validation works will aim to facilitate the proposed development and confirm that the identified potential risks to human health and controlled waters have been mitigated.

Information within this document has, on previous phases, been submitted within phase specific Remediation Strategies and phase specific Controlled Waters Detailed Quantitative Risk Assessments. Following recent PC27 submissions it was requested, by Natural Resources Wales (NRW), that details of the Validation Plan be summarised within one document and phase specific reporting to refer to one individual Validation Plan.

This report summarises the validation plan for both human health and controlled waters and appends the supporting documents, so that all relevant information is available in one place.

1.4. Reference Reports

Validation proposals have been based on the following sources of information, which should be referred to alongside the information in this report:

- RLL, Updated Controlled Waters Detailed Quantitative Risk Assessment, Glan Llyn, ref. 18669-RLE-19-RP-O-0006, dated August 2019 (**Appendix B**).
- Atkins, Glan Llyn, Newport - Engineering Measures to Reduce Permeability & Infiltration, ref. 5111373-LLA-OUT-0256, dated December 2016 (**Appendix C**).
- RLL, CWDQRA Validation Plan, ref. 18669-RLL-22-XX-RP-O-0260, dated June 2022 (**Appendix D**);
- H Fraser Consulting, Glan Llyn: Soils Validation Strategy for Protection of Controlled Waters, ref. 30937 R2, dated December 2024 (**Appendix E**).
- RLL, Glan Llyn Remediation Strategy, ref. 18669-RLL-21-XX-RP-O-0157, dated July 2022 (**Appendix F**); and
- RLL, Glan Llyn, Remediation Strategy Addendum Information, ref. 18669-RLL-22-XX-RP-O-0192, dated January 2022 (**Appendix G**).

1.5. Limitations and Confidentiality

All conclusions and recommendations made within this report are based on and limited to the factual information. No responsibility can be taken by RLL for information obtained by third parties and it has been assumed that all third-party information provided is true and correct.

No liability can be accepted for conditions not revealed within the exploratory holes or pits undertaken. The exploratory points cover only a small portion of the total Site area. RLL has, where necessary, undertaken extrapolation between locations and no responsibility can be taken for different conditions which may occur between locations.

RLL has undertaken the work in accordance with our understanding of current best practice at the time of undertaking the report. Further assessment and revision of the report may be required should new information come to light or legislation/ changes to best practice be introduced after the date of issue of the report. RLL has prepared the report for the sole use and reliance of the Client. The report may not be used or relied upon by any unauthorised third party without the explicit written agreement of RLL.

The work undertaken within this report remains the intellectual property of RLL and must not be divulged to any commercial third party without the prior written agreement of RLL.

2.0 Protection of Controlled Waters

The following reports should be referred to in relation to protection of controlled waters in the final development:

- RLL, Updated Controlled Waters Detailed Quantitative Risk Assessment, Glan Llyn, ref. 18669-RLE-19-RP-O-0006, dated August 2019 (**Appendix B**);
- Atkins, Glan Llyn, Newport - Engineering Measures to Reduce Permeability & Infiltration, ref. 5111373-LLA-OUT-0256, dated December 2016 (**Appendix C**);
- RLL, CWDQRA Validation Plan, ref. 18669-RLL-22-XX-RP-O-0260, dated June 2022 (**Appendix D**); and
- H Fraser Consulting, Glan Llyn: Soils Validation Strategy for Protection of Controlled Waters, ref. 30937 R2, dated December 2024 (**Appendix E**).

2.1. RLL CWDQRA Summary

In 2019, RLL prepared a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) for the wider Glan Llyn development site (**Appendix B**). This assessment incorporated a comprehensive dataset of concentrations of contamination recorded in soils across the development, and included data taken from the 2018 investigations within the Site. Screening analysis of soil, soil leachate, groundwater and surface water data revealed potential moderate to low levels of inorganic and organic contamination present onsite in line with contaminants associated with former steelworks sites. Made Ground comprising clayey sandy gravels with local slag, burnt shale, tarmac, concrete, brick and mudstone was found to be a potential source of contamination. Calculation of representative re-use criteria for a commercial end use was undertaken using a dilution assessment methodology based on the site-wide water balance, incorporating site specific permeability and infiltration parameters. No allowance was made for dilution of discharged waters within Monks' Ditch itself as part of this calculation as, this being the receptor, it is proposed that the water quality in this Controlled Water be maintained (as far as possible) at EQS values.

Comparison of the re-use criteria against available soil chemical testing established that much of the Made Ground was likely to be suitable for re-use onsite, however, localised source materials existed containing higher concentrations of contamination (particularly elevated concentrations of iron, manganese and vanadium), and ammoniacal and cyanide components, may require remediation, or offsite disposal.

Further modelling of these contaminants was undertaken using Remedial Target Methodology (RTM) to assess the potential extent of attenuation of these specific determinands within the ground where these soils may be placed, with the receiving surface waters being assumed to be existing blueways (reens), which were considered as the Compliance Points. The compliance point for the Business Park is at the pumping station and will require an enacted permit for discharge to occur.

Initial modelling was carried out by Atkins (Glan Llyn, Llanwern Controlled Waters Detailed Quantitative Risk Assessment dated February 2017), with this approach being adopted within later revisions of this Report in the Rodgers Leask, Controlled Waters Detailed Quantitative Risk Assessment, Glan Llyn (sitewide) Update (2019). Modelling used the Equation presented in the EA Table 5.2 – soil-water partitioning of the EA Remedial Targets Methodology Guidance (2006) where a pore-water concentration (Cp) was determined from soil concentration analyses to derive soil reuse criteria at the site as a whole. Subsequently, to gauge the potential distance that re-engineered Made Ground could be placed from the respective Compliance Point(s), further modelling was carried out for specific determinands using the EA RT Excel Worksheets, based on maximum and average soils concentrations determined within samples of re-engineered Made Ground and available site derived data.

2.2. Atkins, Engineering Measures to Reduce Permeability & Infiltration

Atkins prepared the Engineering Measures to Reduce Permeability & Infiltration Technical Note (**Appendix C**) in 2016, the note presented the engineering capability of the Made Ground on the site.

The Technical Note discussed how the reduction in permeability and infiltration would be achieved by reducing the permeability of the shallow Made Ground soils by excavation and re-compaction, and providing a fall across its upper surface; as well as the placement of an overlying granular material to create a preferential pathway to minimise the potential for infiltration of precipitation into the underlying re-engineered Made Ground.

The reduction in the permeability of the re-engineered Made Ground was proposed reduce the flow of groundwater through the Made Ground. This was intended to have the benefit of increasing the proportion of intercepted rainwater against water infiltrating through the Made Ground within the surface water drainage system. Thus, the surface water quality within the reens at the perimeters of the development plots would be improved.

The report outlined that the re-engineering of the plots will form a stable platform with a fall from the centre to the periphery, and the materials used

will produce a preferential pathway. Based on soakaway tests carried out in the re-engineered Made Ground, and the results of Particle Size Distribution (PSD) laboratory tests carried out on the material, the site won re-engineered Made Ground within the plots is assessed as having a permeability of approximately 1 x 10^{-7} m/s (i.e. poor permeability).

The overlying gravel layer to be placed above the re-engineered Made Ground is expected to have a permeability of 1 x10^{-3} m/s (good) based on the values for a material on the boundary between a clean gravel and a clean sand.

The reduced permeability of the Made Ground dramatically increases the transport time of the rainwater through the material, in contrast, a large volume of intercepted rainwater can reach the surface water reen system rapidly via the storm water drainage system.

2.3. RLL, CWDQRA Validation Plan

Technical Note 260, ref. 18669-RLL-22-XX-RP-O-0260 (**Appendix D**) presents a validation plan to assess the hydraulic conductivity of the reengineered Made Ground, as assumed within the CWDQRA. The note presented the use of earthworks compaction information alongside formation falling head tests and falling and rising head tests in boreholes, to assess the hydraulic conductivity of the reengineered Made Ground.

The report also incorporates the requirement for construction materials/ a piling mat with the suitable permeability characteristics in accordance with the CWDQRA & Remediation Strategy.

Earthworks Testing

The earthworks validation reports, prepared on a phase-by-phase basis, present test results to characterise the Made Ground and standard results for compaction and air voids validating that the compaction requirements have been achieved. It is considered helpful, as a line of evidence to support the poor drainage characterisation of the reengineered material, to undertake falling head tests, and where possible rising head tests, upon and within the reengineered material.

Formation Falling Head Tests

The formation falling head tests were proposed to be undertaken using a cylinder to hold a head of water against the formation surface.

Whilst the dimensions of the falling head test are not compliant with BRE Soakaway test, the monitoring and assessment will be undertaken in accordance with the BRE. The standard dimensions of the BRE Soakaway test would damage the formation and potentially be influenced by the underlying clay.

Falling and Rising Head Tests

Falling and rising head tests will be undertaken on shallow monitoring wells installed, following the earthworks, in the reengineered Made Ground. Up to 8 shallow monitoring locations will be installed in each phase.

Drainage Layer Above Made Ground

The CWDQRA describes the permeability of piling mat post construction. This (or similar material) provides the required drainage layer. The validation report shall include, as part of the developer obligations, confirmation or verification of construction material/ piling mat with the suitable permeability characteristics in accordance with the CWDQRA & Remediation Strategy.

2.4. HFCL, Glan Llyn: Soils Validation Strategy for Protection of Controlled Waters

Following queries from Natural Resources Wales (NRW), H Fraser Consulting Limited (HFCL) were commissioned by RLL to assist with NRW liaison and reporting pursuant to the discharge of PC28. Following discussion with NRW, RLL and the developer, HFCL prepared a revised methodology for the validation of soils in relation to the protection of controlled waters.

The assessment included standardised presentation of statistical data for potential contaminants of concern; and distance-specific remedial targets that model the attenuation of contaminants in the saturated zone allowing for advection, dispersion, retardation and decay during transport. In addition to the inclusion of distance-specific remedial targets, further statistical and spatial analysis was carried out on contaminants of concern.

More detail is provided in the HFCL Glan Llyn: Soils Validation Strategy for the Protection of Controlled Waters (30937 R2) (**Appendix E**).

3.0 Protection of Human Health

3.1. General

The following reports should be referred to in relation to risk to Human Health in the final development:

- RLL, Glan Llyn Remediation Strategy, ref. 18669-RLL-21-XX-RP-O-0157, dated July 2022 (**Appendix F**);
- RLL, Glan Llyn, Remediation Strategy Addendum Information, ref. 18669-RLL-22-XX-RP-O-0192, January 2022 (**Appendix G**)

3.2. Remediation Strategy

Summary

Based on the results of the previous ground investigations and CWDQRA, the approved sitewide Remediation Strategy (**Appendix F**) highlighted the key requirements for the remediation of the Site. These include the removal of significant sources of contamination, below ground obstructions and re-engineering of near-surface Made Ground to reduce infiltration for the protection of surface waters; and installation of a clean cover system for the protection of human health.

Remediation shall be confirmed using the methodology presented in the Validation of Remediation of Land Contamination - Science Report SC030114/R1 (Environment Agency, 2010).

A Validation Report shall be prepared on completion of the works. The Validation Report will be submitted to the Local Planning Authority pursuant to the discharge of relevant planning conditions.

Post-remediation ground gas/ vapour monitoring will be required to further zone the Site with regard to the required gas/ vapour protection measures.

Remediation Specification

The sequence of deliverables listed below is proposed:

- Materials Management Plan to enable the movement and re-use of excavated and stockpiled materials in accordance with the limitations set out in this document.

- Removal of vegetation.
- Excavation and turnover of Made Ground to natural clay and removal of unsuitable material and buried obstructions.
- Treatment or offsite disposal of impacted soils (where required).
- Chemical and geotechnical validation of the placement of material following turnover.
- Post remediation ground gas and vapour assessment.
- Preparation of a Remediation Validation Report.
- Regulator liaison and submission pursuant to the discharge of relevant planning conditions.
- Onward housebuilder obligations to include:
    a. Placement and validation of a clean cover system (where required).
    b. Provision and validation of appropriate gas/ vapour membranes in buildings (where required).
    c. Designing of appropriate concrete for aggressive ground.
    d. Installation of appropriate chemical resistant water pipes.

Protection of Human Health

The remedial criteria adopted for the clean cover system at the Site are based on S4ULs (suitable for use levels) and C4SLs (category 4 screening levels) for a residential end use with plant uptake.

It is likely that human exposure to contaminants during the operational phase of the development will be restricted to inhalation of dust and dermal contact/ ingestion of contaminants within gardens, public open spaces and soil adhering to home grown produce. Risks to human health may be mitigated through either excavation of the contaminants, provision of clean cover, or construction of hardstanding (or a combination of these); this is intended to prevent exposure to these contaminants and thus break the pollutant linkages.

The overall philosophy for remediation of the Site with regards to protection of human health is therefore severance of linkage pathways, by means of the removal of significant sources of contamination from the sub-surface and installation of a clean cover system or hardstanding in order to provide a safe development platform. This includes a turnover strategy as part of the earthworks. Additional measures, such as the provision of clean cover, soil-gas protection, water pipe protection etc, are then to be provided by the future housebuilder.

3.3. Remediation Strategy Addendum Information (Technical Note 0192)

Technical Note 0192, ref. 18669-RLL-22-XX-RP-O-0192 (**Appendix G**), presents additional information relating to the Remediation Strategy and sets out the process adopted to collect additional validation information to assess the contamination status of the formation surface.

The following points were addressed within the Technical Note, raised by Newport City Council as comments on the Remediation Strategy:

1. Pictorial versions of the earthworks process intended to enhance the conceptual site model (CSM) for the residential part of the development were presented.
2. Explanation of the removal of unsuitable material from the residential phases and the turnover and placement of retained suitable Made Ground in 300mm layers in relation to gas and vapour.
3. Presentation of the proposal to undertake surface validation testing to comply with the recommended testing frequency but also provide information to assess the contamination status of the formation surface.
4. Discussion relating to the clean cover system in POS areas, also requiring 600mm clean cover.
5. Presentation of the developer & housebuilder actions

3.4. Onward Developer Actions

A Validation Report of the remediation shall be prepared and submitted to the regulatory authorities pursuant to the discharge of planning conditions with respect to contaminated land. The Validation Report shall provide information on the works undertaken together with the supporting information and required onward mitigation measures (i.e. clean cover and ground gas membranes).

The following actions are deferred to the developer:

- Undertaking required remediation excavation works including buried obstruction removal;
- Treatment or offsite disposal of impacted soils (where required);
- Chemical and geotechnical validation of the turnover;
- Non-targeted grid validation sampling at a frequency of 1 sample per 500m3 of placed material;
- Delineation and validation of the base and sides of hotspot excavations;
- Delineation and surveying of obstructions / deeper areas of Made Ground encountered;

- Post remediation ground gas and vapour assessment;
- Preparation of a Remediation Validation Report; and
- Regulator liaison and submission pursuant to the discharge of relevant planning conditions.

3.5. Onward Housebuilder Actions

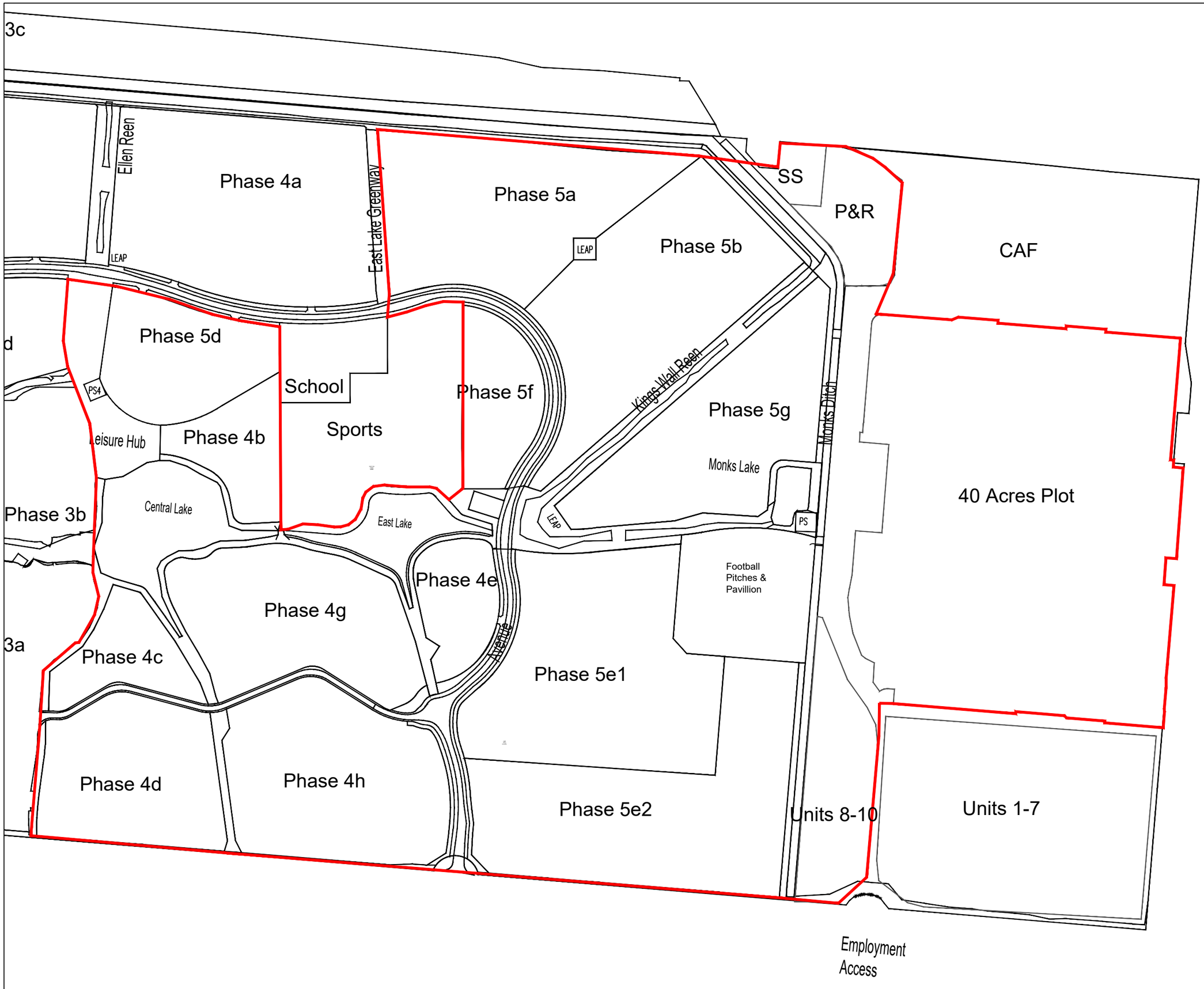
The following actions are deferred to the onward housebuilder:

- Placement of a clean cover system (600mm), construction materials (including piling mat), soils in residential gardens and areas of public open space as part of the overall development;
- Confirmation or verification of construction material/ piling mat with the suitable permeability characteristics in accordance with the CWDQRA & Remediation Strategy;
- Validation of the thickness and chemical composition of soils placed in gardens (as part of the clean cover system) in accordance with NHBC (or equivalent housing insurer) recommendations; and
- Provision of appropriate gas/ vapour membranes in buildings and validation in accordance with BS: 8485:2015+A1:2019 and CIRIA C735, if necessary.

Appendices

Appendix A

Drawings



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

- REMEDIATION STRATEGY BOUNDARY
- PHASE BOUNDARIES

Rev	Date	Amendments	By	Chk
A	03:05:22	Updated Boundary	SR	CW

Client

St Modwen Developments

Project

P18-669 Llanwern Reclamation

Drawing Title

Remediation Strategy Boundary Plan

INFORMATION

	Drawn	Checked	Date
NTS	SR	CW	27.04.22

Drawing No. — Rev.

18669-RLL-22-XX-DR-O-0262 A

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Appendix B:

RLL, Updated Controlled Waters Detailed Quantitative Risk Assessment

Glan Llyn Llanwern

Controlled Water DQRA 2019

Controlled Waters Detailed Quantitative Risk

Assessment

Glan Llyn Llanwern (Sitewide)

2019 Update

For

St. Modwen Developments

DATE: August 2019

REV: A

18669-RLE-19-RP-O-0006

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Approval Status	Name & Position
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Revision Status	Date	Summary of Revision	Revision by:

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Appendices

Appendix A: RLEs Reclamation Performance Specification

Appendix B: Atkins Permeability Technical Note

Appendix C: Groundwater Levels Monitoring

Appendix D: Glan Llyn Diagrammatic CSM

Appendix E: Soils Analysis

Appendix F: Sampling Location Plans

Appendix G: Soil Leachate Analysis

Appendix H: Surface Waters Analysis

Appendix I: Chemical Input Parameters and Justifications

Appendix J: Table 5-4 CWDQRA Reuse Criteria for 5% & 40% Infiltration

Appendix K: Level 3 Groundwater Excel Worksheets

Drawings

Drawing 186669-RLE-19-XX-DR-O-0004 – Site Location Plan

Drawing 8111-008-A011 – Showing Proposed Site Redevelopment

Drawing 5111373-LLA-DWG-EG-0295 – CWRA Borehole Location Plan

Drawing 5111373-LLA-DWG-EG-0408 - Current Surface Water Drainage and Sampling Locations

Drawing D12-084-512 – Post-development Surface Water Drainage Plan

1.0 Introduction

Rodgers Leask Environmental Ltd (RLE) has been commissioned by St Modwen Developments Ltd (St Modwen) to update and further develop a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) of the potential risk to Controlled Waters for the Glan Llyn development at Llanwern, Newport (herein referred to as the site). The previous version of this CWDQRA was prepared by Atkins Limited (Atkins), the latest version of which was identified as: Document Reference: 5111373-LLA-OUT-0257, Version: 3 and dated February 2017. It is recommended that reference be made to the aforementioned Atkins Report, in order to obtain greater detail on the known/documented Reporting background to this site.

The principal objectives of the current exercise is to provide, as practicably possible, future surface water flow contributions from the site are compliant upon entry in to the Monks' Ditch, surface water course, which bisects the site, following the redevelopment of the Glan Llyn site for mixed residential and commercial redevelopment and further limiting the amount of material which require off-site removal by virtue of its contaminative potential towards local Controlled Waters.

These introductory comments provide a narrative and rationale for the assumptions made within this updated model, and also provide considerations relating to the temporary management of the water whilst redevelopment is being undertaken, and sustainability of the brownfield project.

As alluded above, an interim state will exist where the site has been reclaimed, but full residential and commercial development is under construction. The reclamation, in terms of surface water quality, will be at its most effective when it is fully developed. The underlying natural clay currently provides a barrier to downward migration of water and the reens (surface water ditches) which are cut into the natural clay and/or peat, drain the water within the Made Ground.

1.1. Atkins Controlled Waters Detailed Quantitative Risk Assessment of 2016

The initial DQCWRA prepared by Atkins (Version: 3 and dated February 2017), was issued with the intention that, as site specific information was collected, the assessment would be reviewed and updated. It was described as the starting point and that the criteria were understood to be conservative. The CWDQRA modelled two site conditions for the mixed use development comprising; residential and commercial end usage.

The residential end use was assumed to have a rainwater interception/ infiltration ratio of 60:40. The commercial end use was assumed to have a rainwater interception/ infiltration ratio of 95:5. The interception is where roofs, roads and hard paving take the rain water and transfer it directly into the surface water reens. The infiltration is where rainwater lands

on grassed or landscaped areas and is able to percolate into the construction material (soils, piling mat, sub base etc) and underlying post-development Made Ground. The current evapotranspiration rate for grassed areas is estimated as 600mm/a against an annual rainfall rate of 953mm/a. The earlier Atkins value utilised, (applicable to permeable areas) was; 416mm/annually.

The Atkins CWDQRA, that generated the initial criteria, assumed that 100% of the infiltrated rainwater (12.85mm per year or 1.3% of total rainfall) mm/a) percolated through the construction material and in to the Made Ground.

Upon derivation of their soil re-use criteria (calculated to be expressed as mg/kg for direct comparison against actual soil analytical data obtained), it was previously noted by Atkins in their 2017 CWDQRA Report and demonstrated in their associated Table 5.5, that the maximum and average soil sample concentrations exhibit some exceedances for inorganic compounds, copper and vanadium. It was also noted that there were exceedances in surface water analyses for iron, manganese, cyanide, and ammoniacal nitrogen. Although these had not been previously analysed by Atkins in soil samples, subsequent analyses has included these determinands.

Exceedances were also noted in soil samples analysed for organic compounds, especially C_{12}-C_{35} species aromatic TPH (total petroleum hydrocarbons), and a number of PAH (polynuclear aromatic hydrocarbon) species as compared to the derived soil re-use criteria. Concentrations of PAHs present in actual soil analytical data obtained were, in some cases, over one order of magnitude in excess of the calculated re-use criteria, suggesting that attenuation, particularly of heavy fraction TPH and PAHs is likely to be an issue on this site requiring further consideration as part of the proposed remedial and redevelopment works. Although previous analyses of soil samples undertaken by Atkins did not include phenols, recent analyses has included this determined.

1.2. Rationale for Updated Model

The principal rationales for reviewing the model that generated the initial criteria have been:

1. The amount of additional field, site specific, data collected since preparation of the earlier Atkins CWDQRA;

2. The remedial benefits of the currently proposed pre-development turnover and reengineering process were not included in the earlier Atkins CWDQRA. Further details of this proposed Made Ground re-engineering strategy to be employed are provided by Rodgers Leask Environmental Ltd in their Reclamation Performance Specification A – Turnover – Technical Note, dated 14/12/18, Ref: 17480-RLE-18-XX-RP-O-1016). A copy of this Technical Note is provided in **Appendix A** to the current Report.

The large and increasing amount of site specific field data for soils and surface waters has provided further confirmation that the criteria, which is based on theoretical values, is conservative. This is indicated where chemical results for soil placed do not appear to deliver the modelled concentrations to the surface water. The undeveloped site is currently at a worst case scenario where rainfall is free to percolate through material that has not been reengineered. Reengineering and redevelopment will only reduce infiltration and mobilisation serving to improve the currently monitored conditions.

In 2016, geotechnical information relating to the permeability of the Made Ground was assessed (Atkins Ltd Permeability Infiltration Technical Note Ref: 5111373-LLA-OUT-0256, dated 15th December 2016), but this was not used in the model for the Atkins 2017 CWDQRA. A copy of this Technical Note is provided in **Appendix B** of the current Report. The Atkins Ltd Technical Note presented information on the characteristics of the reengineered ground. The earthworks specification for the placement of material (following the turnover to natural clay), requires particle size distribution (PSD) tests, density tests, compaction tests and air void tests on each layer to validate the material has been compacted sufficiently. The particle size distribution within the Made Ground is known to be well graded and when compacted, the permeability is assessed as having a low permeability/poor drainage potential. A number of falling head tests were undertaken within a reengineered plot, which returned failed test results. The reengineering therefore has a remediation/stabilising benefit, by creating a low permeability material and this can be validated by the geotechnical information already collected.

ln contrast to the reengineered ground, the construction materials (6F2 piling mat & clean soils) placed above the Made Ground are likely to be of good drainage potential (if they are not, then they will only serve to further limit the downward migration of rainwater).

The low permeability reengineered material inhibits the downward migration of infiltrated rainwater as the pore water in the construction material does not readily flow into the material with much reduced pore spaces (air voids <10%). Lowering the permeability of this material also greatly increases time taken by the perched water to travel within the material.

The engineered characteristics have two distinct remedial benefits as follows:

1. The volume of infiltrated water entering the body of reengineered Made Ground is reduced, therefore the volume of water exposed to mobile contaminants is also reduced;
2. The time taken for migration of the perched water within the reengineered ground is greatly increased and therefore, the volume of perched water reaching the surface water via this route is reduced, increasing the ratio of clean rainwater in the surface water reens. Where this passage is also through areas of cleaner reengineered Made Ground, there are likely to be benefits associated with increased contamination attenuation prior to reen discharge. These are the areas of the site where some retardation (degradation and/or sorption) of contaminants within the Made Ground is

considered possible. On this basis it is proposed to place 'cleaner' Made Ground closer to the reens which are known to be the surface water receptors for the perched waters.

The Atkins CWDQRA, that generated the initial criteria, assumed that in areas of soft landscaping, 100% of the infiltrated rainwater (12.85mm per year or 1.3% of total rainfall) percolated through the construction material (imported top soils) and in to the Made Ground. This value takes account of estimated surface-water run-off (55% of total rainfall) and evapotranspiration (43.7% of total rainfall). It is considered likely that the lowest achievable, permeability of the post-development Made Ground is like to be in the region of ($1x10^{-7}$ m/s).

It was also apparent in the Atkins CWDQRA and Conceptual Site Model that although lateral drainage within the capping layer was anticipated, this wasn't accounted for in the calculations, where it assumed that essentially all (1.3% of the total rainwater) passed into the underlying post-development Made Ground. It is therefore reasonable to assume that a reduction in infiltration into post-development Made Ground will be enabled by the placement of higher permeability ground surface construction materials (imported soils) and any possible introduced gradient within this layer which will encourage an element of lateral flow.

In order to gauge potential impacts on the existing calculated soil reuse criteria, a process of sensitivity analyses was therefore proposed using possible scenarios where 40% of the 12.85mm per year (5.14mm/year) or 5% (0.64mm/year) penetrates into the underlying post-development Made Ground. It is recognised that this modelling is of a further potential reduction in what is already, apparently, a low rate of rainwater infiltration (1.3% of total rainfall). Reuse criteria would then be derived for the range of determinands previously selected by Atkins, and it was proposed that these criteria now also include iron, manganese, cyanide, ammoniacal nitrogen and phenol, which would be modelled in current revision to the Report.

It was considered that the very low 5% (0.64mm/year) infiltration rate may not necessarily be achievable, but was introduced as a mechanism to reflect distance from the surface water receptors (existing reens), and effectively represent a greater travel of infiltrated water. It was proposed that the findings should be superseded by modelled travel time parameters, when appropriate, and from this would be derived what would be considered to be realistic achievable soil reuse criteria.

1.3 Natural Attenuation from Site Features

It is also considered that there is a potential for natural attenuation benefits from further improving and expanding the existing surface water features on the site, which mainly comprise reens and ponds/small lakes. This is anticipated particularly through:

1. Further establishing the vegetation within the reens which will help reduce the concentrations of organic contaminants and particularly nutrients such as ammoniacal

nitrogen. The reens are known to vegetate rapidly and require regular maintenance to remove surplus growth;

2. Undertaking organic matter enrichment of soils along margins of the reens and ponds/lakes into which water penetrating the Made Ground are likely to discharge. This could be undertaken by placement of locally excavated peat (obtained from Alluvial and underlying Tidal Flat Deposits) and other soils containing high concentrations of organic matter. This should enable a further stripping out of low concentrations of PAHs and TPH within these discharge waters. Amendment of these soils with other materials will also be considered, taking into consideration further knowledge of the residual contaminant profile, in order to provide a passive sustainable solution to the long-term remediation of this site.

2.0 Site History and Environmental Setting

2.1 Site Setting

The Glan Llyn development site is located south of Llanwern, immediately east of Newport at National Grid Reference (NGR) ST 36101 86848. The site covers an area of approximately 243 ha which comprises previously developed land (Section 2.2). The site is bound to the north by a railway line and to the south by Queen's Way (A4810). The operational Tata steelworks is located adjacent to the eastern boundary and a north-south drainage ditch borders the western boundary, beyond which lies Newport Retail Park. A plan showing the site's location is presented on Drawing 18669-RLE-19-XX-DR-O-0004. The site is proposed to be redeveloped as a mixed residential and commercial development (Drawing8111-008-A0111). Residential development is proposed for the majority of the site, whilst commercial development is limited to the Celtic Business Park area in the east of the site (Drawing 8111-008-A0111).). A copy of this Drawing is provided to the rear of this Report.

2.2 Site History

Details of the documented site history are provided in the above-noted Atkins CWDQRA Report dated February 2017. However, in summary, the site was extensively developed as a steelworks by Richard Thomas and Baldwins Ltd in the 1960s. Prior to construction, marshland and arable farmland within the site boundary was subject to significant land raise and engineering to bring ground level to current levels. Within the confines of the development site, steelworks ancillaries included but were not limited to; mineral stockyards, blast furnaces, offices, railway sidings, a 'Bit Mac' plant and coking works. Steel making operations ceased in the western half of the steelworks site in 2001, with the majority of infrastructure demolished in 2004, following land transfer to St. Modwen Developments Ltd.

It is much of the material used as part of this pre-development land raise, together with demolished former steelworks buildings and structures that comprise the existing Made Ground across the site, which will be subject to the proposed reengineering and compaction works associated with this redevelopment.

Approximately 20% of the development has been completed up to August 2019, including near completion of two residential phases (Phase 1 & Phase 2), the construction of two commercial units (Amazon & CAF), the park and a pub within the Western Sub Area.

2.3 Geology

2.3.1. Published Geology

The BGS GeoIndex (BGS, 2016a) indicates that Superficial Tidal Flat Deposits comprising clays and silts underlie the areas of interest. The BGS Lexicon of Named Rock Units (BGS, 2016b)

describes these deposits as: *'normally a consolidated soft silty clay, with layers of sand, gravel and peat. Characteristically low relief; from the tidal zone'* Bedrock geology underlying the areas of interest comprises mudstones of the Mercia Mudstone Group (BGS, 2016a); the BGS Lexicon of Named Rock Units (BGS, 2016b) describes the Mercia Mudstone as: *'dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite* [are] *widespread, sandstones are also present.'* Given the history of development within the areas of interest, it is anticipated that a layer of Made Ground will be present across the proposed developments.

2.3.2. Local Geology

The Glan Llyn development site benefits from several phases of GI and the ground model for the site is well constrained. For ease of discussion and brevity, a summary of local geology underlying the site is presented in Atkins Table 2-1 below (reproduced from their February 2017 Report). However, a full discussion of local geology within each development phase is presented in the respective "Ground Investigation and Ground Conditions" section of the geo environmental reports (Atkins; 2015b, 2015c, 2015d). Boreholes drilled as part of the 2016 CWRA Ground Investigation (IFA, 2016) confirm the presence of Made Ground, Tidal Flat Deposits and Bedrock across the site, as outlined in Table2-1 below.

Table 2-1 Summary of Local Geology (Atkins, 2015 a)

Geological Unit		Indicative Geological Composition	Approximate Thickness
Topsoil		Soft brown slightly sandy clay.	Nominal thickness, only locally
Made Ground	Made Ground 1	Grey occasionally clayey, sandy gravel of and angular to sub-angular fine to coarse slag with occasional tarmac, concrete, brick, limestone and ceramic / fused slag.	0.02 2.6 m
	Made Ground 2	Red brown / brown clayey sandy gravel (locally gravelly sand) with cobbles and boulders	
	Made Ground 3	Red brown / brown soft to firm sandy gravelly clay with cobbles and boulders. Gravel includes sub-rounded to angular fine to coarse burnt shale, brick, slag, sandstone, mudstone, shale and occasional coal.	
Tidal Flat Deposits	Upper Tidal Clay	Generally very soft to firm blue grey slightly gravelly silty clay with rare localised pockets of peat.	7 – 10 m (IFA, 2016)
	Upper Peat	Generally a spongy dark brown occasionally clayey pseudo-fibrous to fibrous peat.	
	Lower Peat	Generally a spongy to plastic dark brown occasionally clayey occasionally sandy pseudo-fibrous to amorphous peat.	
	Lower Tidal Clay	Generally described as a soft to firm bluish grey slightly sandy slightly gravelly clay gravel is of angular to sub-angular fine to medium sandstone.	
	Red Clay	Generally described as a firm to stiff red brown mottled grey slight gravelly clay, gravel is angular to sub-angular fine to coarse mudstone.	
	Basal Sand	Generally a medium dense light brown slightly silty slightly gravelly fine grained sand the gravel is of sub-rounded to sub-angular fine siltstone and quartzite.	
Bedrock	Mercia Mudstone Group	Weathered Mercia Mudstone being described as stiff to very stiff reddish brown slightly gravelly clay and extremely weak to weak occasionally laminated red brown mudstone.	Encountered, thickness not proven

2.3.3 Post-development Ground Conditions

The post-development ground conditions on site are as detailed in Table 2-2 below. Existing Made Ground is to be excavated and re-compacted to comply with the Atkins geotechnical specification for the development (Atkins, 2016b). In addition, it was proposed that a 1 in 100 gradient (0.01) be applied to the surface of the Made Ground to prevent ponding and promote lateral drainage within the construction materials.

Potential further mitigation to promote lateral flow that may be considered is the provision of a drainage blanket to cap the reengineered material and increasing the fall from the centre of a plot to periphery.

Table 2-2 Post-Development Ground Conditions

Unit	Approximate Thickness	Description
Impermeable Construction Materials/ Housing Sub-base/Permeable Topsoil	0.6 m	Imported clean topsoil/construction materials
Piling Mat*	0.5 m	Imported 6F2 (*may be included within 600mm of construction materials)
Made Ground	1.5 – 2.0 m	Excavated and re-compacted Made Ground
Tidal Flat Deposits	7.0 – 10.0 m	No change from current conditions
Bedrock (Mercia Mudstone Group)	>1,350m	No change from current conditions

2.4 Hydrogeology

The following details are based upon information presented in the Atkins 2017 Report, and reviewed again prior to preparation of the current update.

2.4.1. Published Hydrogeology

Groundwater maps previously available on the Environment Agency website (Atkins, 2015a) show that the Mercia Mudstone bedrock deposits below the proposed developments are classified as a Secondary B Aquifer. The Environment Agency define a Secondary B Aquifer as being: *'predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.'*

The Tidal Flat Deposits are classified as non-productive strata which are defined by the Environment Agency as being: *'deposits with low permeability that have negligible significance for water supply or river base flow'.*

It is understood from investigations carried out by Atkins that the Environment Agency website indicated that there were no groundwater abstractions within 1 km of the proposed developments. Information presented on the GroundSure Enviro Data Viewer website (http://groundsure.io/), accessed August 2019, indicates that the Site is not located within a Groundwater Source Protection Zone (SPZ).

2.4.2. Local Hydrogeology

A site-wide programme of monthly groundwater level monitoring was undertaken from May to November 2016 in the shallow and deep wells installed during the CWRA GI (Drawing 5111373-LLA-DWG-EG-0295) to inform the hydrogeological conceptual site model. A copy of this Drawing is provided in the Appendices to the current Report.

This monthly monitoring was subsequently continued until 2017.

A summary of groundwater levels recorded in the deep and shallow wells were presented in Appendix A of the Atkins 2017 CWDQRA Report and are reproduced in the current Report (**Appendix C**). It is indicated that groundwater level monitoring and water strike data recorded during the Ground Investigations (GI) of each site development phase, were presented in the "Ground Investigation and Ground Conditions" section of the relevant geo-environmental Report (Atkins; 2015b, 2015c, 2015d); and are summarised in the CWRA Position Statement (Atkins, 2015a).

It was considered that groundwater levels recorded during the CWRA GI and subsequent monitoring suggested that the groundwater is present beneath the proposed development as follows (Atkins, 2015a):

- Shallow / perched groundwater within the Made Ground (shallow boreholes); and
- Groundwater within the Tidal Flat Deposits (confined to the basal sand layers) and Mercia Mudstone (deep boreholes).

Groundwater monitored within the deep boreholes was considered to be primarily derived from the bedrock geology, and hydraulic continuity between the upper perched shallow groundwater and 'regional' groundwater was considered likely to be limited. Post-development, the excavation and re-compaction of the Made Ground was recognised as likely to reduce its permeability, lowering still further, the hydraulic continuity.

The permeability of the reengineered material based on the compaction necessary to attain the requirements of the specification is likely to consistently achieve low permeability or poor drainage characteristics. This is likely to be a permeability of 10^{-7} m/s.

Downward percolation of water through the Tidal Flat Deposits was considered to be limited due to the low permeability of the clay-rich strata. This is likely to cause water to accumulate within the overlying Made Ground. Regional groundwater within the Basal Sands of the Tidal Flat Deposits and Mercia Mudstone bedrock is confined by the overlying clay within the Tidal Flat Deposits and is under sub-artesian pressure (Atkins, 2015a). These conditions are further confirmed by the presence of water strikes consistent with the top of the Mudstone/Basal Sands which rose several metres within a short time period (IFA, 2016).

Where the piezometric level in the regional aquifer is higher than shallow perched water then the shallow perched water system is likely to be hydraulically contained with limited downward leakage permitted. However, it is unknown how groundwater conditions will change throughout the hydraulic year within the post-development site. As outlined by Atkins (2015a), during hydraulic conditions where the piezometric level is below the level of the shallow perched water, slow downward migration of this water through the Tidal Flat

Deposits is to be expected. Table 2-4 of the Atkins 2017 CWDQRA Report, below (reproduced from their February 2017 Report), presents deep – shallow groundwater levels (mAOD) for the available groundwater level data across the site. It was indicated by Atkins that based on a review of the water levels in the deep and shallow borehole pairs, there are examples of both conditions being present at the proposed development site during all 2016 monitoring rounds. It was indicated that the majority of differences between piezometric levels are less than half a metre across the site, with only four occurrences where shallow piezometric levels are at or greater than 1.00m than deep levels (BH05 03/11/16, BH06 03/11/16, BH21 05/10/16 and 07/07/16, BH30 05/10/16).

Table 2-4 Deep and Shallow Groundwater Level Comparison

Deep Borehole	Shallow Borehole	Deep Groundwater Level (mAOD) – Shallow Groundwater Level (mAOD)*						
		10/05/2016	06/06/2016	07/07/2016	02/08/2016	01/09/2016	05/10/2016	03/11/2016
CWCP-03	CWWS-03	0.195	0.005	-0.145	0.035	-0.025	n/a	-0.305
CWCP-04	CWWS-04	-0.264	-0.764	-0.664	-0.584	-0.544	n/a	-0.774
CWCP-05	CWWS-05	0.181	-0.819	n/a	-0.429	-0.659	-0.769	-1.069
CWCP-06	CWWS-06	n/a	n/a	n/a	-0.336	n/a	n/a	-1.186
CWCP-07	CWWS-07	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-08	CWWS-08	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-09	CWWS-09	0.018	-0.682	-0.982	0.068	-0.162	-0.122	-0.432
CWCP-10	CWWS-10	-0.089	n/a	n/a	-0.279	-0.389	-0.399	-0.419
CWCP-11	CWWS-11	0.048	0.018	-0.012	-0.092	0.018	-0.032	-0.012
CWCP-12	CWWS-12	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-13	CWWS-13	-0.904	-0.834	-0.984	-0.844	-0.894	-0.774	-0.864
CWCP-14	CWWS-14	0.008	0.078	-0.022	-0.112	-0.002	-0.212	-0.132
CWCP-15	CWWS-15	0.078	0.118	0.668	-0.032	0.178	-0.242	0.108
CWCP-18	CWWS-18	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-19	CWWS-19	-0.112	-0.072	-0.232	-0.082	-0.182	-0.252	-0.112
CWCP-20	CWWS-20	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-21	CWWS-21	-0.93	-0.77	-1.06	0.34	-0.82	-1.18	n/a
CWCP-22	CWWS-22	-0.818	0.152	0.002	0.682	0.232	-0.088	-0.048
CWCP-23	CWWS-23	0.526	0.596	0.856	0.146	0.036	0.036	0.026
CWCP-24	CWWS-24	0.607	0.127	0.117	-0.013	0.127	n/a	-0.253
CWCP-25	CWWS-25	-0.617	-0.257	-0.247	-0.397	-0.337	0.553	-0.637
CWCP-26-e	CWWS-26-e	-0.006	0.014	-0.196	-0.116	-0.156	-1.196	-0.206
CWCP-26-w	CWWS-26-w	0.525	0.365	0.345	0.325	0.155	0.675	-0.305
CWCP-27	CWWS-27	n/a	-0.09	-0.1	-0.17	-0.15	-0.31	-0.36
CWCP-28	CWWS-28	0.189	0.069	0.039	-0.021	0.179	0.069	0.219
CWCP-29	CWWS-29	-0.193	-0.363	-0.413	-0.263	-0.383	0.487	-0.553
CWCP-30	CWWS-30	0.38	0.17	0.15	0.2	-1	0	0.13
CWCP-31	CWWS-31	-0.298	-0.328	-0.398	n/a	-1.088	-0.388	-0.508
CWCP-32	CWWS-32	-0.562	-0.452	-0.552	-0.702	-0.702	-0.562	-0.552
CWCP-34	CWWS-34	n/a	n/a	n/a	n/a	n/a	-5.468	n/a
CWCP-35	CWWS-35	-0.27	-0.47	-0.47	-0.36	0.6	-0.51	-0.44
CWCP-36	CWWS-36	n/a	-0.165	-0.295	n/a	-0.385	n/a	n/a

*n/a indicates no two corresponding samples available for comparison (i.e. dry borehole/no data), where value is negative deep groundwater levels are lower than shallow, positive values indicate deep groundwater levels above shallow.

Further analysis of regional groundwater data (13/10/2015) from the boreholes installed into the bedrock geology was undertaken in the CWRA Position Statement (Atkins, 2015a). Deep groundwater contours produced suggest a regional groundwater flow direction towards the south and south east towards the estuary of the River Severn, which is broadly expected. This is confirmed by analysis of recent groundwater level monitoring data.

Review of the shallow perched water system indicates that it is likely to be extremely complex with no discernible single flow direction (Atkins, 2015a). The Made Ground is known to be highly heterogeneous (Table 2-1), resultant flow of perched water is likely to be discontinuous and tortuous through permeable and connected pathways only. In addition, flow within the Made Ground is fragmented across the site by the extensive network of surface water drainage ditches (reens) across the site (Section 2.5.1); it is anticipated that flow converges towards these surface water features where permeable pathways exist within the Made Ground. As a result of natural clay lining of the reens around the periphery of the site (Section 2.5.1), no lateral hydraulic connection exists between the Made Ground onsite and surrounding superficial deposits.

2.4.2.1. Hydrogeological Properties

Capping Drainage Layer

The gravels of the capping drainage layer are expected to have a permeability of approximately 1x10-3 m/s (Freeze and Cherry, 1979), assuming the material to have good drainage characteristics consistent with a clean gravel/sand (Atkins, 2016b).

Made Ground

It was indicated by Atkins, that soakaway tests undertaken within the re-engineered Made Ground onsite (in accordance with BRE 365 (BRE, 2007)) produced very little seepage and therefore analysis of results was not possible. It was noted that composition of the Made Ground as indicated by Particle Size Distribution (PSD) laboratory tests approximate the hydraulic conductivity of the post-development Made Ground at 1x10-7 m/s (Atkins, 2016b). It was therefore indicated that the assigned hydraulic conductivity of the re-engineered Made Ground be based on the values included within Barnes (2010) for a material with poor drainage characteristics as indicated by the soakaway tests. It was noted that this value is consistent with previous analysis undertaken by Atkins. The results of these tests are presented in Table 2-5, as reproduced below.

Table 2.5: Properties of the Re-engineered Made Ground

Made Ground	PSD No./ Average	BRE Soakaway Test Result	Adopted Permeability(*k*)
Test 1	102 No./ 11% fines, 22% sand, 62% gravel, 5% cobbles	Fell 4mm in 3hrs	1 x 10^{-7} m/s
Test 2		Fell 20mm in 2hrs	1 x 10^{-7} m/s

2.5. Hydrology

2.5.1. Surface Water Features

It was previously indicated by Atkins that, the surface water drainage onsite comprises several man-made surface water drainage ditches (reens) cut into the natural clay which divide the site north to south, receiving water from the land to the north in addition to onsite drainage and baseflow. A maximum channel flow of 10.64 l/s was previously recorded at sampling location D5N. The reens are connected to east-west drains which run the length of the site along the A4810 (Queen's Way Road) within 50 m from the southern boundary and the northern carrier drain within the site adjacent to the northern boundary(Drawing 5111373-LLA-DWG-EG-0408); ultimately discharging to the water treatment works at the operational Tata steelworks to the east. Drawing 5111373-LLA-DWG-EG-0408 depicts the current surface water drainage onsite and indicates sampling locations.

Monks' Ditch, a main river (Waterbody ID GB109056026850) crosses the site flowing north to south. The river flows across the site in a fully contained deep piled concrete channel approximately 7 m wide and 3 m deep (Rodgers Leask, 2016) before crossing the Gwent Levels to the south as a natural channel (Section 2.5.3) and discharging to the Severn Estuary via a tidal exclusion gate. A number of reens and watercourses controlled and maintained by Cyfoeth Naturiol Cymru / Natural Resources Wales (CNC/NRW) surround the site and are described in the surface water drainage strategy (Rodgers Leask, 2016).

A comprehensive surface water drainage strategy for the site has been developed by Rodgers Leask (2016), considering areas already developed (Western Sub Area and parts of the Celtic Business Park) and those yet to be developed. The strategy outlines the sustainable surface water management planned for the finished development. Approximately 399,000 m3 of storage is planned within the site, taking the form of an extensive network of blueways/reens, lakes and Sustainable Drainage Systems (SuDS), receiving all surface water runoff from the site. A post-development surface water drainage plan is presented in Drawing D12- 084-512 and summarised below:

- Blueways (Reen 1, Reen 2, Julian's Reen, Ellen Reen, East Lake Reen, King's Wall Reen and Celtic Business Park Reens) – primary surface water channels comprising existing and newly created reens which will be engineered to flow south to north across the site, culminating in a west-east channel adjacent to the northern boundary of the site, from which water will be discharged to Monk's Ditch. Reens within the site boundary will be unlined (other than being cut into the underlying clay to achieve the required invert level therefore the base and deeper parts of banks will be formed in the natural clay);
- Greenways – high level dry, shallow ditches intended to channel overland surface water from the development plots into the blueways;
- Lakes – a number of lakes and ponds are anticipated to be connected to the blueway system to provide amenity with some additional storage for surface water runoff; and
- Monks' Ditch – surface water from the site is proposed to be pumped to the Main River at a maximum flow rate of 750 l/s as specified by CNC/NRW.

The strategy as submitted (Rodgers Leask, 2016), states that discharges to Monks' Ditch will be allowed once the specified quality criteria and quality control systems have been

established and are met, until that point discharges to the Tata system will continue from the development site.

2.5.2. Rainfall

In the absence of an onsite rain gauge, rainfall data used within the Atkins 2017 CWDQRA assessment was taken from MAFF (1976) for the area surrounding Newport. Literature values for annual total rainfall, (953 mm, MAFF, 1976) are comparable to available data from nearby CNC/NRW rain gauge at Newport for the year 2015 (945 mm).

2.5.3. Designated Areas

Gwent Levels (Nash and Gold Cliff) Site of Special Scientific Interest (SSSI) encompasses the area between the southern site boundary and the Severn Estuary and comprises a large area of ancient grazing marshes, farmed wetland, and reens. The area is part of a series of adjoining SSSI designated for their wildlife and archaeology; specifically water beetles and dragonflies found in the reens, farmland birds, and brown hare, otter and water vole.

3.0 Conceptual Site Model

3.1 Introduction

A Conceptual Site Model (CSM) was previously prepared by Atkins for the Glan Llyn site, as a whole, and presented in their 2017 CWDQRA Report. It was indicated that the CSM, which was considered to be representative of the site in an un-remediated, undeveloped scenario, considered all available geological and hydrogeological information relating to the proposed development to produce a CSM upon which a detailed assessment of the risk to Controlled Waters could be assessed. Risks to Human health via inhalation, direct ingestion or dermal contact of soils did not form part of the CSM. Again, it is recommended that the relevant chapter of the Atkins Report is read in conjunction with this section of the current Report. However, much of the earlier Atkins CSM is presented again below for convenience.

3.2 Potential Sources of Contamination

The following potential sources of contamination were identified with respect to Controlled Waters considering the available historical and recent data for the site:

The Made Ground, which was historically used to build up the level of the site was known to include imported waste products (slag, concrete, brick, burnt shale) from other steelworks in addition to natural deposits (Table 2-1).

Chemical compounds which have the potential to contaminate the ground outlined by the Department of Environment (DoE, 1995) as being associated with metal production industry are: metals and metalloids, inorganic compounds, acids and alkalis. Contaminants, particularly related to coke-making include; PAHs, cyanides, ammoniacal liquors, sulphur and sulphates, BTEX VOCs and also include petroleum-based fuels and oils. Contaminants of Concern (CoC) are presented in Section 5.1.1.

It was noted by Atkins that groundwater within the bedrock has previously been impacted by contaminants associated with the former steel producing industry formerly located on this site. However given the direction of the groundwater flow and the location of elevated concentrations a link between the steelworks as a source and regional groundwater could not be confirmed.

3.3 Potential Receptors

Receptors relating to Controlled Waters are identified to comprise:

- Monks' Ditch (into which surface water from the development site is pumped);
- Engineered surface water reens onsite;
- Perched groundwater within the Made Ground;
- Groundwater within the Tidal Flat Deposits Unproductive Strata; and
- Mercia Mudstone Secondary B Aquifer.

It was indicated that the Made Ground and Tidal Flat Deposits (unproductive strata) are not considered to be a Controlled Waters receptor in the context of the assessment due to their anticipated low resource potential. The post-development surface water reens within the site were not considered to be Controlled Waters given the artificial nature of their origin and the fact that discharge from this system will always be entirely managed by on site pumping stations. The reens are therefore treated as part of the engineered water management system in the same way that SuDS features are on many developments.

Monks' Ditch, as a Main River, was considered to the principal receptor for any Controlled Waters impact at the site.

3.4 Potential Pathways

Potential Controlled Waters pathways were identified as follows:

Leaching of soil-borne contamination in Made Ground and subsequent lateral migration through permeable pathways in Made Ground to Monks' Ditch via onsite reens.

No effective pathway was identified between the shallow groundwater in the Made Ground and the deep groundwater within the Mercia Mudstone Secondary B Aquifer, due to the low permeability of the clay-rich Tidal Flat Deposits.

3.5 Potential Pollutant Linkages

It was assessed that contamination present within the Made Ground onsite is anticipated to directly leach into the underlying perched shallow groundwater via infiltration and diffusion. The degree of leaching from the source materials present within the Made Ground is a function of portioning to the soil matrix and volatilisation potential to the gaseous phase. Little dilution was anticipated to occur within the Made Ground as the site was considered to be hydraulically isolated from the surrounding superficial deposits by reens formed in the natural clay, preventing inflow of uncontaminated groundwater. The base of the reens are also known to be excavated into the clay-rich Tidal Flat Deposits.

The prevailing flow of perched groundwater was anticipated to be separated along the central north-south divide of each sub-area, flowing laterally to the adjacent reen following the slope of the Made Ground (Section 2.3.3). Groundwater flow was considered to be able to move laterally within the Made Ground without impedance. However, it is recognised that areas of low hydraulic conductivity are likely to exist in the Made Ground (i.e. due to the presence of silts and clays), which will baffle flow locally and prevent bulk advection of contaminants.

It was assumed that no dilution occurs within the shallow groundwater in the Made Ground and that concentrations of contaminants reach equilibrium. Substantial dilution will occur within the reens as groundwater mixes with surface water runoff from the site.

Water in the reens is proposed to be physically pumped into the Controlled Waters receptor, Monks' Ditch; details of which are outlined in the Surface Water Drainage Strategy (Rodgers

Leask, 2016). Currently it is understood that the surface water discharge from site flows into the Tata surface water system and is controlled and discharged as part of their industrial discharge consent.

As previously outlined, due to the low resource potential and low permeability nature of the Made Ground, Tidal Flat Deposits and Mercia Mudstone, in addition to the restricted pathway between shallow and deep groundwater, no credible groundwater receptors were realised. A diagrammatic CSM was prepared, which has been reproduced by RLE (dated 05/07/19) and is provided in **Appendix D**.

4.0 Contamination Data Assessment

4.1. Water Quality Standards

The Atkins CSM identified Monks' Ditch as a Controlled Waters receptor for the site. Therefore, the annual average Inland Surface Waters EQS applicable under the Water Framework Directive was adopted as the primary WQS (DEFRA/Welsh Ministers, 2015). Where a value was not available for a particular element or compound, then the following standards were used in order of preference:

- EU Statutory EQS (Protection of Surface Water Quality) (Council Directive 2000/60/EC);
- UK Statutory EQS (Protection of Aquatic Life) (Council Directive 76/464/EEC);
- UK Non-statutory EQSs (Protection of Aquatic Life) (Council Directive 76/464/EEC) and;
- UK Drinking Water Standard (DWS) (Water Supply (Water Quality) Regulations, 2000).

There are no current UK WQS for TPH; however, a concentration of 0.01 mg/l was used, which is based on the UK DWS in the former 1989 regulations (Water Supply (Water Quality) Regulations, 1989).

It is considered upon further review that the EQS Values for Controlled Water as applied in the earlier Atkins 2017 CWDQRA, still remain appropriate for this site, and therefore have remained unchanged in the current Revision.

4.2 Soil Quality Assessment Methodology

In order to determine the potential impacts through leachability of the existing insitu Made Ground, derivation of Screening Values (expressed as mg/kg) was previously undertaken by Atkins for a range of determinands using the Environment Agency calculation provided in their Remedial Target Worksheet (Level 1 Soils), using, where possible, site specific data. These previously derived Screening Values have been retained and utilised as part of the current revised assessment. Details as to the methodology utilised are provided in the earlier Atkins 2017 CWDQRA Report, and it is recommended that this methodology employed be read in conjunction with the current Report.

4.3 Atkins Earlier Findings from July 2015 to September 2016

For greater detail of these findings, reference should be made here to the earlier Atkins 2017 CWDQRA Report. However, in brief summary:

4.3.1 Soils

From analyses of 243 (No.) samples of Made Ground recovered from unremediated stockpiles across the site, it was noted, upon comparison, that total concentrations of determinands (which included metals, petroleum hydrocarbons and PAHs), were found in many of these samples, to exceed their respective calculated Level 1 Soils Screening Values,

based upon application of the proposed site specific EQS Values for Controlled Waters. The full results are presented in Appendix B of the earlier Atkins 2017 CWDQRA Report.

4.3.2 Soil Leachates

114 (No.) soil leachates were also generated from samples of Made Ground recovered. It was noted that upon analyses for an appropriate suite of inorganic determinands (mainly metals), and upon comparison with the proposed site specific EQS values, that a number of these (particularly chromium, copper and vanadium), were also found in many of these samples to exceed the respective EQS values. The full results are presented in Appendix B of the earlier Atkins 2017 CWDQRA Report.

4.3.3 Groundwater Samples

Concentrations of a range of metal determinands, consistent with the former usage of the site in the metal production industry, were also analysed in shallow and deep groundwater samples recovered from boreholes installed across the site. The full results are presented in Appendix C of the earlier Atkins 2017 CWSQRA Report. In view of the relative degree of hydraulic isolation of the shallow and deep groundwater horizons present across the site, these findings were considered separately.

4.3.3.1 Shallow Groundwater Horizon Samples

These samples were considered to be representative of groundwater in contact with existing Made Ground present on the site.

A total of 68 (No.) samples were recovered from the shallow groundwater within the Made Ground across 24 locations during May, June and July 2016 based upon a specification presented in an earlier monitoring strategy (Atkins, 2016a). The WQS standards adopted for groundwater quality screening are as outlined in Section 4.1 of the Atkins 2017 CWDQRA Report, and a summary of exceedances is presented in Table 4-3 of the same Report as it was determined that the LoD (limit of detection) was greater than or equal to the WQS for many of the determinands, for screening purposes exceedances were only considered for samples where analytical results were found to be above the LoD.

It was noted that, as expected, the determinands in exceedance of the WQS in the soil samples (consistent with those associated with the metal production industry (DOE, 1995)) are also reflected in the results of analyses of the shallow groundwater samples.

A review and discussion of the results of analyses of shallow groundwater samples is presented below, together with consideration of the results of more recent (post 2017) monitoring and analyses.

4.3.3.2 Deep Groundwater Horizon Samples

A total of 138 (No.) samples were recovered from the deep groundwater within the Tidal Flat Deposits and underlying Mudstone across 47 locations during May, June and July 2016 based upon a specification presented in an earlier monitoring strategy (Atkins, 2016a). Again, as the LoD was greater than or equal to the WQS for many of the determinands, for screening purposes exceedances were only considered for samples above the LoD. A summary of WQS exceedances is presented in Table 4-4 of the Atkins 2017 CWDQRA Report.

4.3.4 Surface Water Quality

It was indicated that surface water quality data was collected monthly from the reens and ponds onsite based upon a specification presented in an earlier monitoring strategy (Atkins, 2016a). A total of 104 (no.) samples were collected from June to November 2016 and were screened as outlined in Section 4.1 of the Atkins 2017 CWDQRA Report. Again, as the LoD was greater than or equal to the WQS for many of the determinands, for screening purposes exceedances were only considered for samples above the LoD.

4.3.4.1 Onsite Surface Water Quality

Of the 104 (No.) samples, 94 (No.) were from onsite. The determinands detected above the WQS within the onsite surface water samples were considered to be broadly consistent with those identified within the soil samples (Table 4-1 of the Atkins 2017 CWDQRA Report). Cyanide, iron, manganese, SVOC and VOCs were in exceedance of the WQS in the surface water, however they were not tested for in the soil samples, so a comparison may not be made.

Upon further review of the results obtained, it may be noted that:

67% exceeded the ammoniacal nitrogen WQS;
6% exceeded the total cyanide WQS;
4.3% samples exceeded the copper WQS, where bioavailable copper is considered only;
5.4% exceeded the vanadium WQS;
6.5% exceeded the nickel WQS.

4.3.4.2. Monks' Ditch Surface Water Quality

Of the 104 (No.) samples recovered, 10 (No.) were from the Monks' Ditch monitoring locations (MD-N and MD-S). The exceedances of the WQS present within Monks' Ditch were presented in Table 4-6 of the Atkins 2017 CWDQRA Report. It was indicated that the exceedances reported were spread across all samples and collection dates. As the Monks' Ditch is understood to be hydraulically isolated as it flows through the Glan Llyn Llanwern Site, then assuming that this is the case, then it may be inferred that where elevated concentrations of contaminant determinands are recorded, then these are likely to have originated from an offsite up-gradient/up-flow source.

4.4 Assessment of Data from 2017 Onwards

4.4.1 Soils

Subsequent soils analyses have been undertaken on samples recovered from across the site, over a period from 01/05/17 to 03/04/19, with a total number of 1806 (No.) samples being analysed. The results of analyses are provided in **Appendix E** of the current Report Details of specific areas of the site where these samples have been recovered are presented in **Appendix F** of the current Report. From analyses of 1806 (No.) samples of Made Ground recovered from unremediated ground across the site, it may be noted again, upon comparison, that total concentrations of determinands (which included metals, petroleum hydrocarbons and PAHs), may be found in many of these samples, to exceed their respective calculated Level 1 Soils Screening Values, based upon application of the proposed site specific WQS Values for Controlled Waters.

4.4.2 Soil Leachates

Subsequent soil leachate analyses have been undertaken on samples recovered from across the site, over a period from 01/06/18 to 11/04/19, with a total number of 1121 (No.) samples being analysed for metals. The results of analyses are provided in **Appendix G** of the current Report. Details of specific areas of the site where these samples have been recovered are presented in **Appendix F.** It was noted that upon comparison of metals results with the proposed site specific WQS values, that a number of these, again, particularly; arsenic, chromium, copper, vanadium and to a lesser extent; lead and zinc, were also found in a significant number of these samples to exceed their respective WQS values. It should be recognised, however, that the laboratory preparation of leachate samples produces results which will tend to be conservative and of limited relevance where shallow surface water quality results are available (as in the case of this site), for comparison purposes.

However, it is noted that of the samples analysed:

- 83% exceeded the arsenic WQS;
- 54% exceeded the chromium WQS;
- 86% exceeded the copper WQS;
- 66% exceeded the nickel WQS;
- 76% exceeded the selenium WQS;
- 92% exceeded the vanadium WQS;
- 42% exceeded the lead WQS;
- 66% exceeded the zinc WQS;
- A low to very low number of exceedances for BTEX VOCs were recorded;
- No samples exceeded the respective WQS values for PAHs;
- No samples exceeded the respective WQS values for TPHs.

4.4.3 Groundwater

No additional groundwater monitoring samples have been recovered.

4.4.4 Surface Water Quality

4.4.4.1 Onsite Surface Water Quality

A further significant volume of additional data has been obtained from monitoring of the quality of surface waters across the site, with a total number of 998 samples being recovered over a period from 06/03/2018 to 30/04/19. The results of analyses are provided in **Appendix H** of the current Report. It is noted that of the samples analysed:

- 63% exceeded the ammoniacal nitrogen WQS;
- 3.4% exceed the free cyanide WQS;
- No samples exceeded the copper WQS where bioavailable copper is considered only;
- 25.5% exceeded the vanadium WQS
- No samples exceeded the nickel WQS where bioavailable nickel is considered only;
- 4.3% of samples exceeded the TPH WQS;
- 90% of samples exceeded their WQS for a range of PAHs.

4.4.4.2 Monks' Ditch Surface Water Quality

Of the 104 (No.) samples taken, 48 (No.) were from the Monks' Ditch monitoring locations (MD-N and MD-S). The flow direction is from MD-N to MD-S, in a southerly direction.

It may be noted that for the MD-N location:

- 16% exceeded the ammoniacal nitrogen WQS;
- 4% exceeded the aliphatic TPH (C_{21}-C_{35} aliphatic carbon chain) WQS;
- 88% of samples exceeded their WQS for a range of PAHs;
- Exceedances were noted for a range of metals in unfiltered samples, but did not exceed their respective WQS in filtered samples and corrected for bioavailability;
- pH values recorded ranged between 7.80 and 8.24 and were within the proposed WQS range.

It may be noted that for the MD-S location:

- 39% exceeded the ammoniacal nitrogen WQS;
- 83% of samples exceeded their WQS for a range of PAHs;
- Exceedances were noted for a range of metals in unfiltered samples, but did not exceed their respective WQS in filtered samples and corrected for bioavailability;
- 22% of samples exceeded the proposed WQS range for pH. Values recorded ranged between 7.54 and 9.68.

4.5. Discussion of Results

4.5.1 Surface Waters

4.5.1.1 Inorganics

Compared to earlier data, there appears to be a significant increase in the number of surface water samples analysed which exceed the vanadium WQS concentration. It is known that

vanadium becomes concentrated (between 2-3% mass) in BOF- (basic oxygen furnace slag). This is considered likely to be the vanadium source (particularly vanadium dicalcium silicate phases), with vanadium leaching out into surface waters, as the slag weathers. Vanadium concentrations were noted to be particularly elevated in surface water samples recovered from position R4C, and to extent in R1C. Vanadium concentrations appear to become more diluted/attenuated as surface water drains towards Surface Water Pumping Station No. 2. However it appears that the vanadium precipitates out, as pH values tend to lower (become more neutral) and some incorporation with iron oxyhydroxides (particularly goethite) which are another slag weathering by-product takes place.

There appears to be no obvious increase or decrease in recorded concentrations of metal determinands within upstream reens and positions downstream within the Kings Wall Reen. However, cyanide concentrations appear to increase downstream within the reen system, possibly as leached contributions are made from deposited wastes associated with the former coking works located within the northern central section of the site. However, there is evidence for decrease again in cyanide concentrations, further downstream, potentially due to complexation with metals such as iron and nickel, particularly in the higher pH conditions which are likely to prevail. There is also noted to be evidence of a possible contribution here from ammoniacal liquors associated with the former coking works.

When iron concentrations are compared, it may be noted that in post 2017 samples analysed, only 0.5% of the samples exceeded WQS values for filtered samples whilst 22% exceeded the WQS in unfiltered samples. This suggests that iron is flocculating/precipitating out as the leached solution becomes more oxygenated. Within the reens, this iron precipitation as an oxi-hydroxide is likely to take place contemporaneously with the dissolved vanadium.

When compared with earlier results obtained by Atkins prior to 2017, the number of WQS exceedance for concentrations of ammoniacal nitrogen remain largely unchanged (63% exceeding WQS) in post-2017 data, although some concentration values were found to be more elevated in recently obtained surface water samples.

The number of WQS exceedances for cyanide in post-2017 data appear comparable to those obtained by Atkins pre-2017.

4.5.1.2 Organics

Although there are a slightly higher proportion of surface water samples recovered from across the site, more generally, that exceed the WQS for PAH concentration (over 90.58% exceed the WQS for fluoranthene), it is also noted that for water samples recovered from the Monks' Ditch, which is understood to be hydraulically isolated from the Glan Llyn Llanwern site, PAH (again; fluoranthene) exceedance of the WQS in up to 88.0% of the samples (Monks' Ditch North MD-N) and 82.6% of samples (Monks' Ditch South MD-S) was noted. The source of these slightly elevated PAH concentrations determined in the Monks' Ditch is unclear, although again, it suggests the presence of an upstream off-site contributing source.

There appears to be no discernible reduction in PAH concentrations generally when comparing the earlier and post-2017 surface water analytical results.

TPH concentrations were exceeded in 4.3% of surface water samples recovered from across the site. These findings are considered to be consistent with TPH impact from isolated hotspots within the Made Ground.

4.5.2 Groundwaters

4.5.2.1 Inorganics

The following discussion is largely taken from the Atkins 2017 CWDQRA Report and updated, as considered appropriate. Consistent with soil leachate samples, elevations of pH are greatest in the shallow groundwater, with an average of 9.6, and 49% of samples greater than the WQS range of 6-9. In comparison pH values in the deep groundwater are lower; the reported average is 8, and less than 9% of samples are in exceedance. The elevated pH in shallow groundwater samples as compared to deep groundwater samples is likely to be attributable to impacts from weathering of BOF slag, whilst the pH of deeper groundwater samples can be influenced by oxidation of sulphidic minerals which will lower the pH of groundwater in contact with these minerals. However, in this case where an average pH of 8 is reported, the findings would suggest an absence of evidence for impact from weathering BOF slag or significant impact from sulphide oxidation.

Copper, lead, nickel and selenium are present at higher concentrations and produce more exceedances of the WQS within the shallow groundwater. Concentrations of vanadium are also found to be much greater in shallow groundwater; the maximum shallow groundwater value is 485 mg/l (WQS exceedance in 28% of samples) in comparison to the deep groundwater maximum of 157 mg/l (WQS exceedance in 7% of samples). Again, the elevated vanadium concentrations are likely to be attributable to weathering of the BOF slag, which may also be impacting on concentrations of copper, lead, nickel and selenium in shallow groundwater, as compared to the deeper groundwater samples recovered where slag weathering by-products are less likely to impact.

Concentrations of ammoniacal nitrogen are reduced by half in the shallow groundwater in comparison to the deep. Atkins (2015a) suggested that the lower ammoniacal nitrogen concentrations present in the shallow groundwater are the result of upward leakage and that the direction of the groundwater flow from the north west indicates that the elevated concentrations of ammoniacal nitrogen are more likely to be from an off-site diffuse source, such as from infiltrated runoff from agricultural activities.

Maximum and average concentrations of dissolved arsenic are considerably higher in the deep groundwater (220 µg/l and 32.1 µg/l respectively) than in the shallow (40.5 µg/l and 9.2 µg/l respectively). Similarly for total arsenic, 13% of the deep samples but only 3% of shallow samples are in exceedance of the WQS (50 µg/l). Concentrations of iron, cadmium, chromium, manganese are also elevated within the deep groundwater in comparison to the

shallow. The lower concentrations of these metals determined in surface water samples as compared to deeper samples may be due in part to greater dilution of the surface groundwaters, as the results of soil leachate analyses suggests that Made Ground across the site are likely to contain significant leachable concentrations of these metals.

4.5.2.2 Organics

The majority of TPH samples in both shallow and deep groundwater are reported below the LoD, however a few boreholes are proven to be hot spots for TPH contamination. Maximum concentrations of TPH are up to two orders of magnitude greater in shallow groundwater in comparison to deep groundwater. In shallow groundwater, TPH in exceedance of the WQS are limited to less than 15% of the total sample population for each exceeding contaminant. The samples reported in exceedance during the May 2016 sampling round are distributed across nine locations, however samples in the June and July rounds exceeding for three or more contaminants are limited to locations CWWS-04, CWWS-19 and CWWS-11.

In deep groundwater, TPH in exceedance of the WQS are limited to less than 5% of the total sample population for each exceeding contaminant with the exception of aromatic >EC21-EC35 (16.7%). Sample locations with exceedances of two or more TPH in a single sample are locations CBBH04, CBBH05, CWCP- 04, CWCP-19 and CWCP-11.

PAHs are present in both the shallow and deep groundwater; concentrations of contaminants and frequency of exceedances are greater in the shallow groundwater. As for TPH, maximum concentrations within the shallow groundwater are up to two orders of magnitude larger than in the deep. Exceedances are widespread within the shallow groundwater, with a percentage of samples exceeding up to 69%; within deep groundwater exceedances are limited to 14%, with the exception of fluoranthene (29%) and benzo(a)pyrene (28%).

Exceedances of SVOCs and VOCs above the LoD are limited, and remain below 9% of the shallow groundwater and 2.2% of the deep groundwater total sample population for each contaminant.

A wide range of contaminants are found to exceed the WQS in both the shallow and deep groundwater. However, the chemical signatures of each aquifer unit are distinct and the greatest concentrations and percentages of exceedances are not simply attributed to the shallow groundwater. It is possible that due to the fluctuating upwards and downwards gradients across the site as presented in Section 2.4.2 (Table 2-4) groundwater from either unit may be influencing the other. For example, where deep groundwater levels are lower than shallow, downward migration of water into the Tidal Flat Deposits is possible. Atkins (2015a) calculated that the un-retarded breakthrough of shallow groundwater through the Tidal Flat Deposits is likely to be 9 years. Taking into account conservative partition coefficients for naphthalene (a mobile PAH) and cadmium, the retarded breakthrough of naphthalene and cadmium is likely to be 644 and 1,435 years, respectively. Considering this,

it is unlikely that the contamination identified within the deep groundwater originated within the made ground.

5.0 Detailed Quantitative Risk Assessment and Re-use Assessment

5.1. Overview

It was indicated in the earlier Atkins 2017 CWDQRA Report, that the purpose of this assessment was to define, for a set of potential contaminants, the maximum concentration in the soil that does not pose a risk to the Controlled Waters receptor (re-use criteria). Where site soil concentrations, for one or more contaminants are greater than the re-use criteria, then in the absence of soil remediation or water treatment prior to discharge, a risk to Controlled Waters may exist.

5.1.1. Contaminants of Concern

Based on the site contamination status and known contaminants associated with steelworks (DoE, 1995), calculation of re-use criteria are to be undertaken for the Contaminants of Concern (CoCs) outlined in below. The current contamination status of the site is outlined above in Section 4; the assessment highlighted several metals, TPH and PAH that exceed the appropriate criteria. This essentially remains unchanged for the updated assessment.

Table 5-1: Contaminents of Concern (COCs)

Compound Type	Compounds
Heavy Metals/Metalloids	Arsenic, cadmium, chromium, copper, iron, lead, vanadium, manganese, mercury, nickel, selenium, zinc.
Other Inorganics	Ammoniacal nitrogen, cyanide.
Organics	Ethylbenzene, xylene, PCB, phenol.
TPH Bands	TPH aliphatic >C5-C6, TPH aliphatic >C6-C8, TPH aliphatic >C8-C10, TPH aliphatic >C10-C12, TPH aliphatic >C12-C16, TPH aliphatic >C16-C21, TPH aliphatic >C21-C35, TPH aliphatic >C35-C44, TPH aromatic >C5-C7 (Benzene), TPH aromatic >C7-C8 (Toluene), TPH aromatic >C8-C10, TPH aromatic >C10-C12, TPH aromatic >C12-C16, TPH aromatic >C16-C21, TPH aromatic >C21-C35, TPH aromatic >C35-C44, TPH Aromatic >C40-C44.
PAHs	Acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, di-benz(a,h)anthracene, indeno(1,2,3-cd)pyrene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene.

5.1.2. Compliance Point

In order to be protective of the Controlled Waters receptor outlined in Section 4.5, determination of the site specific compliance point has been undertaken in general accordance with the RTM (Environment Agency, 2006). The compliance point has been assigned to the point of discharge into the receptor (Monks' Ditch). Consistent with the contamination data assessment (Section 4), the WQS (Water Quality Standards) have been

set at the EQS in order to be protective of the principal Controlled Waters receptor (Section 4.1).

5.2. Dilution Assessment

5.2.1. Rationale

It was previously indicated that in order to maintain discharge of EQS compliant waters into the Controlled Waters receptor (Monks' Ditch), concentrations within the reens must be retained at or below the EQS. Due to the anthropogenic controls on discharges of water from the on-site reens to Monks' Ditch, in order to calculate the maximum concentration allowable for each contaminant within the excavated and re-compacted Made Ground (re-use criteria) the average annual water balance for the entire site is applied. This is considered appropriate given that EQS values are in relation to the annual average concentration.

Shallow groundwater is known to originate from infiltrating precipitation only, as the Made Ground of the site is hydraulically contained (Section 2.4.2). The remainder of the precipitation is either lost to evapotranspiration/evaporation or constitutes surface water runoff, and is diverted directly to the onsite drainage reens by SuDS (Section 2.5.1). Therefore, contaminant concentrations present in the shallow groundwater within the Made Ground are subject to dilution within the reens by clean SuDS drainage. As outlined in Section 2.3.3, the proportion of proposed impermeable to permeable surface area differs between the residential area and the Celtic Business Park commercial area. Resultantly, individual re-use criteria values were previously produced for each contaminant (Table 5-4 of Atkins 2017 CWDQRA Report), within each development area due to the differing volumes of water available for dilution.

As indicated in the current Introduction, the earlier CWDQRA prepared by Atkins (Version: 3 and dated February 2017), was issued with the intention that, as further site specific information was collected, the assessment would be reviewed and updated. It was described as the starting point and that the re-use criteria generated were understood to be conservative. An assumption was also made that 100% of the infiltrated rainwater percolated through the construction material and in to the Made Ground.

Since preparation of the Atkins 2017 CWDQRA Report, further consideration has been given (Rodgers Leask Environmental Ltd - Reclamation Performance Specification A – Turnover – Technical Note, dated 14/12/18, Ref: 17480-RLE-18-XX-RP-O-1016), to the pre-construction reclamation methodology to be employed across the site. The particle size distribution of the Made Ground is known to be well graded, and when compacted, the permeability is assessed as having poor drainage potential, with when appropriately placed, expected values in the region of 10^{-7}m/s.

Consideration has also been given to the application of differing standards of compaction of the Made Ground, and as a result, alteration of the rates of incident water infiltration. In order to consider the impacts of reducing infiltration rates into the Made Ground (impacts of which are likely to be greatest in areas of the site proposed for residential reusage where greater areas of soft landscaping will be present), two modelling scenarios have been considered in comparison with the Atkins previously assumed 100% infiltration into the underlying Made Ground. These models assume a greater proportion of incident rainwater

being directed laterally within the clean surface soils and 6F2 granular blanket, towards the reens. On this basis, the assumption is made that these redirected waters remain uncontaminated and provide further dilution of the waters passing through the Made Ground and ultimately discharging into the reens. In order to provide values which are likely to be 'typical' and 'potentially achievable', the following scenarios (details of which are outlined in Section 1.2 above), have been considered:

1. A 40% infiltration rate into underlying Made Ground which should be easily achievable;
2. A 5% infiltration rate into underlying Made Ground which, it is considered may be potentially achievable.

5.2.2. Methodology

The methodology employed in the current updated CWDQRA is that utilised previously by Atkins in their 2017 CWDQRA. The maximum (annual average) contaminant concentration possible within the perched groundwater in the Made Ground is calculated using dilution within the reens onsite as per Equations 3 to 7 below, whilst retaining concentrations at the EQS. Again, no allowance has been made for dilution of discharged water within Monks' Ditch as part of this calculation, as this being the receptor, it is proposed that the WSQ in this Controlled Water be maintained (as far as possible) at EQS values.

A summary of the methodology is provided below:

$$EQS = (Cgw + Qgw)/Qr \quad \text{Equation 3}$$

$$Cgw = (EQS \; x \; Qr)/Qgw \quad \text{Equation 4}$$

- Where:
  - EQS (mg/l) = Environmental Quality Standard
  - C_{gw} (mg/l) = annual average groundwater contaminant concentration
  - Q_{gw} (m^3/a) = groundwater flow
  - Q_r (m^3/a) = reen flow

$$Qr = Qgw + Qol + (RO \; x \; permeable \; surface \; area) \quad \text{Equation 5}$$

$$Qgw = (R - ET - RO) \; x \; permeable \; surface \; area \quad \text{Equation 6}$$

$$Qol = (R - E) \; x \; impermeable \; surface \; area \quad \text{Equation 7}$$

- Where:
  - R (mm/a) = total annual rainfall
  - E (mm/a) = evaporation
  - RO (mm/a) = runoff

The calculated annual average groundwater contaminant concentration Cgw (mg/l) values have been converted to Made Ground solid Cmg (mg/kg) values using Equation 8.

$$Cmg = Cgw \; x \; ((Kd + (\theta w + \theta a \; x \; H))/Pc) \quad \text{Equation 8}$$

- Where:
  - C_{mg} (mg/kg) = annual average Made Ground (solid) concentration
  - Kd (l/kg) = contaminant partition coefficient
  - Θw (-) = water filled porosity
  - Θa (-) = air filled porosity
  - H (-) = Henry's law constant
  - Pc (g/cm^3) = soil bulk density

5.2.3. Parameterisation

A summary of key input parameters is presented in Table 5-2 and Table 5-3 below. The full chemical input parameters and justifications are included in **Appendix I** of the current Report.

Table 5-2: Physical Parameters

Parameter	Unit	Value	Comment/Justification/Source
Average Annual Rainfall	mm/a	953	MAFF, 1976
Evapotranspiration	mm/a	416	MAFF, 1976. Applicable to permeable areas
Evaporation	%	10	Grimmond & Oke, 1999. Evaporation from impermeable surface area as a percentage of total rainfall.
Runoff coefficient	%	55	National Coal Board, 1982 (See Figure E-1)
Residential Permeable Area	m^2	676,000	Rodgers Leask, 2016
Residential Impermeable Area	m^2	1,014,000	Rodgers Leask, 2016
Commercial Permeable Area	m^2	45,000	Rodgers Leask, 2016
Commercial Impermeable Area	m^2	405,000	Rodgers Leask, 2016

Table 5-3 Chemical Parameters

Parameter	Abbreviation	Unit	Value	Comment/Justification/Source
Fraction of Organic Carbon	foc	fraction	0.024	Site specific value - average foc from 243 samples of Made Ground
Air Filled Porosity	θa	fraction	0.0037	Site specific value – average θa from 3 samples of Made Ground
Water Filled Porosity	θw	fraction	0.5	Site specific value – average θw from 3 samples of Made Ground
Dry Bulk Density	Pc	g/cm^3	1.36	Site specific value – average Pc from 3 samples of Made Ground

5.2.4. Assumptions and Limitations

The following assumptions and limitations are inherent within the modelling undertaken:

- Dilution calculations produce maximum likely average concentrations of contaminants (re-use criteria) within the Made Ground;
- Dilution methodology does not account for any dilution within Monks' Ditch at the point of discharge;
- Incident infiltrating rainwater is considered to flow laterally through the capping drainage layer, with varying proportions entering the underlying Made Ground. A 5% infiltration and a 40% infiltration rate into the underlying Made Ground have been modelled;
- No infiltration is assumed to occur within the impermeable area;
- Limited retardation (degradation and/or sorption) of contaminants within the Made Ground is considered given the extensive area of potential source materials across the site:
- Dilution calculations assume simultaneous discharge of the annual volume of surface water runoff and infiltrated water, providing a worst case volume of potentially contaminated shallow groundwater;

- No allowance has been made for additional dilution as a result of inflows to the reen system from the land to the north, as it is understood that these flows are minimal;
- The site geology and hydrogeology are assumed to be homogeneous, and parameter values and contaminant concentrations used are based on site-specific data, where available;
- Where no site-specific data are available, literature sources have been used to develop suitable parameters considered likely to reflect site conditions;
- Made Ground geology by its very nature is likely to be both laterally and vertically variable following finalisation of site development;
- Data presented by third parties has been incorporated into this report. These data have been assumed to be correct for the purposes of this assessment; and
- This assessment has been made considerate of the proposed post-development ground conditions and cover. Should this change, then the site may require re-assessment.
- It should be noted that the assessment undertaken herein and re-use criteria is for protection of Controlled Waters only. The re-use criteria derived are not necessarily protective of risk to Human Health. Re-used materials must also be geotechnically suitable, however this has not been considered as part of this assessment.

5.2.5. Material Re-use Criteria

The calculated maximum concentration of each PCOC (Re-use Criteria) in Made Ground (mg/kg) based upon the two scenarios of a 40% infiltration rate into underlying Made Ground and a 5% infiltration rate into underlying Made Ground are presented in Table 5.4 (**Appendix J**) of the current Report.

The updated results have been formatted to allow direct comparison with the earlier derived Atkins re-use criteria where 100% infiltration rate into underlying Made Ground has been assumed.

The calculated re-use criteria specified are intended to be protective of the Controlled Waters receptor with regard to the post-development site, and will, compared to earlier derived values, facilitate the greater re-use of existing on-site Made Ground in general accordance with a Remediation Strategy (Section 6.2). As previously indicated, it should be noted that re-use criteria do not apply where there is evidence of contamination in soil or Made Ground in excess of solubility (i.e. free phase product)

5.3 Contaminant Attenuation Assessment

It may be noted from Table 5.4 **(Appendix J**) that assuming only a 5% infiltration of incident rainwater into reengineered Made Ground, there remain exceedances of the respective re-use criteria in both residential and commercial redevelopment scenarios, for manganese (within a residential area reusage only) but particularly for a number of PAH species within both commercial and residential reusage areas.

Given that it is proposed within the reengineered Made Ground, to achieve a permeability of approximately $1x10^{-7}$ m/s, then it is considered that, particularly where organic CoC are considered (such as PAHs), that there is a potential for consideration of attenuation through processes of degradation/biodegradation of these leached species within the Made Ground

in view of their likely significant residence time prior to discharge into a local surface water reen.

However, given that the extent of these residual contaminant sources are likely to be of widespread (albeit variable contribution) presence within the reengineered Made Ground, then the potential for attenuation of these contaminants within the Made Ground between their source and the designated receptor (surface water reen) will be compromised. This needs to be appreciated within the further assessment undertaken, as outlined below:

5.3.1 EA Remedial Target Worksheet (Level 3 Groundwater) Assessment

In order to further consider the potential for attenuation of the residual contaminants within the Made Ground, this has been undertaken using the Environment Agency calculations provided in their Remedial Target Worksheet (Level 3 Groundwater) using, where possible, site specific data, as indicated below:

Table 5.3.1: Site Specific Data Sources Utilised in RT Worksheet Level 3 Groundwater Assessment

Variable	Value Utilised	Data Source
Width of aquifer at source	500m	Site measurements and likely width of each separate redevelopment perpendicular to directed perched groundwater flow towards appropriate reen.
Plume thickness at source	2.0m	Based upon proposed thickness of reengineered Made Ground and assumption that full thickness of Made Ground represents potential contaminant source
Saturated aquifer thickness	1.5m	Based upon typical likely groundwater levels in reengineered Made Ground.
Bulk Density of aquifer materials	1.36g/cm^3	Site specific test data
Effective Porosity of aquifer	0.08	Site specific test data
Hydraulic Gradient	0.0133	Estimation - also based upon earlier estimation used by Atkins
Hydraulic Conductivity of aquifer	8.64E-03m/d (1.0E-7m/s)	Based upon proposed permeability to be achieved following turning and reengineering of Made Ground
Distance to Compliance Point	20m	Assumed to be typical distance to surface water reen. However further dilution of contaminants will take place in reens from uncontaminated runoff from redevelopment

Using site-derived soil analyses concentration data for a range of determinands taken from 2017 onwards, maximum derived concentrations (mg/kg) in each case were then utilised for the modelled determinands. These data were then input into the equation presented in the EA Table 5.2 – soil-water partitioning of the EA Remedial Targets Methodology Guidance (2006) and a pore-water concentration Cp was determined. Soil/water partition coefficient (Kd) values utilised were site specific, and derived from those generated by Atkins (Table E4 of the Llanwern Controlled Waters Detailed Quantitative Risk Assessment Version 3.0 (February 2017)).

Consideration has also been given as to the application in the Level 3 Groundwater Remedial Target Calculation of applying 'degradation of organics in all phases' or whether a 'dissolved

pollutants only' variable should be applied. It is considered that there are likely to be different degradation rates for dissolved phase and free product. Evidence for choosing an 'all phases' variable was based upon:

- Site observations made on 09/05/19, where it was noted that hydrocarbon free-product was also present on water surface within some of the recent excavations, albeit mainly as surface iridescence, (together with probable dissolved phase). Therefore, there was considered to be evidence for the presence in site soils of hydrocarbons in both dissolved (laboratory evidence) and free-phase (site observations).

- Given in this instance that the scenario being considered is near surface degradation and biodegradation, then oxidation and volatilisation are likely to be fairly important means of loss of both free-product and dissolved phase, and will probably encourage a faster rate of degradation than would be likely at greater depth within a more anaerobic/less oxygenated environment. However, it has been noted that 'applying degradation rate to dissolved pollutants only' appears to add more conservativity to the model, so it has been proposed to utilise this variable.

The calculated pore-water value was then considered to be representative of the initial contaminant concentration in groundwater at the plume core, and utilised in the Level 3 Groundwater Remedial Target Calculation, as provided in the Excel Worksheets accompanying the current CWDQRA Report revision Draft.

The selected determinands chosen for modelling were from within (but not all) of those where soil concentrations were found from chemical analyses carried out to continue to exceed the calculated 5% and 40% infiltration scenarios reuse criteria. These determinands included metals: iron, manganese and vanadium and PAHs, benzo(a)pyrene, benzo(b)fluoranthene and naphthalene.

In the case of the Remedial Target modelling carried out to date, no specific consideration of 5% and 40% infiltration scenarios has taken place, and the assessment was carried out essentially to gauge the potential extent of attenuation of these specific determinands within the ground where these soils may be placed, with receiving surface waters being assumed to be existing reens, which have been taken as the Compliance Points. For initial calculation purposes, it has been assumed that compliant material proposed to be reused, would be placed no nearer than 20m from these reens.

It is proposed that the calculations may be revisited and updated, should it be considered appropriate, as more detailed information becomes available on the proposed site redevelopment layout.

Calculated values for Contaminants of Concern (CoC), as derived using the Level 3 Groundwater Excel Worksheets, are provided in **Appendix K** to the current Report. Where determined maximum soil concentrations exceed the calculated 40% and 5% infiltration reusage criteria, the initial contaminant porewater concentration in groundwater is

calculated based upon the maximum soil concentration recorded for each determinand, utilising the Equation provided in Table 5.2 of the EA Remedial Targets Methodology Guidance. In order to consider the impact of different concentrations of the above determinands, these scenarios have also been modelled using average porewater concentrations (calculated from average soil concentrations) utilising the Equation provided in Table 5.2 of the EA Remedial Targets Methodology Guidance. Copies of the associated Excel spreadsheets modelled for these same determinands and based upon average porewater concentrations are also provided in **Appendix K**.

As indicated above, in selecting the specific determinands for modelling, Level 3 Groundwater calculations have been carried out for a representative range of PAHs and metals, as actual concentrations of these have been found from analyses of site soils to exceed the calculated 40% and 5% infiltration reusage criteria, rather than only considering contaminants currently determined in the reens which are found to exceed the proposed EQS Values. The reasoning for this is based upon the rationale that existing water quality within the reens may not necessarily be representative of the water quality following excavation and replacement of this Made Ground prior to redevelopment. However existing surface water quality has been considered when assessing which determinands to model, and it was not considered appropriate to model ammoniacal nitrogen attenuation, as in a number of cases, exceedances were noted for this determinand in incoming off-site surface waters (as indicated above). It also appeared that cyanide concentrations deplete during flow through the reens, potentially due to complexation with metals such as iron and nickel, particularly in the higher pH conditions which are likely to prevail initially.

For this exercise, the modelling has therefore included the following determinands, with iron, manganese and vanadium being considered representative of metal behaviour and benzo(a)pyrene, benzo(b)fluoranthene and naphthalene of PAHs :

- Benzo(a)pyrene –
- Benzo(b)fluoranthene
- Naphthalene
- Iron
- Manganese
- Vanadium

Discussion of Findings

PAHs

As indicated above, the PAHs modelled have included benzo(a)pyrene, benzo(b)fluoranthene and naphthalene.

Although naphthalene concentrations in some site soils were found to be elevated in concentration, this PAH is readily attenuated, probably mostly through processes of volatilisation and aerobic biodegradation as indicated in the Level 3 Groundwater Excel Worksheets, (**Appendix K)** to the current Report.

It may be noted that the PAHs determined in surface water and shallow groundwater samples recovered, which were found to be most significantly elevated, have included fluoranthene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, Benzo(g,h,i)perylene and Indeno(1,2,3-cd)pyrene, this is consistent with many of the PAH

determinands found to exceed the calculated reuse criteria. This suggests that significant leaching of these PAHs into the perched groundwater and subsequently into the receiving surface water reens is currently taking place across the site, and from consideration of the Level 3 Groundwater Excel Worksheets, is likely to continue from re-engineered Made Ground assuming that all of the PAH concentrations determined in shallow groundwaters are dissolved rather than being present in all phases. Where the Level 3 Groundwater Excel Worksheets are modelled to 'apply the degradation rate to all phases', then there is significant attenuation of these PAHs, thereby suggesting that re-engineered Made Ground containing concentrations of these PAHs in excess (up to the maximum determined|) of the soil reuse criteria (**Appendix J**) may be utilised. In reality, it is considered likely (as indicated above) that although attenuation is taking place, and some processes of volatilisation and aerobic oxidation are likely to be experienced, these processes are not significant enough to enable placement of soils with PAH concentrations in excess of the calculated reusage criteria (in 40% and 5% infiltrations scenarios) very close to the surface water reens.

Metals

It may be noted that based upon scenarios where the maximum iron (2390000mg/kg), manganese (408000mg/kg) and vanadium (2880mg/kg) concentrations determined in samples of Made Ground at the site are present, then soils of this concentration and assuming a 5% and more especially a 40% infiltration of surface water following re-engineering and placement of this material show a potential to impact on the quality of a Compliance Point (taken as the nearest reen) located at a distance of approximately 20m away. Where these scenarios have also been modelled using average porewater concentrations (calculated from average soil concentrations for iron, manganese, vanadium), utilising the Equation provided in Table 5.2 of the EA Remedial Targets Methodology Guidance, it is noted that these soils also show, a potential to impact on the quality of a Compliance Point located at a distance of approximately 20m away.

5.4. DQRA Results

The re-use criteria presented in Table 5-4 (**Appendix J**) are compared to maximum and average concentrations of each determinand as recorded from the 1806 (No.) samples of Made Ground..

Earlier Atkins re-use criteria were calculated based upon the assumption that 100% of the rainwater incident upon areas of the site utilised for soft landscaping for both residential and commercial development penetrates into the underlying re-engineered Made Ground. As indicated above, re-use criteria have now been recalculated assuming a 5% and 40% rainwater infiltration into the re-engineering Made Ground. It is considered that these two infiltration values are likely to be more realistic of the redeveloped site following the undertaking of the Made Ground re-engineering works and the incorporation of measures to encourage infiltrating water to move laterally to the reens through a near-surface drainage blanket comprising clean materials.

In comparison with the calculated re-use criteria, the maximum soil sample concentrations continue to exhibit some exceedances (shown as highlighted, cells in Table 5-4 (**Appendix J**)), which are discussed below.

The calculated re-use criteria for the commercial area are greater than for the residential area as a result of the smaller infiltration to runoff ratio.

Inorganics

With reference to the Soil Re-use Criteria presented in Table 5.4, **(Appendix J)** it may be noted that:

Based upon an assumption of a 40% infiltration scenario:

Compared to calculated re-use criteria, exceedances for samples of Made Ground potentially for re-use in a residential scenario were determined for iron, manganese and vanadium, where maximum concentrations of these metals are considered. However, where average concentrations are considered, it may be noted that these values are found to be significantly lower than their respective calculated re-use criteria.

For a commercial re-use scenario, concentration exceedances for iron and manganese were determined. Where average concentrations are considered, it may be noted that all of these values are found to be significantly lower than their respective calculated re-use criteria.

Compared to calculated re-use criteria, significant exceedances were also noted for ammoniacal nitrogen and cyanide for a 40% infiltration in both residential and commercial materials reuse scenarios.

Based upon an assumption of a 5% infiltration scenario:

Compared to calculated re-use criteria, exceedances for samples of Made Ground potentially for re-use in a residential scenario were determined for manganese only, where maximum concentration of this metal are considered. Where average concentrations are considered, it may be noted that the average manganese soil concentration is significantly lower than the calculated re-use criteria for this metal.

For a commercial re-use scenario, with the exception of cyanide, no concentration exceedances were determined.

Compared to calculated re-use criteria, significant exceedances were noted for ammoniacal nitrogen and cyanide for a 5% infiltration in residential and cyanide only in commercial materials reuse scenarios.

Comparison with the more conservative 40% infiltration scenario for ammoniacal nitrogen Cgw for the commercial (510.69.75 mg/l) and residential areas (129.25 mg/l) with the maximum previously reported shallow groundwater concentration (66.1 mg/l) and more recently reported (post 2017) maximum surface water concentration (18.6mg/l) suggests however that these soils represent a low risk to the quality of Controlled Waters in terms of ammoniacal nitrogen contribution. Similarly with 40% infiltration scenario for iron and manganese, the maximum previously reported shallow groundwater concentrations (92 mg/l and 12 mg/l respectively) are lower than the Cgw for the commercial (1702.33mg/land 209.39mg/l) and residential (430.85 mg/l and 52.99 mg/l) areas, again suggesting that these soils represent a low risk to the quality of Controlled Waters. For cyanide, a comparison (40% infiltration scenario) of the maximum previously reported shallow groundwater concentration (1.4 mg/l) with Cgw for the commercial (1.70.64 mg/l) and residential areas (0.43 mg/l) indicates an exceedance. However, average shallow groundwater concentrations (0.13 mg/l) are lower than the Cgw for both commercial and residential areas. The maximum surface water cyanide concentration recorded post-2017 was 0.28mg/l.

Organics

PAHs:

In the case of the highlighted PAH concentrations a selection of which have been further modelled using the EA RT Level 3 Groundwater Worksheets, it may be noted that the levels of exceedance (based upon maximum determined soil concentrations of these specific PAHs, in both 5% and 40% infiltration scenarios), are likely to impact on the quality of water within the Compliance Point (nearest reen), assuming that this reen is at a distance of 20m from Made Ground. However, this modelling does not take account of processes of volatilisation, which may cause some further depletion in the leached PAH concentrations prior to discharge in surface water reens.

Phenols:

Compared to calculated re-use criteria for both 5% and 40% infiltration scenarios, no exceedances for phenols were determined. In addition, the maximum phenol concentration previously reported in shallow groundwater (0.83 mg/l) is compliant with the 5% and more conservative 40% infiltration scenarios Cgw for the commercial (13.10 mg/l) and residential areas (3.32.25 mg/l). As further comparison, a maximum phenol concentration of 0.04mg/l was determined in surface water samples recovered, post 2017.

Petroleum Hydrocarbons based upon an assumption of 40% infiltration scenario:

Exceedances of the re-use criteria are present for several TPH species with respect to the maximum soil concentration within the aromatic C_{10}-C_{21} range for residential reusage and C_{12}-C_{21} range for commercial reusage. However, where average concentrations are considered, it may be noted that these values are all found to be significantly lower than their respective calculated re-use criteria.

Petroleum Hydrocarbons based upon an assumption of 5% infiltration scenario:

No exceedances of the re-use criteria are determined for TPH species under a 5% infiltration scenario.

5.4.1. DQRA Discussion

The previous re-use criteria produced by Atkins and provided in their 2017 CWDQRA Report (Version: 3 and dated February 2017) were purposely presented as conservative values. A principal conservativity was indicated to be the dilution assessment assumption of a simultaneous discharge of the annual volume of surface water runoff and infiltrated water (Section 5.4). It was indicated that in actual fact, the infiltrated water is subject to storage within the Made Ground and travel times are anticipated to be elongated. Applying Darcy's Law (Darcy flux (q) = Ki where K = hydraulic conductivity (m/s) and i = hydraulic gradient (-) (change in groundwater level/travel distance) and using a hydraulic conductivity $1x10^{-7}$ m/s, travel distance of 10 m and hydraulic gradient of 0.013 (assuming 2 m thick Made Ground is fully saturated), the un-retarded travel time within the Western Sub-Area is likely to be 238 years (at a flux of 0.04 m/year). With the current CWDQRA Revision, and additional assessment using EA P20 Level 3 Groundwater RT Worksheet modelling, these parameters have been incorporated and the re-engineered Made Ground has been predicted as presenting a hydraulic conductivity of $1x10^{-7}$ m/s.

The earlier assumption which has been shown to have significant impact on the value of the re-use criteria, has been the degree of infiltration of the incident water into the re-engineered Made Ground. The earlier Atkins assessment assumed that 100% of this water would penetrate into the Made Ground. However, given the proposed hydraulic conductivity ($1x10^{-7}$ m/s) of this re-engineered material, and the introduction of an overlying 6F2 piling mat/drainage blanket (estimated permeability of $1x10^{-3}$ m/s) beneath clean imported topsoils and subsoils, then a significant proportion of this infiltrating water is considered unlikely to penetrate the re-engineered Made Ground. In order to further encourage lateral movement of this incident water toward the nearest reens prior to penetration into the underlying Made Ground, it has been proposed to create a shallow gradient across the surface of the Made Ground within the development plots sloping downwards towards the reens. On this basis, it has been estimated that water infiltration, rates, provided Made Ground re-engineering works are suitably undertaken, may potentially be reduced to 5% penetration.

It was previously indicated in the Atkins 2017 CWDQRA Report that maximum contaminant soil concentrations were present up to two orders of magnitude larger than the commercial area re-use criteria for several TPH and PAH. In view of this, it was proposed that the poorest quality Made Ground material would be relocated to beneath the commercial area, where infiltration is lowest. It was also indicated that where onsite concentrations are greater than the re-use criteria, remediation or disposal of material offsite may be required. The current revision of the re-use criteria has indicated that provided this material is appropriately re-engineered, then a greater proportion of existing Made Ground may potentially be re-used beneath sections of the site proposed for residential redevelopment. The results of additional EA P20 Level 3 Groundwater RT Worksheet modelling, has also suggested that material which contains concentrations of PAHs in excess of the re-use criteria (Table 5.4 (**Appendix J**)), may also (subject to verification) be suitable for placement across most areas of the site provided that a suitably thick buffer zone of uncontaminated materials is placed between the redeveloped plots and the surface water receptors (reens and ponds). Based upon EA P20 Level 3 Groundwater RT Worksheet modelling, it would appear necessary that the width of this buffer zone between this material and existing surface water reens, will need to be in excess of 20m and potentially closer to 200m. The nature of materials utilised in these buffer zones will need further consideration, in order to optimise the potential for biodegradation of organic contaminants, attenuation of dissolved metals and lowering of pH values prior to discharge of these waters into the reens, within which it is proposed to further encourage fauna and flora colonisation.

It was previously considered by Atkins that reported exceedances of the EQS in the onsite surface water samples are a reflection of the current site condition. This is considered to remain an important point with post-development conditions significantly reducing surface water infiltration by reducing the permeability of the Made Ground and increasing the impermeable surface area across the site, causing increased surface water runoff and subsequently, dilution within the reens. Concentrations of ammoniacal nitrogen released from Made Ground are considered likely to deplete over time in surface waters across the site as this component is leached from the residual sources associated with the former coking works. However, there are known to be other potential off-site sources (mainly agriculturally related), which will continue to impact on the quality particularly of the Monks' Ditch. However, surface water reens across the site which are hydraulically isolated from the main river Monk's Ditch but receive inflow from upstream off-site, surface waters

including agricultural land, may also be impacted by atmospheric contribution of ammoniacal nitrogen, again largely from agriculturally related sources.

As indicated above, fluids passing through the weathering BOF (basic oxygen furnace slag) which will be incorporated within the re-engineered Made Ground will potentially provide an ongoing source of dissolved metals and high pH discharge into the surface water reens. However, reducing the permeability of this Made Ground by reengineering, and placement of a greater proportion of impermeable surface cover following redevelopment should reduce contributions from the present (likely) worst case levels.

6. Conclusions and Recommendations

6.1. Conclusions

Rodgers Leask Environmental Ltd (RLE) has been commissioned by St Modwen Developments Ltd (St Modwen) to update and further develop a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) of the potential risk to Controlled Waters for the Glan Llyn development at Llanwern, Newport. A Conceptual Site Model (CSM) for the site has been further developed and updated based on the contamination data assessment. Screening analysis of recent soil, soil leachate, groundwater and surface water data (revealed potential moderate to low levels of inorganic and organic contamination present onsite in line with contaminants associated with former steelworks sites (DoE, 1995). Made Ground constituting clayey sandy gravels with local slag, burnt shale, tarmac, concrete, brick and mudstone was found to be a potential source of contamination. Contaminants in the unsaturated zone and shallow groundwater attenuate along the transport pathway, including within the onsite drainage ditches (reens), where groundwater seepage combines with onsite water from the SuDS system before being discharged to the Controlled Waters receptor (Monks' Ditch).

There appears to be no obvious increase or decrease in recorded concentrations of metal determinands within upstream reens and positions downstream within the Kings Wall Reen. However, cyanide concentrations appear to increase downstream within the reen system, possibly as leached contributions are made from deposited wastes associated with the former coking works located within the northern central section of the site. However, there is evidence for decrease again in cyanide concentrations, further downstream, potentially due to complexation with metals such as iron and nickel, particularly in the higher pH (alkaline) conditions which are likely to prevail. There is also noted to be evidence of a possible contribution here from ammoniacal liquors associated with the former coking works, although pervasive slightly elevated concentrations of ammoniacal nitrogen have been recorded in surface waters more widely across the site, and from what appear to be sources upstream of the study site.

It is considered that following the undertaking specific remedial works within the area of the site previously occupied by the coking works, then this should have a positive impact on the reduction of ammoniacal and cyanide leachates which appear to be currently entering the surface water reen drainage system.

Calculation of conservative re-use criteria was undertaken using a dilution assessment methodology based on the site-wide water balance and has now incorporated permeability and infiltration parameters which it is considered are more representative of the redeveloped site. Comparison of re-use criteria against available information regarding the current composition of the Made Ground established that the much of Made Ground is likely to be suitable for re-use onsite, however localised source materials containing high concentration material (particularly elevated concentrations of iron, manganese and vanadium), and ammoniacal and cyanide components, may require remediation, or offsite disposal.

Where materials contain PAH concentrations in excess of the calculated reuse criteria for 40% and 5% infiltrations scenarios are to be used within areas of the site proposed for

residential and commercial reusage, then it concluded that this material should, as a precaution, be placed no closer than 150m-200m from the surface water reens into which infiltrated waters are likely to discharge and materials placed within the 'buffer zone' be engineered to provide a dissolved hydrocarbons and metals (principally iron and manganese), attenuating capability.

6.2. Recommendations

The following recommendations are proposed based on the outcomes of the assessment:

- The current programme of long-term monthly surface water monitoring should be continued at the established current sampling locations to monitor the quality of the reen system during and post-development until it is established that water quality is stable and compliant;
- Discharges into Monks' Ditch from the reens onsite are not to occur until specified quality criteria and quality control systems have been established and are met; and
- The sitewide MMP sets out the overall approach to materials management within the development and is a live document to be updated as the development progresses. In order to appropriately mitigate the risk to Controlled Waters, it is proposed that a remediation strategy be produced in conjunction with updates to the Materials Management Plan (MMP), as required, on a phase by phase basis, to regulate the application of the re-use criteria and establish remediation requirements for any localised source zones.

7. References

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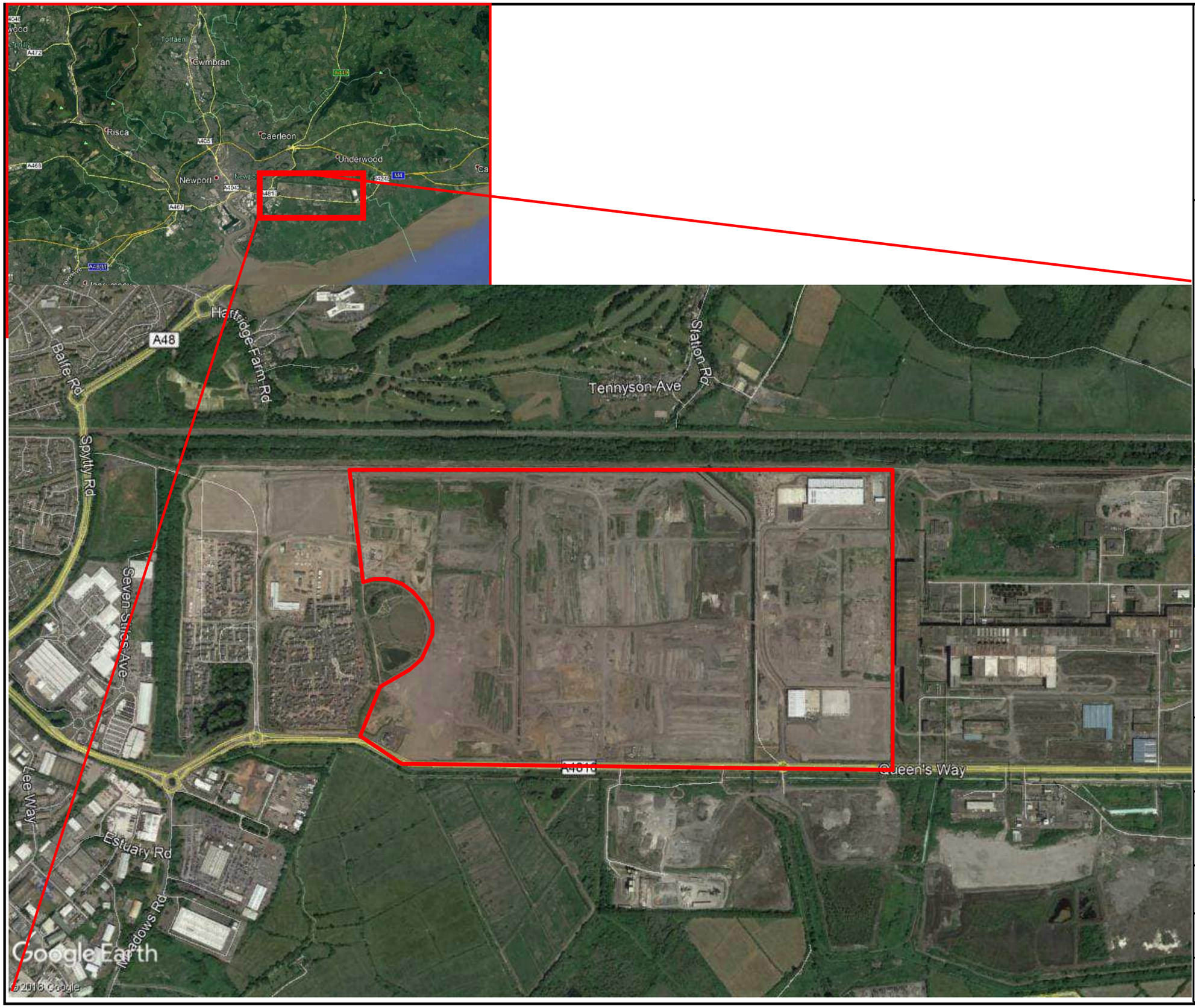
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Drawings



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT RCHITECTS AND ENGINEER'S DRAWINGS

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY

Key

Redline boundary



CLIENT

ST. MODWEN DEVELOPMENTS

PROJECT

LLANWERN SITE LOCATION PLAN

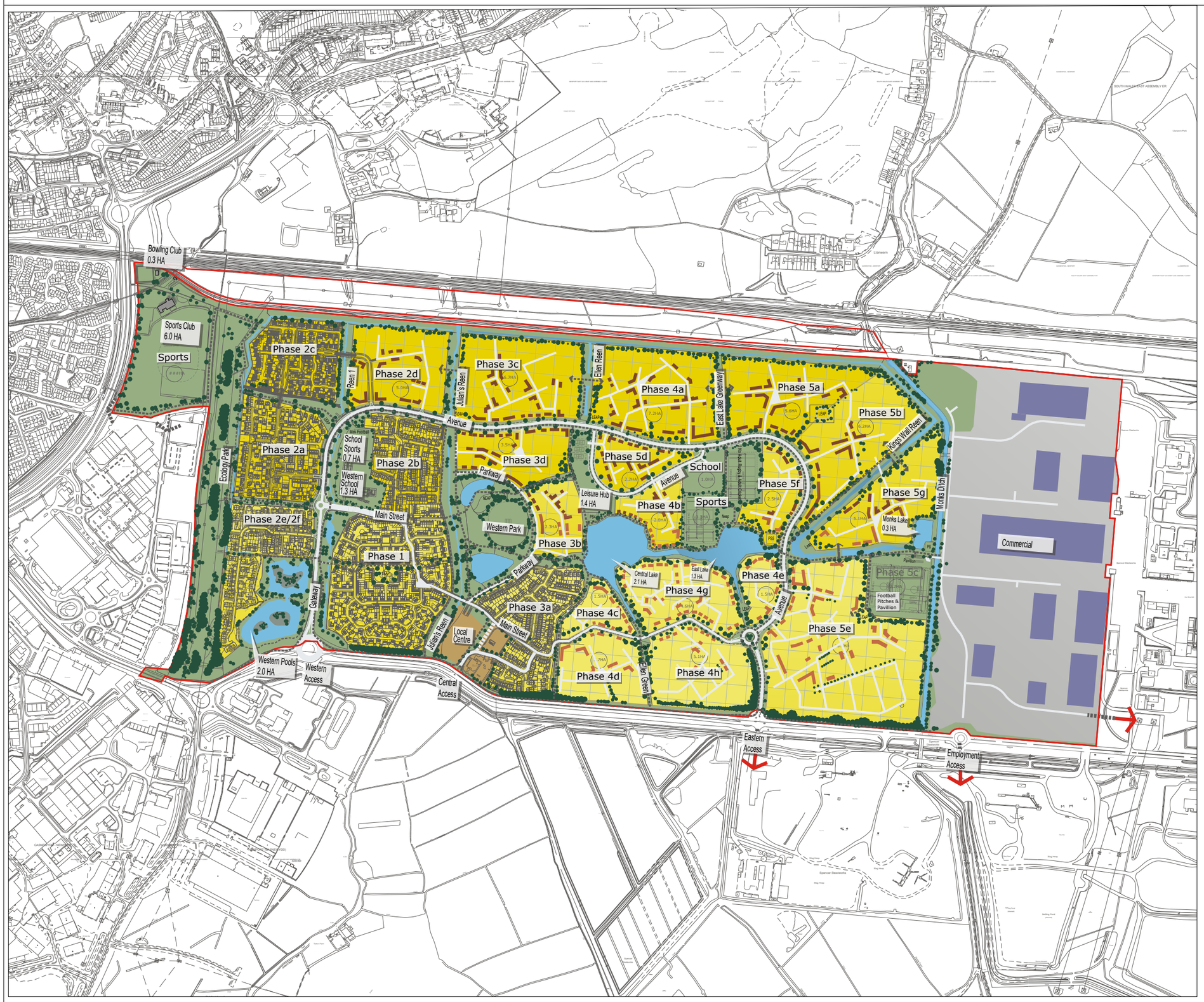
STATUS

FOR INFORMATION

DRAWN	CHECKED	DATE
ET	CW	19/08/2019

PROJECT NUMBER	DRAWING NUMBER	REV.
P18-669	18669-RLE-19-XX-DR-O-0004	

Glan Llyn -ESAMP Indicative Masterplan



Glan Llyn Residential Numbers (based on existing masterplan)					
Phase/Plot	Outlet	Area (HA)	Area (Acres)	Density (HA)	Total Units
1	Persimmon	**9.77**	**24.15**	31.4	307
2/a	Bellway	5.20	12.84	35	182
2/b	SMH	4.06	10.02	35	142
2/c	Bellway	4.30	10.62	35.3	152
2/d	Persimmon	4.98	12.30	35	174
2/e&f	SMH	5.10	12.61	29.8	152
1 and 2/Total		**33.40**	**82.54**		**1109**
3a		5.86	14.49	35	205
3b		2.32	5.74	35	81
3c		6.72	16.60	38.1	256
3d		3.45	8.53	35	121
3 Total		18.36	45.36		663
4a		7.19	17.78	34.8	250
4b		2.04	5.04	35	71
4c		1.53	3.78	35	54
4d		3.65	9.03	35	128
4e		1.49	3.68	35	52
4f		-	-	-	-
4g		4.64	11.46	35	162
4h		5.15	12.73	35	180
5a		5.65	13.95	35	198
5b		6.23	15.41	35	218
5c	Sports	2.67	6.60	35	93
5d		2.24	5.53	35	78
5e		13.72	33.90	35	480
5f		2.49	6.15	35	87
5g		5.06	12.50	35	177
4 and 5/Total		**63.75**	**157.53**		**2230**
1,2,3,4,5 Total		**115.51**	**285.44**		**4002**

NOTE: Areas and housing numbers assume that plot 5c sports is moved to CBP and converted to resi

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SGP File Ref:	8111-08-A011	**Drawing No:**	8111-08-A011
Project No:	8111-08	**Rev:**	**Rev P09**
Drawn By:	NV	**Scale:**	1:5000 @A1
Date:	10/04/2019		

Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastructure

Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastructlayture

0 50 100 200 250 300 400 500
Metres at scale 1:5000

ST.MODWEN

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