

Sapa Extrusions Limited
Bedwas Plant
Pant Glas Industrial Estate
Bedwas
Caerphilly
CF83 8DR

Dear Ruth

**SITE PROTECTION AND MONITORING PROGRAMME (SPMP), JANUARY
2017 (ROUND 27): ENVIRONMENTAL PERMIT REF. BX94551F**

Date 13/02/2017

Background

Sapa Extrusions Ltd., (formerly Hydro Aluminium Extrusions) has carried out regular groundwater monitoring at the installation since August 2005. Ramboll Environ has carried out twenty-three rounds of monitoring between August 2005 and January 2017; and Mabbett and Associates Ltd (M&A) carried out monitoring on four occasions (between February 2009 and April 2010). In accordance with the SPMP, groundwater monitoring is required in order to assess the nature of any identified groundwater contamination arising from potential identified sources over the longer term; and to confirm improvements in site control and management have reduced the levels of contamination.

The main manufacturing operations at the site ceased in March 2014 and the installation has been decommissioned, including decontamination works (cleaning of press-pits, removal of oil storage tanks etc.). However, the anodising plant is intended to be re-commissioned going forward.

Although the main manufacturing activities have been suspended, there are plans to re-commission the anodising plant at a future date and the Environmental Permit remains in place. As such, ongoing SPMP monitoring is required by Natural Resources Wales (NRW), unless otherwise agreed.

A Compliance Assessment Report (CAR), (Ref: CAR_NRW0020594) was issued by NRW on 23rd May 2016 following its review of the previous SPMP monitoring results (Ramboll Environ Report Ref: UK17-22794_01, February 2016). NRW made the following recommendations in the CAR:

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Ref LUK17-23995_1

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- the passive skimmer in BH12 could be removed, considering the minor amounts of product recorded over the past two years; and that the likely source of contamination (P16 Press Pit) has been emptied;
- further investigation should be carried out in order to understand the reason for discolouration in BH6 (sentry borehole). The groundwater has been black/ brown coloured for the last few monitoring rounds; however, the hydrocarbon concentration is not significantly elevated and the groundwater was not observed to have an oily sheen;
- the pH values across the site should continue to be monitored due to a previous spillage in the anodising plant. Although the majority of pH values have returned to more neutral levels, MW2 and BH6 continued to have slightly acidic values; and
- the frequency of monitoring can be reduced to an annual event considering that manufacturing has ceased, unless any production activities resume.

This report details the results of the twenty-seventh round of groundwater monitoring which was undertaken on 19th January 2017. The monitoring has taken into account the aforementioned comments and recommendations made by NRW.

Scope of Works

Groundwater samples were recovered from the following seven SPMP monitoring wells (shown on Figure 1): BH1, BH4, BH6, BHS6, BH11, MW1 and MW2; a sample was not collected from BH12, due the presence of a thin layer of free-phase hydrocarbon (discussed further below).

At each location, the depth to groundwater was recorded and, where present, the thickness of free product was recorded.

Groundwater samples were analysed for metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, V, Be), pH, total cyanide, sulphate, ammonia and Total Petroleum Hydrocarbons (TPH). Additionally, groundwater samples from BH4, BH5, BH6, BHS6 and BH11 were analysed for total suspended solids (TSS), total dissolved solids (TDS), total organic carbon (TOC), iron, and redox potential, in order to gain further information on the potential source of discolouration of groundwater in monitoring wells BH6 and BHS6.

For continuity, the results have been compared with UK Drinking Water Standards (UK DWS) in the groundwater analysis summary table (attached). However, given the objective of the SPMP, to identify increases in groundwater concentrations which may be attributable to the permitted operations, the UK DWS are presented for benchmarking purposes only. The 2017 concentrations should also be considered against the Reference Data.

A graphical representation of results over time is presented on the attached Figures and table. The Reference Data collected in August 2005 (BH1, BH4, BH6, BH11, BH12, MW1, MW2) and February 2009 (BHS6) is included in the table.

Results

A full set of laboratory certificates and a summary table are attached to this letter and the main findings are summarised below.

Passive Skimmer

A passive skimmer was installed in BH12 on 11th February 2011 due to consistent measurements of free phase product (up to 7mm in thickness). The amount of floating product recovered by the skimmer was measured periodically and a total volume of 177ml of floating product has been recovered since 2011. However, over the past two years, no measurable layer of free product has been detected on the surface of the water in BH12 other than a slight oily sheen. Furthermore, the likely source of contamination (the adjacent P16 press pit) has been emptied as part of the decommissioning process. Accordingly, Ramboll Environ removed the passive skimmer in August 2016, as agreed by NRW in an email dated 31st May 2016.

During the most recent round of monitoring, an approximately 0.2cm layer of hydrocarbons was detected on the surface of the water in BH12. However, the results indicate that the amount of floating product present in the ground has remained low and has decreased since passive skimming commenced. This also suggests that the source area of free phase hydrocarbons is likely to be limited in extent in the area of the borehole.

Groundwater Monitoring Results

A summary of the key findings of the groundwater monitoring and analysis results are presented below:

- Groundwater levels across the site ranged from 3.04m below ground level (bgl) (MW2) to 3.87m bgl (BHS6) and remain similar to the previous round of monitoring in August 2016.
- Concentrations of TPH ranged from 0.01mg/l in BH4 to 9.03mg/l in BH1. The concentration of TPH in BH1 has increased slightly from 6.11mg/l in August 2016 to 9.03mg/l in January 2017. However, the 2017 concentration remains well below previous concentrations of TPH detected at this location and is similar to the Reference Data concentrations of 9mg/l.
- The concentration of TPH has decreased in BH4 (from 0.04mg/l to 0.01mg/l); MW2 (from 0.71mg/l to 0.12mg/l); and BHS6 (from 0.04mg/l to 0.03mg/l).
- Historically, the highest TPH concentration is found in BH12 with a strong hydrocarbon odour and an oily sheen on the surface of the sample observed during previous sampling occasions. This well was not sampled during the most recent monitoring round of January 2017 due to the presence of a thin layer of free product.
- The groundwater sample recovered from BHS6 (the 'sentry borehole') was coloured black/brown which is consistent with previous monitoring rounds. However, the TPH concentration continues to be low (0.03mg/l), and remains below the sentry borehole risk-based trigger concentration of 0.108mg/l. During the previous round of monitoring in August 2016, groundwater from borehole BHS6 was removed by submersible pump for approximately one hour to ascertain whether discoloration of groundwater would reduce with an increased volume of purged water. No visible change to the colour of purged water was observed during groundwater removal.
- Black/brown coloured groundwater has also been observed in monitoring wells BH6 and BH5, located adjacent east and west of BHS6. Samples of groundwater from BHS6, BH6 and BH5; and BH4, BH11 and MW2 (across, up and down gradient monitoring wells) were analysed for TSS, TDS, TOC, iron and redox potential in order to gain further information on the potential source of

discolouration of groundwater at locations BHS6, BH6 and BH5. The results are presented in Table 1 and are discussed further in the following section.

- Across the site, pH values ranged from pH 6.9 (MW2) to pH 8.2 (BHS6). Historically, low (acidic) pH values have been recorded at the site; however, during the most recent round of monitoring (January 2017) no pH values were recorded below the lower limit identified in the Water Supply (Water Quality) Regulations 2000 (i.e. pH 6.5).
- Arsenic was detected above the laboratory LOD ($1\mu\text{g/l}$) in BHS6 at a concentration of $9\mu\text{g/l}$, and in BH6 at a concentration of $1\mu\text{g/l}$, i.e. below the UK DWS of $10\mu\text{g/l}$ and within the range of previously recorded values at these locations.
- Boron was not recorded above the LOD ($<10\mu\text{g/l}$) in any of the sampled locations during the most recent round of monitoring.
- Cadmium was detected at or above the laboratory LOD ($<0.1\mu\text{g/l}$) in BH6 ($0.2\mu\text{g/l}$), BHS6 ($0.3\mu\text{g/l}$) and MW2 ($0.1\mu\text{g/l}$), all of which are below the UK DWS of $5\mu\text{g/l}$.
- Chromium was recorded at or above the laboratory LOD ($<1\mu\text{g/l}$) in the majority of sampled monitoring wells, with a maximum concentration of $15\mu\text{g/l}$ in BHS6, which does not exceed the UK DWS of $50\mu\text{g/l}$. All recorded chromium concentrations are within the range of previously recorded concentrations at each location.
- Concentrations of copper were recorded above the laboratory LOD ($<1\mu\text{g/l}$) in monitoring wells BH6 ($5\mu\text{g/l}$), BH11 ($3\mu\text{g/l}$), MW1 ($1\mu\text{g/l}$) and BHS6 ($81\mu\text{g/l}$), which do not exceed the UK DWS of $2,000\mu\text{g/l}$. All recorded concentrations are within the range of values previously recorded at each location.
- Lead was below the laboratory LOD ($<1\mu\text{g/l}$) in all monitoring wells except BH11 ($3\mu\text{g/l}$) and BHS6 ($7\mu\text{g/l}$), below the UK DWS of $25\mu\text{g/l}$.
- Mercury was recorded above the laboratory LOD ($<0.1\mu\text{g/l}$) in monitoring well BHS6 ($0.1\mu\text{g/l}$), which does not exceed the UK DWS of $1\mu\text{g/l}$.
- The concentration of nickel ranged from below the laboratory LOD ($<1\mu\text{g/l}$) in BH4 and MW1 to $8\mu\text{g/l}$ in BH11 (below the UK DWS of $20\mu\text{g/l}$). Historically, elevated concentrations of nickel have been detected in MW2, located at the southern site boundary; however, concentrations have decreased over the monitoring period to date and are now below the screening criteria.
- Selenium was recorded at the laboratory LOD ($<1\mu\text{g/l}$) in monitoring well BHS6 ($1\mu\text{g/l}$), which is below the UK DWS of $10\mu\text{g/l}$. All other concentrations of selenium were below the laboratory LOD.
- Concentrations of zinc were recorded above the laboratory LOD ($<2\mu\text{g/l}$) in all sampled monitoring wells and ranged between $2\mu\text{g/l}$ in BH4 and $38\mu\text{g/l}$ in MW1. The maximum concentration detected does not exceed the UK DWS ($5,000\mu\text{g/l}$).
- Concentrations of ammonia ranged from below the laboratory LOD ($<10\mu\text{g/l}$) in MW1 to $2,100\mu\text{g/l}$ in BH11, which exceeds the UK DWS of $500\mu\text{g/l}$. Whilst the UK DWS has been exceeded on three other occasions at this location since 2012, this represents the highest recorded concentration of ammonia at this location. It should be noted that this monitoring location is up-hydraulic gradient of the main operations and ammonia was not elevated at down-hydraulic gradient monitoring wells. The source of the ammonia is not known.
- Cyanide was below the laboratory LOD ($<20\mu\text{g/l}$) in all sampled monitoring wells.

- The concentrations of sulphate in groundwater ranged from 8.9mg/l in BH1 to 57.9mg/l in BHS6. Sulphate concentrations do not exceed the UK DWS of 250mg/l at any of the monitoring locations.

Groundwater Discolouration

Table 1 below presents the results of additional analysis carried out on groundwater collected from BHS6 and BH6, which have previously been noted as discoloured; and BH4, BH5, BH11 and MW2, which are located up, down and across gradient of BHS6. Monitoring wells BHS6 and BH6 are located to the south of the main Extrusions Building; BH4 and BH5 are located across gradient, to the west of BHS6; BH11 is located up hydraulic gradient of BHS6; and MW2 is located down hydraulic gradient of BHS6, in the south-east of the site.

Table 1: Additional Analysis						
Determinand	BH4	BH5	BHS6	BH6	BH11	MW2
Total Suspended Solids (TSS) (mg/l)	195	1,073	315	276	3,850	704
Total Dissolved Solids (TDS) (mg/l)	174	183	975	296	228	136
Total Organic Carbon (TOC) (mg/l)	0.89	1.2	100	22	6.6	0.61
Iron (total dissolved) (µg/l)	70	60	3,680	130	170	70
Redox Potential (mV)	249.4	321.5	300.5	269.4	260.5	269.4
pH	7.4	Not tested	8.2	7.3	7.1	6.9
Description	Pale brown, slightly silty	black / brown	Black / brown	Dark brown	Brown, silty	Brown, silty
Notes: Descriptions are based on visual observations at the time of sampling. No hydrocarbon odours or oily sheens were noted during sample collection.						

The results indicate that TDS, TOC and dissolved iron concentrations were higher in BHS6 (where the most prominent discolouration occurs) than in the other analysed samples. The discolouration is therefore likely to be related to the elevated concentration of iron and resultant dissolved solids causing the groundwater to appear black, rather than a hydrocarbon source. Hydrocarbons were not detected in significantly elevated concentrations at any of these locations and no oily sheen was observed on groundwater. Although redox potential and pH do not appear to correlate strongly with the discolouration, slight increases in dissolved metal concentrations do correlate with the increase in dissolved iron, suggesting that redox potential and TOC may be an influence on the groundwater chemistry in this area of the site.

The iron concentration in BHS6 (3,680µg/l) is elevated above the UK DWS (0.2µg/l). The UK DWS is considered to be conservative considering that groundwater is not abstracted for potable water in the area. For context, the Environmental Quality Standard (EQS) for inland surface water is 1,000µg/l. The cause of the discolouration and dissolved iron is not known, but may indicate an area of less oxygenated groundwater in this area of the site. The absence of discolouration in BH4, BH11 and MW2, along with comparatively lower concentrations of iron, indicates that the area of impacted groundwater is restricted to monitoring wells BH5, BHS6 and BH6. The absence of discolouration recorded in monitoring wells BH11 and MW2 suggests that on-site or off-site migration of discoloured groundwater or higher dissolved iron contamination is considered unlikely. It is also unlikely that the discolouration is attributable to an operational activity.

As previously reported, the concentrations of determinands in BHS6 over the monitoring period have decreased since the Reference Data recorded in April 2010. In April 2010, arsenic, chromium, mercury, nickel and selenium exceeded the respective screening criteria. TPH was also recorded at the maximum concentration for this location (0.74mg/l). These concentrations have all decreased significantly over the monitoring period to date and only TPH has slightly exceeded the UK DWS over the last seven rounds of monitoring.

Conclusions and Recommendations

The results of the twenty-seventh (January 2017) round of groundwater monitoring have identified minor variations in TPH concentrations across the site; however, all are within the same order of magnitude compared with previous monitoring rounds. No significant increases or decreases have been identified.

The TPH concentration in the Sentry Borehole (BHS6) did not exceed the risk based target of 0.108mg/l, which is designed to be protective of the river from hydrocarbon (including free phase product) contamination in the west of the site. The results therefore indicate that although elevated TPH concentrations continue to be detected in the vicinity of BH12, the contamination is localised and is not migrating in groundwater to the south-east (in the direction of the river).

The passive skimmer was removed from BH12 in August 2016 and the 2017 monitoring has confirmed that only a small quantity of free phase floating product (approximately 0.2cm) has accumulated in monitoring well following removal of the skimmer.

The pH values in BH6 and MW2 have historically been low (acidic) over the early monitoring period, with a gradual increase towards neutral values in more recent monitoring rounds (throughout 2012 to 2015, the pH was generally more alkaline). During the most recent round of monitoring, January 2017, no pH values were recorded below the lower limit identified in the Water Supply (Water Quality) Regulations 2000 (i.e. pH 6.5).

A concentration of ammonia of 2,100µg/l was recorded in BH11, which exceeds the UK DWS of 500µg/l and represents the highest recorded concentration of ammonia at this location. Ammonia concentrations of up to 900µg/l have previously been recorded at this location on three occasions since 2012. The source of the ammonia has not been attributed to on site operational activities and is up-hydraulic gradient from the operational area of the site.

The presence of discoloured groundwater in BHS6 and BH6 has been investigated further. The discolouration is localised, is unlikely to be migrating onto or off the site and is also unlikely to be attributed to operational activities. Although redox potential and pH do not appear to correlate strongly with the discolouration, slight increases in dissolved metal concentrations do correlate with the increase in dissolved iron, suggesting that redox potential and TOC may be an influence on the groundwater chemistry in this area of the site.

Please do not hesitate to contact us if you wish to discuss any of the above.

Yours sincerely,



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Encl. Appendix 1, Figures

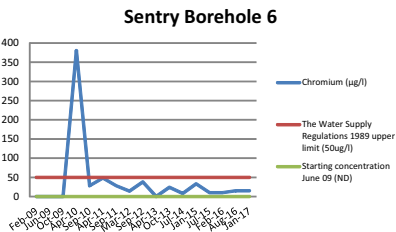
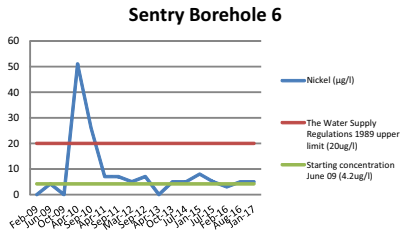
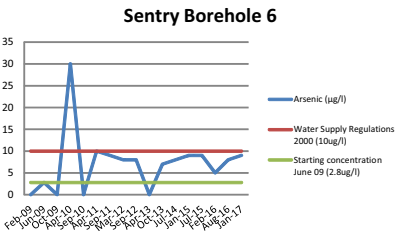
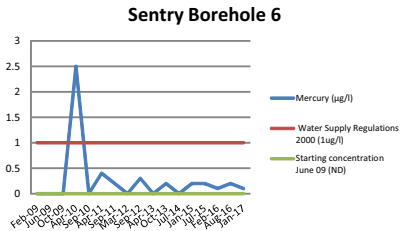
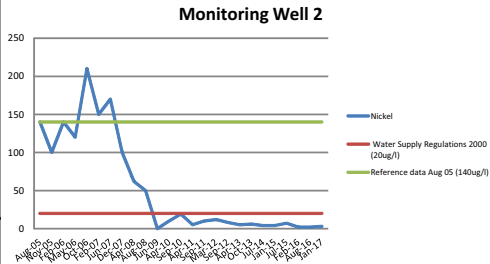
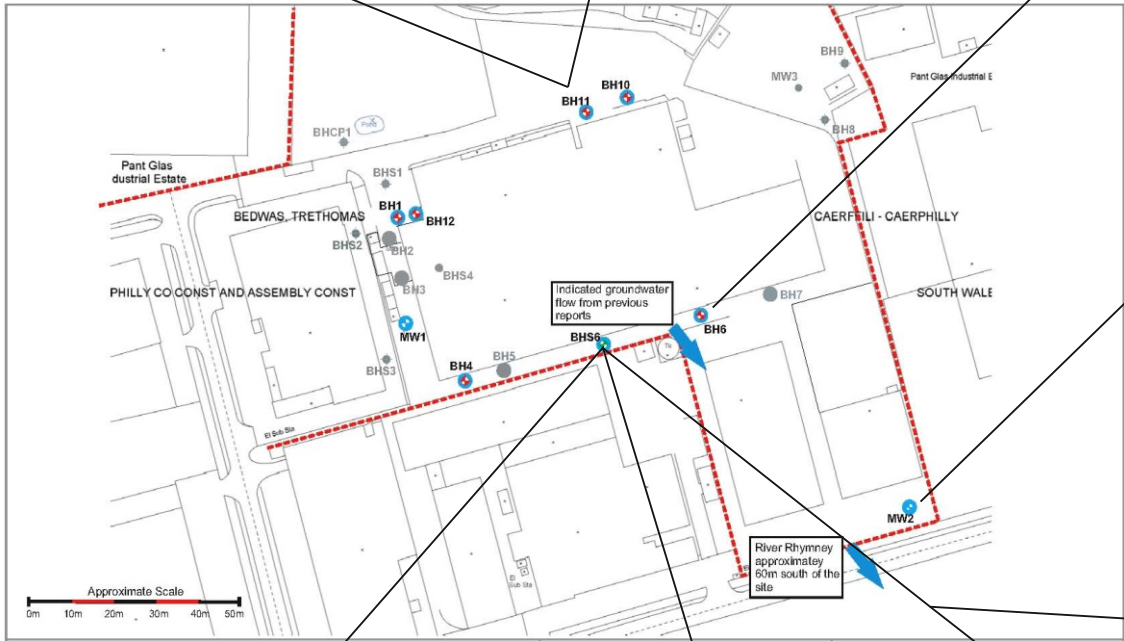
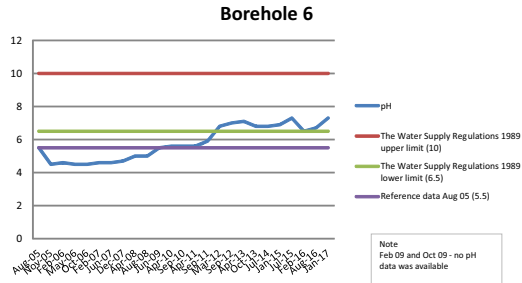
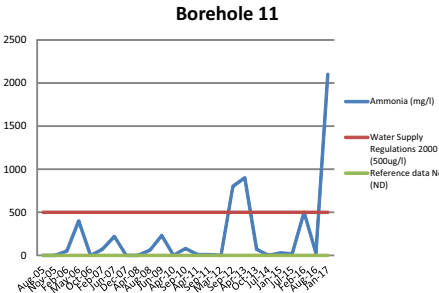
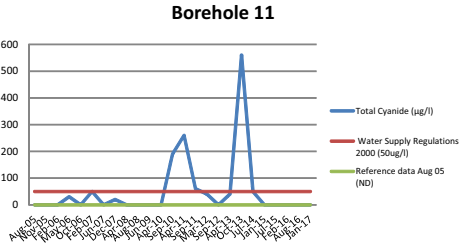
Appendix 2, Table of Groundwater Analysis Results

Appendix 3, Laboratory Certificate of Analysis

Appendix 1

Figures

Contaminant Concentration Graphs



Legend

- Approximate Site Boundary
- Previously Installed Monitoring Well
- SPMP Monitoring Wells
- Previous locations
- ENVIRON Monitoring Well (installed 2005)
- Monitoring Well Location for Hydrocarbon Delineation

Title Contaminant Concentration Graphs

Site Sapa Extrusion Ltd, Bedwas Plant, Pantglas Industrial Estate, Bedwas, Caerphilly

Client Sapa Extrusion Ltd

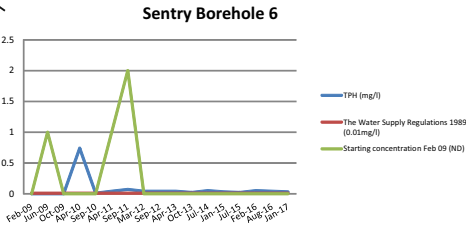
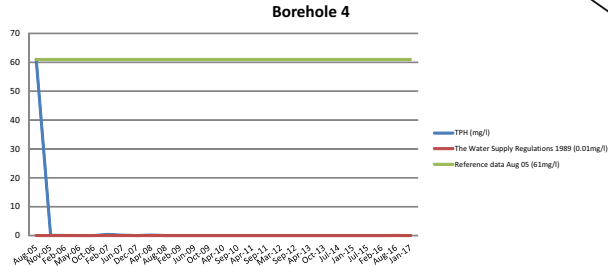
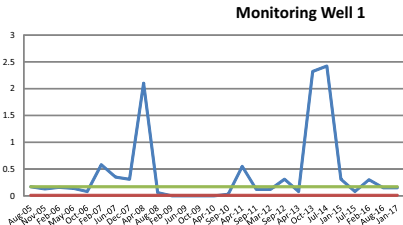
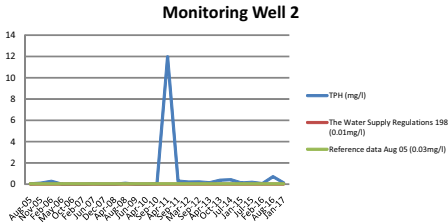
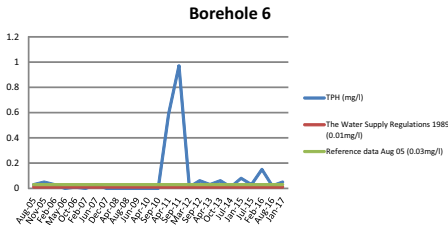
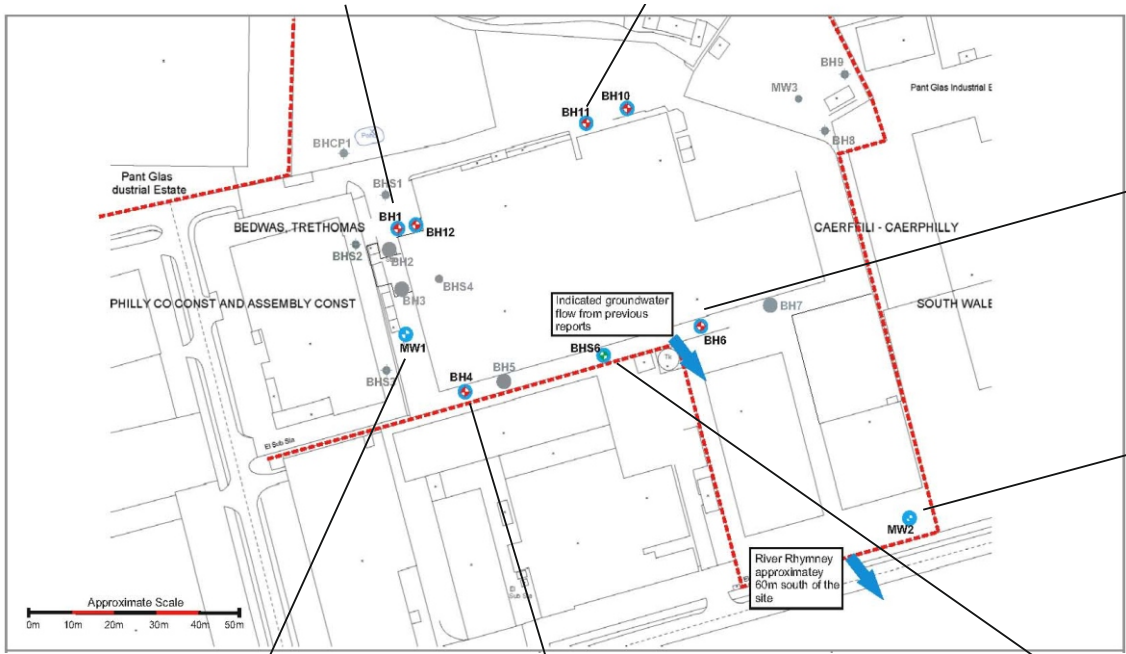
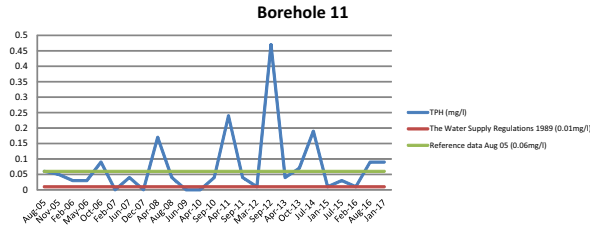
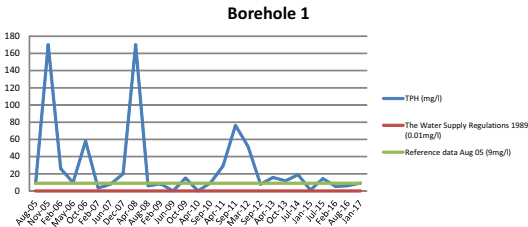
Project No. UK17-23995

Issue 1

Date January 2017

Drawn by RH

TPH Concentration Graphs



Legend

- Approximate Site Boundary
- Previously Installed Monitoring Well
- SPMP Monitoring Wells
- Previous locations
- ENVIRON Monitoring Well (installed 2005)
- Monitoring Well Location for Hydrocarbon Delineation

Title TPH Concentration Graphs

Site Sapa Extrusions Ltd,
Bedwas Plant,
Pantglas Industrial Estate,
Bedwas,
Caerphilly

Client Sapa Extrusions Ltd

Project No. UK17-23995

Issue 1

Date January 2017

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Appendix 2

Table of Groundwater Analysis Results

Sapa (UK17-23995) - Summary of Groundwater Analysis Results (January 2017)

Borehole Location	Date	Analysis														pH	Sulphate as SO ₄ (mg/l)	Water Level (m bgl)
		TPH/EPH (mg/l)	Arsenic (µg/l)	Boron (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Copper (µg/l)	Lead (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Zinc (µg/l)	Ammonia as N (µg/l)	Total Cyanide (µg/l)				
BH1	Aug-05	9	9	NA	ND	ND	ND	ND	ND	ND	ND	ND	1200	ND	6.5	10	3.85	
	Nov-05	170	8	ND	ND	ND	ND	ND	ND	ND	ND	8	60	ND	6.5	12	2.90	
	Feb-06	26	ND	16	ND	ND	ND	ND	ND	5	ND	ND	60	ND	6.4	ND	3.51	
	May-06	9.7	ND	17	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	6.5	49	3.36	
	Oct-06	58	ND	26	ND	ND	ND	ND	ND	10	ND	7	60	ND	6.5	23	3.56	
	Feb-07	3.4	ND	25	ND	ND	ND	ND	ND	ND	ND	ND	70	ND	6.5	ND	2.88	
	Jun-07	7.9	ND	24	ND	ND	ND	ND	ND	8	ND	ND	730	ND	6.4	24	3.45	
	Dec-07	20	ND	26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.2	ND	3.13	
	Apr-08	170	ND	20	ND	ND	ND	ND	ND	ND	ND	8	ND	ND	6.6	ND	3.17	
	Aug-08	6	ND	64	ND	7	ND	ND	ND	ND	ND	8	ND	ND	6.6	ND	3.17	
	Feb-09	8.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.10	
	Jun-09	ND	1.4	39	ND	9.9	ND	ND	ND	2.3	1.3	100	120	ND	6.5	5.1	3.68	
	Oct-09	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.55	
	Apr-10	ND	0.9	NA	0.03	14	ND	ND	ND	4	0.5	10	NA	NA	6.5	ND	3.12	
	Sep-10	9.39	ND	20	ND	6	ND	ND	ND	2	ND	ND	30	ND	6.4	12	3.49	
	Apr-11	28.95	ND	20	ND	2	2	ND	ND	2	ND	9	ND	ND	6.6	6	3.72	
	Sep-11	76.31	ND	20	ND	7	ND	ND	ND	2	ND	2	50	ND	6.4	8	3.53	
	Mar-12	51.97	1	ND	0.1	6	2	3	ND	2	1	6	20	20	7	8	3.60	
	Sep-12	7.81	1	40	ND	2	3	4	ND	3	ND	20	70	ND	7.3	11	3.24	
	Apr-13	15.75	ND	NA	ND	2	ND	ND	ND	ND	ND	5	20	ND	7.3	7	3.39	
	Oct-13	11.7	ND	20	ND	3	ND	ND	ND	2	ND	7	70	ND	6.9	9	3.70	
	Jul-14	19.01	ND	20	ND	2	ND	ND	ND	1	ND	3	ND	ND	6.6	6	3.72	
	Jan-15	0.98	ND	ND	ND	ND	ND	ND	ND	1	ND	25	110	ND	6.9	7	2.80	
	Jul-15	14.4	ND	ND	ND	ND	ND	ND	ND	3	ND	ND	70	ND	7.1	9	3.53	
	Feb-16	5.2	ND	30	ND	ND	ND	ND	ND	4	ND	74	130	ND	6.6	13	2.41	
	Aug-16	6.11	ND	10	ND	ND	ND	ND	ND	ND	ND	80	ND	ND	6.6	8.6	3.53	
	Jan-17	9.03	ND	ND	ND	ND	3	ND	ND	ND	4	ND	5	70	ND	7.1	8.9	3.55
BH4	Aug-05	61	10	NA	ND	ND	ND	ND	ND	ND	ND	ND	110	ND	6.8	34	4.02	
	Nov-05	0.11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.6	20	3.10	
	Feb-06	0.07	ND	24	ND	10	ND	ND	ND	ND	ND	ND	110	ND	6.8	25	3.73	
	May-06	0.02	ND	23	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	6.9	26	3.56	
	Oct-06	0.02	ND	30	ND	ND	17	ND	ND	ND	ND	10	ND	ND	6.8	34	3.81	
	Feb-07	0.4	ND	27	ND	ND	ND	ND	ND	ND	ND	ND	80	ND	7	21	3.11	
	Jun-07	0.15	ND	30	ND	ND	ND	ND	ND	ND	ND	ND	210	ND	6.8	24	3.62	
	Dec-07	ND	ND	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.8	24	3.28	
	Apr-08	0.19	ND	25	ND	ND	7	ND	ND	ND	ND	ND	ND	ND	7.1	20	3.39	
	Aug-08	ND	ND	36	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	6.8	19	3.30	
	Feb-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.10	
	Jun-09	ND	1.3	33	ND	12	1.3	ND	ND	ND	1.4	7.1	40	ND	7	15	3.80	
	Oct-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.79	
	Apr-10	ND	2	NA	ND	12	ND	ND	ND	3	0.7	5	NA	NA	6.9	17	3.35	
	Sep-10	0.01	ND	20	ND	4	ND	ND	ND	ND	ND	ND	20	ND	6.8	15	3.62	
	Apr-11	0.03	ND	30	ND	4	2	ND	ND	ND	ND	ND	ND	ND	7	16	3.84	
	Sep-11	0.01	ND	20	ND	7	ND	ND	ND	ND	1	ND	30	ND	6.6	18	3.61	
	Mar-12	0.03	ND	ND	0.1	6	3	2	ND	ND	2	5	ND	ND	7.3	21	3.75	
	Sep-12	ND	ND	20	ND	3	1	ND	ND	ND	1	ND	ND	ND	7.5	19	3.42	
	Apr-13	0.02	ND	NA	ND	3	ND	ND	ND	ND	ND	ND	10	ND	7.4	17	3.57	
	Oct-13	0.02	ND	20	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	7.2	18	3.80	
	Jul-14	ND	ND	20	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	7	14	3.86	
	Jan-15	ND	ND	ND	ND	1	ND	ND	ND	ND	ND	ND	ND	ND	7.3	15	2.97	
	Jul-15	ND	ND	20	ND	2	ND	ND	ND	ND	ND	ND	20	ND	7.5	16	3.65	
	Feb-16	0.02	ND	30	ND	2	ND	ND	ND	ND	ND	21	10	ND	6.8	14	2.50	
	Aug-16	0.04	ND	10	ND	ND	ND	ND	ND	ND	ND	2	ND	ND	6.8	17.5	3.69	
	Jan-17	0.01	ND	ND	ND	2	ND	ND	ND	ND	ND	2	10	ND	7.4	17.6	3.70	
BH6	Aug-05	0.03	9	NA	2	ND	ND	ND	ND	48	ND	140	700	ND	5.5	440	3.68	
	Nov-05	0.05	8	ND	2	ND	ND	ND	ND	58	ND	200	490	ND	4.5	450	3.07	
	Feb-06	0.03	ND	23	2	7	7	ND	ND	45	ND	130	1200	ND	4.6	740	3.45	
	May-06	ND	ND	25	2	ND	9	ND	ND	56	ND	160	920	ND	4.5	830	3.29	
	Oct-06	0.01	ND	21	1	ND	7	ND	ND	46	ND	130	120	ND	4.5	380	3.41	
	Feb-07	ND	ND	29	1	ND	5	ND	ND	36	ND	95	630	ND	4.6	340	2.99	
	Jun-07	0.03	ND	27	ND	ND	ND	ND	ND	24	ND	54	470	ND	4.6	230	3.39	
	Dec-07	ND	ND	29	ND	ND	ND	ND	ND	13	ND	53	200	ND	4.7	110	3.18	
	Apr-08	ND	ND	27	ND	ND	ND	ND	ND	15	ND	39	140	ND	5.0	170	3.27	
	Aug-08	ND	ND	31	ND	ND	ND	ND	ND	13	ND	31	140	ND	5.0	130	3.08	
	Jun-09	ND	ND	34	ND	ND	ND	ND	ND	6.7	ND	23	160	ND	5.5	97	4.83	
	Apr-10	ND	1.1	NA	0.22	3	ND	ND	ND	5	1.1	21	NA	NA	5.6	100	3.28	
	Sep-10	ND	ND	20	0.3	2	ND	ND	ND	4	ND	54	20	ND	5.6	58	3.42	
	Apr-11	0.59	ND	50	0.2	1	2	ND	ND	3	ND	20	ND	ND	5.6	61	3.60	
	Sep-11	0.97	ND	20	0.2	4	ND	ND	ND	5	ND	11	20	ND	5.9	47	3.46	
	Mar-12	0.01	ND	ND	0.3	2	ND	2	0.1	1	1	9	ND	ND	6.8	60	3.50	
	Sep-12	0.06	ND	20	0.1	ND	ND	2	ND	1	2	12	ND	ND	7	51	3.24	
	Apr-13	0.03	ND	NA	0.2	2	ND	ND	ND	1	1	29	ND	ND	7.1	49	3.36	
	Oct-13	0.06	ND	20	0.1	2	ND	ND	ND	ND	1	13	ND	ND	6.8	32	3.56	
	Jul-14	0.01	ND	20	ND	1	ND	ND	ND	ND	1	3	ND	ND	6.8	35	3.60	
	Jan-15	0.08	ND	ND	ND	ND	2	ND	ND	4	ND	4	10	ND	6.9	37	2.95	
	Jul-15	0.03	ND	20	ND	ND	ND	ND	ND	1	1	ND	20	ND	7.3	29	3.45	
	Feb-16	0.15	1	80	0.2	ND	7	1	ND	8	1	64	20	ND	6.5	43	2.51	
	Aug-16	0.02	ND	70	0.1	ND	3	ND	ND	6	ND	98	ND	ND	6.7	32.6	3.43	
	Jan-17	0.05	1	ND	0.2	ND	5	ND	ND	7	ND	4	10	ND	7.3	36.2	3.43	
	BH11	Aug-05	0.06	11	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	7.4	190	3.62
		Nov-05	0.05	6	ND	ND	ND	ND	ND	ND	ND	ND	7	ND	ND	6.8	140	2.79
Feb-06		0.03	ND	34	ND	10	ND	ND	ND	ND	ND	6	50	ND	7.6	550	3.00	
May-06		0.03	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	400	30	7.1	180	3.27	
Oct-06		0.09	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.9	13	3.33	
Feb-07		ND	ND	34	ND	ND	ND	ND	ND	ND	ND	ND	70	50	6.8	31	2.77	
Jun-07		0.04	ND	32	ND	ND	ND	ND	ND	ND	ND	ND	220	ND	6.8	44	3.21	
Dec-07		ND	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.5	49	3.08	
Apr-08		0.17	ND	21	ND	ND	ND	ND	ND	ND	ND	47	ND	ND	7.0	30	3.00	
Aug-08		0.04	ND	25														

		Analysis																	
Borehole Location	Date	TPH/EPH (mg/l)	Arsenic (µg/l)	Boron (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Copper (µg/l)	Lead (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Zinc (µg/l)	Ammonia as N (µg/l)	Total Cyanide (µg/l)	pH	Sulphate as SO ₄ (mg/l)	Water Level (m bgl)		
BH12	Aug-05	7.8	7	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	1400	ND	6.6	5	4.00	
	Nov-05	34	ND	ND	ND	20	ND	ND	ND	7	ND	9	ND	ND	ND	6.4	22	3.02	
	Feb-06	13	ND	16	ND	ND	ND	ND	ND	10	ND	ND	70	ND	ND	6.3	ND	3.64	
	May-06	71	ND	15	ND	10	ND	ND	ND	5	ND	ND	ND	ND	ND	6.5	ND	3.51	
	Oct-06	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	6.5	NS*	3.26	
	Feb-07	21	ND	23	ND	ND	ND	ND	ND	ND	ND	ND	120	ND	ND	6.5	ND	3.01	
	Jun-07	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	6.4	NS*	3.12	
	Dec-07	1000	ND	26	ND	ND	ND	ND	ND	7	ND	30	79	ND	ND	6.3	ND	3.23	
	Apr-08	34	ND	19	ND	ND	ND	ND	ND	5	ND	ND	ND	ND	ND	6.6	ND	3.33	
	Aug-08	260	ND	23	ND	ND	ND	ND	ND	ND	ND	8	ND	ND	ND	6.5	ND	3.28	
	Feb-09	48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.45	NA	3.11	
	Jun-09	240	ND	ND	ND	ND	2	1.5	ND	3.7	ND	15	190	ND	ND	6.4	4.8	3.68	
	Oct-09	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.45	NA	3.85	
	Apr-10	72	1.7	NA	0.04	15	0.9	ND	ND	6	0.9	7	NA	NA	NA	6.5	ND	3.45	
	Sep-10	160.7	ND	20	ND	5	ND	ND	ND	2	ND	6	40	ND	ND	6.4	ND	3.71	
	Apr-13	45.98	1	NA	ND	2	ND	ND	ND	12	ND	10	10	ND	ND	7.2	8	3.51	
	Oct-13	128	ND	10	ND	3	ND	ND	ND	2	ND	8	80	ND	ND	6.9	ND	3.80	
	Jul-14	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	3.88	
	Jan-15	34.2	ND	ND	ND	ND	ND	ND	ND	1	ND	67	60	ND	ND	6.8	ND	2.92	
	Jul-15	49	ND	ND	ND	ND	ND	ND	ND	4	ND	ND	80	ND	ND	6.9	ND	3.68	
	Feb-16	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	2.55	
	Aug-16	90.2	ND	10	ND	ND	ND	ND	ND	2	ND	7	40	ND	ND	6.5	ND	3.69	
	Jan-17	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	3.70	
MW1	Aug-05	0.17	11	NA	ND	ND	ND	ND	ND	ND	ND	32	160	ND	ND	6.6	24	4.01	
	Nov-05	0.13	ND	ND	ND	ND	ND	ND	ND	ND	ND	43	ND	ND	ND	6.8	33	3.11	
	Feb-06	0.16	ND	22	ND	ND	ND	ND	ND	ND	ND	80	50	ND	ND	6.6	25	3.73	
	May-06	0.14	ND	20	ND	8	ND	ND	ND	ND	ND	32	ND	ND	ND	6.8	23	3.58	
	Oct-06	0.08	12	20	ND	10	5	ND	ND	ND	ND	24	ND	ND	ND	7.2	22	3.87	
	Feb-07	0.58	ND	27	ND	ND	ND	ND	ND	ND	ND	51	230	ND	ND	7	22	3.18	
	Jun-07	0.35	ND	27	ND	ND	ND	ND	ND	ND	ND	40	80	ND	ND	6.7	21	3.61	
	Dec-07	0.31	ND	29	ND	ND	ND	ND	ND	ND	ND	40	ND	ND	ND	6.5	22	3.29	
	Apr-08	2.1	ND	26	ND	ND	ND	ND	ND	ND	ND	37	50	ND	ND	6.8	20	3.41	
	Aug-08	0.06	ND	26	ND	ND	ND	ND	ND	ND	ND	56	ND	ND	ND	6.7	18	3.29	
	Feb-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.44	
	Jun-09	ND	ND	ND	ND	ND	10	14	ND	3.4	ND	120	210	ND	7	2.6	3.15		
	Oct-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.87	
	Apr-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.41	
	Sep-10	0.03	ND	20	0.1	4	1	ND	ND	1	ND	86	20	ND	ND	6.6	24	3.64	
	Apr-11	0.55	ND	30	0.1	1	5	ND	ND	2	ND	126	ND	ND	ND	6.8	22	3.86	
	Sep-11	0.12	ND	50	ND	4	1	ND	ND	1	ND	49	20	ND	ND	6.7	26	3.64	
	Mar-12	0.12	ND	ND	0.2	5	3	3	ND	2	1	126	ND	ND	ND	7.1	22	3.75	
	Sep-12	0.31	ND	20	ND	2	2	2	ND	1	1	46	ND	ND	ND	7.3	19	3.41	
	Apr-13	0.08	ND	NA	0.1	2	2	ND	ND	ND	2	ND	84	30	ND	ND	7.3	17	3.56
	Oct-13	2.32	ND	20	ND	2	ND	ND	ND	2	1	73	ND	ND	ND	7	22	3.80	
	Jul-14	2.42	ND	20	ND	1	1	ND	ND	2	ND	40	ND	ND	ND	6.9	15	3.86	
	Jan-15	0.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	36	10	ND	ND	7.2	14	2.95	
Jul-15	0.08	ND	20	ND	ND	ND	ND	ND	1	ND	26	60	ND	ND	7.4	20	3.65		
Feb-16	0.3	ND	ND	ND	ND	1	ND	ND	ND	ND	26	10	ND	ND	6.8	26	2.47		
Aug-16	0.15	ND	10	ND	ND	1	ND	ND	ND	1	14	ND	ND	ND	6.6	19.8	3.67		
Jan-17	0.15	ND	ND	ND	2	1	ND	ND	ND	ND	38	ND	ND	ND	7.2	20.7	3.70		
MW2	Aug-05	0.03	6	NA	ND	ND	ND	ND	ND	140	ND	120	95	ND	ND	5.5	370	3.19	
	Nov-05	0.1	ND	ND	2	ND	ND	ND	ND	100	ND	100	ND	ND	ND	5.4	380	2.60	
	Feb-06	0.27	ND	24	4	6	ND	ND	ND	140	ND	110	70	ND	ND	5.5	480	3.00	
	May-06	ND	ND	25	3	ND	ND	ND	ND	120	ND	91	70	ND	ND	5.6	580	2.94	
	Oct-06	0.01	ND	27	7	ND	ND	ND	ND	210	ND	200	90	ND	ND	5.8	790	3.04	
	Feb-07	ND	ND	33	3	ND	ND	ND	ND	150	ND	110	90	ND	ND	5.6	510	2.69	
	Jun-07	0.08	ND	28	5	ND	ND	ND	ND	170	ND	170	240	ND	ND	5.4	510	2.94	
	Dec-07	ND	ND	29	3	ND	ND	ND	ND	100	ND	120	88	ND	ND	5.5	350	2.88	
	Apr-08	ND	ND	27	2	ND	ND	ND	ND	62	ND	72	1	ND	ND	5.5	210	2.83	
	Aug-08	0.09	ND	30	1	ND	ND	ND	ND	60	ND	76	ND	ND	ND	5.6	170	2.70	
	Jun-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.95	NA	2.78	
	Apr-10	ND	0.5	NA	0.54	8	3.6	ND	ND	10	0.6	170	NA	NA	NA	6.3	100	2.86	
	Sep-10	0.04	ND	30	0.8	3	ND	ND	ND	19	ND	121	30	ND	ND	8.1	82	2.94	
	Apr-11	11.97	ND	30	0.1	2	2	ND	ND	5	ND	7	ND	ND	ND	7.4	71	3.14	
	Sep-11	0.3	ND	40	0.1	5	ND	ND	ND	10	ND	11	60	ND	ND	6.4	71	3.00	
	Mar-12	0.2	ND	ND	0.5	2	1	6	ND	12	1	33	ND	ND	ND	7	61	3.09	
	Sep-12	0.22	ND	20	0.1	ND	1	5	ND	8	ND	30	ND	ND	ND	7.1	54	2.82	
	Apr-13	0.13	ND	NA	0.4	2	ND	ND	ND	5	ND	21	30	ND	ND	7.7	55	2.95	
	Oct-13	0.38	ND	20	ND	1	ND	ND	ND	6	ND	17	10	ND	ND	6.7	60	3.12	
	Jul-14	0.42	ND	20	ND	ND	ND	ND	ND	4	ND	16	ND	ND	ND	6.6	45	3.18	
	Jan-15	0.11	ND	ND	0.1	ND	ND	ND	ND	4	ND	17	50	ND	ND	6.8	44	2.58	
	Jul-15	0.18	ND	30	ND	ND	ND	ND	ND	7	ND	21	50	ND	7	7	43	3.05	
	Feb-16	0.06	ND	ND	0.1	ND	ND	ND	ND	2	ND	17	20	ND	ND	6.3	36	2.11	
Aug-16	0.71	ND	ND	ND	ND	ND	ND	ND	2	ND	9	30	ND	ND	6.3	36.4	3.02		
Jan-17	0.12	ND	ND	0.1	1	ND	ND	ND	3	ND	9	10	ND	ND	6.9	39.4	3.04		
BHS6 (Sentry Borehole)	Feb-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.47	
	Jun-09	ND	2.8	ND	ND	ND	13	1.1	ND	4.2	1.8	6.7	310	ND	7.3	NA	4.00		
	Oct-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.00		
	Apr-10	0.74	30	NA	1.8	380	410	41	2.5	51	21	71	NA	NA	NA	7.5	81	3.65	
	Sep-10	0.01	ND	30	1	28	1723	11	ND	26	ND	338	300	ND	7.3	46	3.86		
	Apr-11	0.04	10	40	0.8	48	85	21	0.4	7	4	37	400	ND	7.8	55	4.03		
	Sep-11	0.07	9	ND	1.1	28	81	22	0.2	7	4	24	400	ND	7.5	61	3.90		
	Mar-12	0.04	8	ND	0.9	14	66	17	ND	5	3	22	330	ND	7.9	63	3.95		
	Sep-12	0.04	8	ND	0.8	38	99	20	0.3	7	3	15	160	ND	8.2	59	3.66		
	Apr-13	0.04	ND	NA	0.8	ND	189	ND	ND	ND	ND	515	6888	ND	8.2	60			

Appendix 3

Laboratory Certificate of Analysis

Our Ref: EXR/234038 (Ver. 1)

Your Ref: UK17-23995

January 27, 2017



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Rob Hodgson
Ramboll Environ
8 Village Way
Cardiff
CF15 7NE

For the attention of Rob Hodgson

Dear Rob Hodgson

Sample Analysis - SAPA SPMP Round 27

Samples from the above site have been analysed in accordance with the schedule supplied.

The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink, appearing to read 'K Spencer', followed by a small horizontal line.

K Spencer
Project Co-ordinator
01283 554463

TEST REPORT



Report No. EXR/234038 (Ver. 1)

Ramboll Environ
8 Village Way
Cardiff
CF15 7NE

Site: SAPA SPMP Round 27

The 8 samples described in this report were registered for analysis by ESG on 20-Jan-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 27-Jan-2017

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

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
GC-FID Chromatograms (Pages 4 to 10)
Analytical and Deviating Sample Overview (Pages 11 to 12)
Table of Method Descriptions (Page 13)
Table of Report Notes (Page 14)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

A handwritten signature in blue ink, appearing to read 'Tim Barnes'.

Operations Director
Energy & Waste Services

Date of Issue: 27-Jan-2017

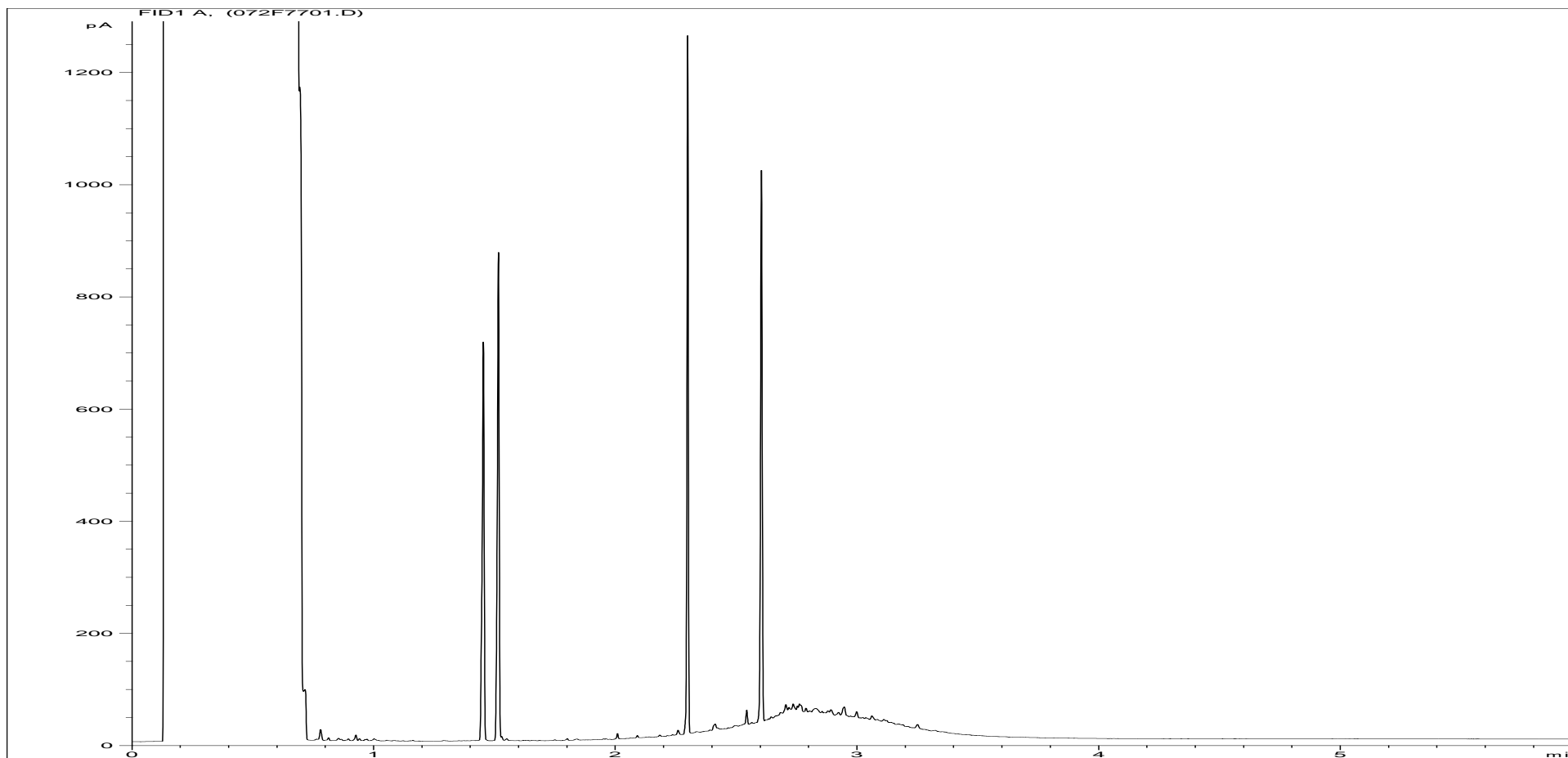
Tests marked '^' have been subcontracted to another laboratory.

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

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

Units : Method Codes : Method Reporting Limits : UKAS Accredited :			pH units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			WSLM3	WSLM10	Calc_HD	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR	ICPMSW	ICPWATVAR	ICPMSW
			5	7	3	1	1	0.001	0.001	0.0001	0.001	0.001	0.002	0.01	0.001	0.01	0.0001	
			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EX/	Client Sample Description	Sample Date	pH units w	Suspended Solids w	Total Hardness as CaCO3	Total Sulphur as SO4 (Dissolved) a	Calcium as Ca (Dissolved) a	Magnesium as Mg (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Dissolved)	Cadmium as Cd (Dissolved)	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Iron as Fe (Dissolved) a	Arsenic as As (Dissolved)	Boron as B (Dissolved) a	Mercury as Hg (Dissolved)
1764233	MW2	19-Jan-17 10:50	6.9	704	66	39.4	16.7	5.9	0.003	0.001	0.0001	<0.001	<0.001	0.009	0.07	<0.001	<0.01	<0.0001
1764234	BH6	19-Jan-17 11:25	7.3	276	48	36.2	11.7	4.5	0.007	<0.001	0.0002	0.005	<0.001	0.004	0.13	0.001	<0.01	<0.0001
1764235	BHS6	19-Jan-17 11:45	8.2	315	<10	57.9	2.3	<1.0	0.005	0.015	0.0003	0.081	0.007	0.019	3.68	0.009	<0.01	0.0001
1764236	BH4	19-Jan-17 12:15	7.4	195	118	17.6	35.0	7.5	<0.001	0.002	<0.0001	<0.001	<0.001	0.002	0.07	<0.001	<0.01	<0.0001
1764237	BH5	19-Jan-17 12:30		1073											0.06			
1764238	MW1	19-Jan-17 13:30	7.2		128	20.7	38.6	7.6	<0.001	0.002	<0.0001	0.001	<0.001	0.038		<0.001	<0.01	<0.0001
1764239	BH1	19-Jan-17 14:00	7.1		206	8.9	58.8	14.3	0.004	0.003	<0.0001	<0.001	<0.001	0.005		<0.001	<0.01	<0.0001
1764240	MW11	19-Jan-17 10:20	7.1	3850	109	24.8	31.7	7.2	0.008	0.002	<0.0001	0.003	0.003	0.007	0.17	<0.001	<0.01	<0.0001
							</											

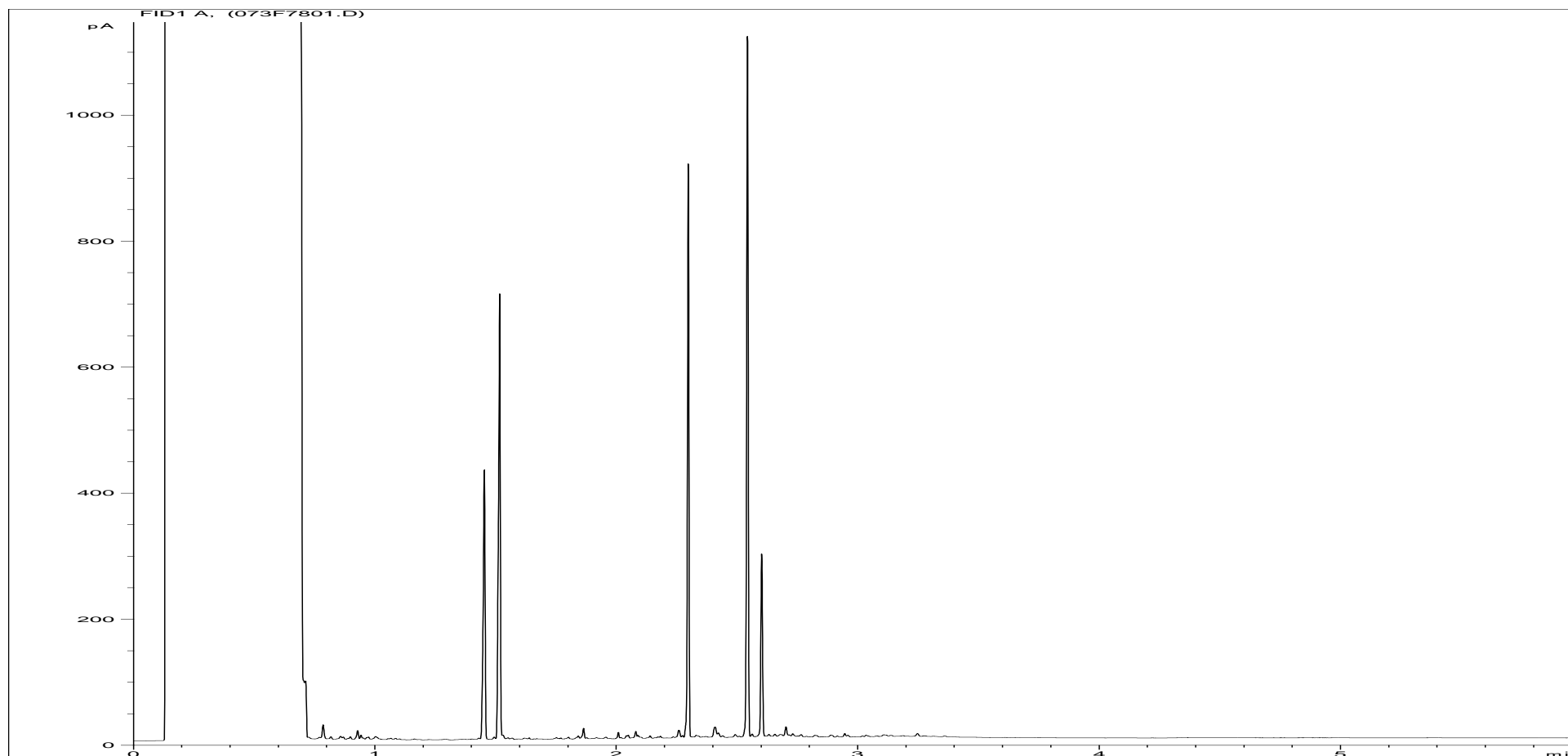
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1764233	Job Number:	W23_4038
Multiplier:	0.005	Client:	Ramboll Environ
Dilution:	1	Site:	SAPA SPMP Round 27
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	MW2
Acquisition Date/Time:	25-Jan-17, 08:23:00		
Datafile:	D:\TES\DATA\Y2017\012417TPH_GC3\012417 2017-01-24 16-09-46\072F7701.D		

Where individual results are flagged see report notes for status.

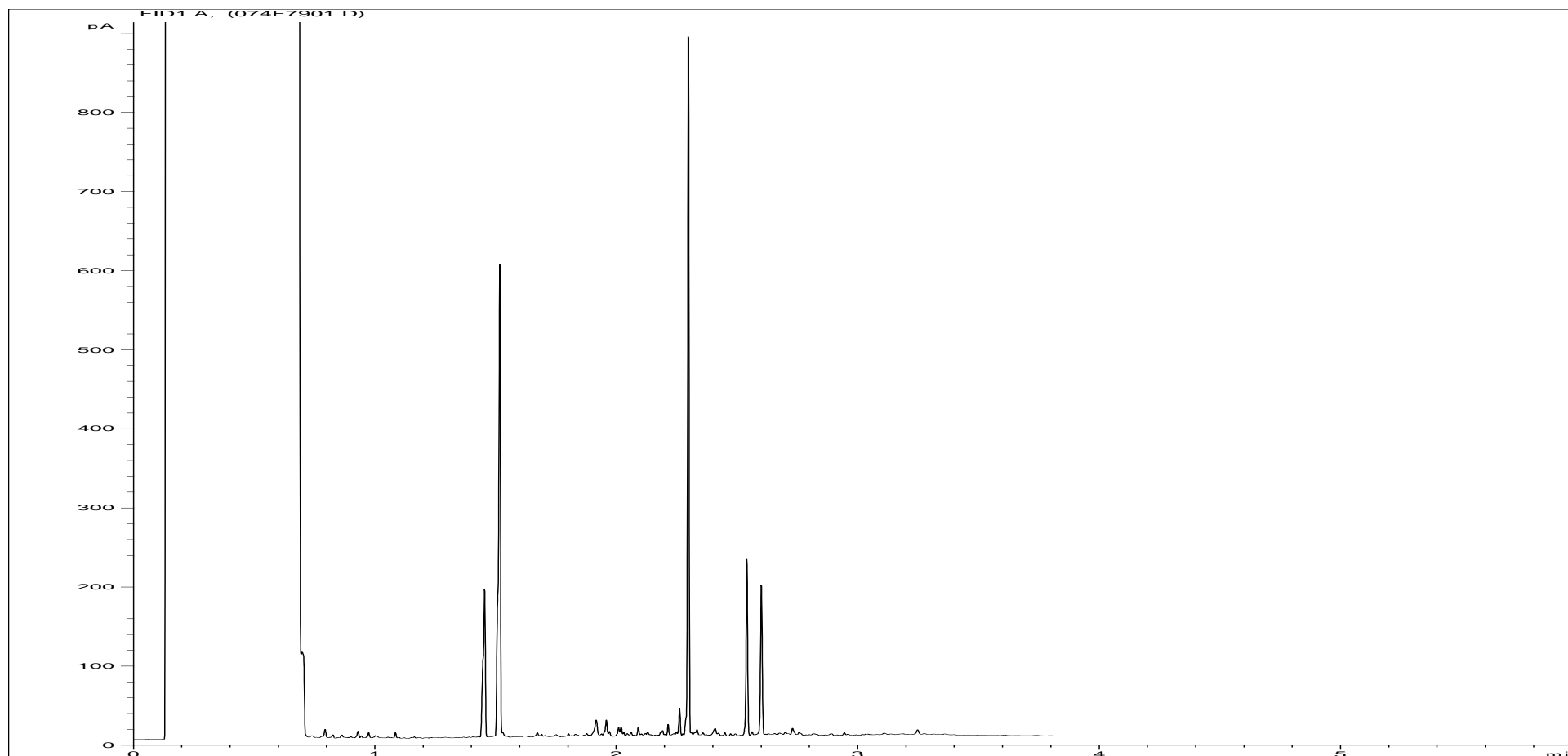
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1764234	Job Number:	W23_4038
Multiplier:	0.005	Client:	Ramboll Environ
Dilution:	1	Site:	SAPA SPMP Round 27
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH6
Acquisition Date/Time:	25-Jan-17, 08:35:40		
Datafile:	D:\TES\DATA\Y2017\012417TPH_GC3\012417 2017-01-24 16-09-46\073F7801.D		

Where individual results are flagged see report notes for status.

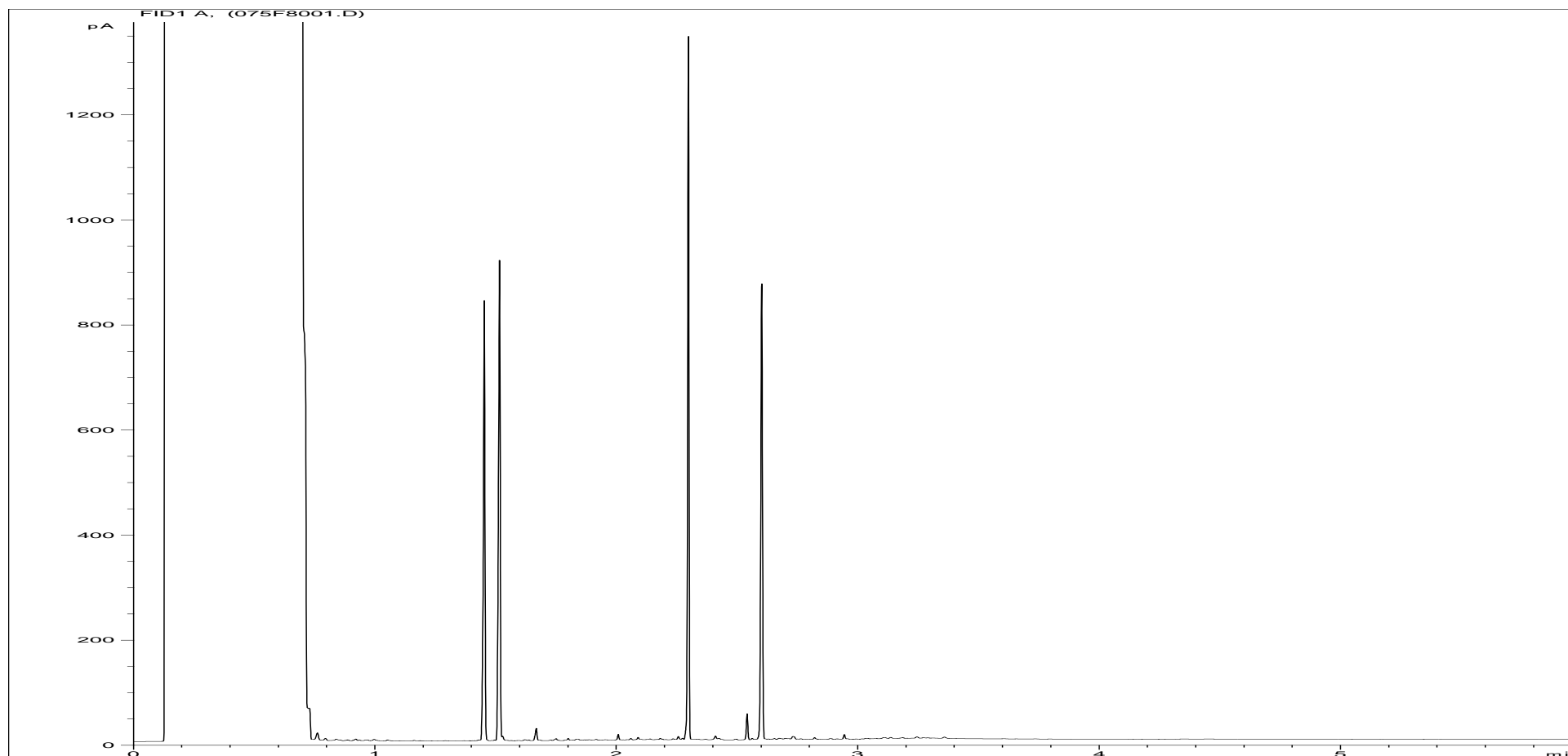
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1764235	Job Number:	W23_4038
Multiplier:	0.005	Client:	Ramboll Environ
Dilution:	1	Site:	SAPA SPMP Round 27
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BHS6
Acquisition Date/Time:	25-Jan-17, 08:48:22		
Datafile:	D:\TES\DATA\Y2017\012417TPH_GC3\012417 2017-01-24 16-09-46\074F7901.D		

Where individual results are flagged see report notes for status.

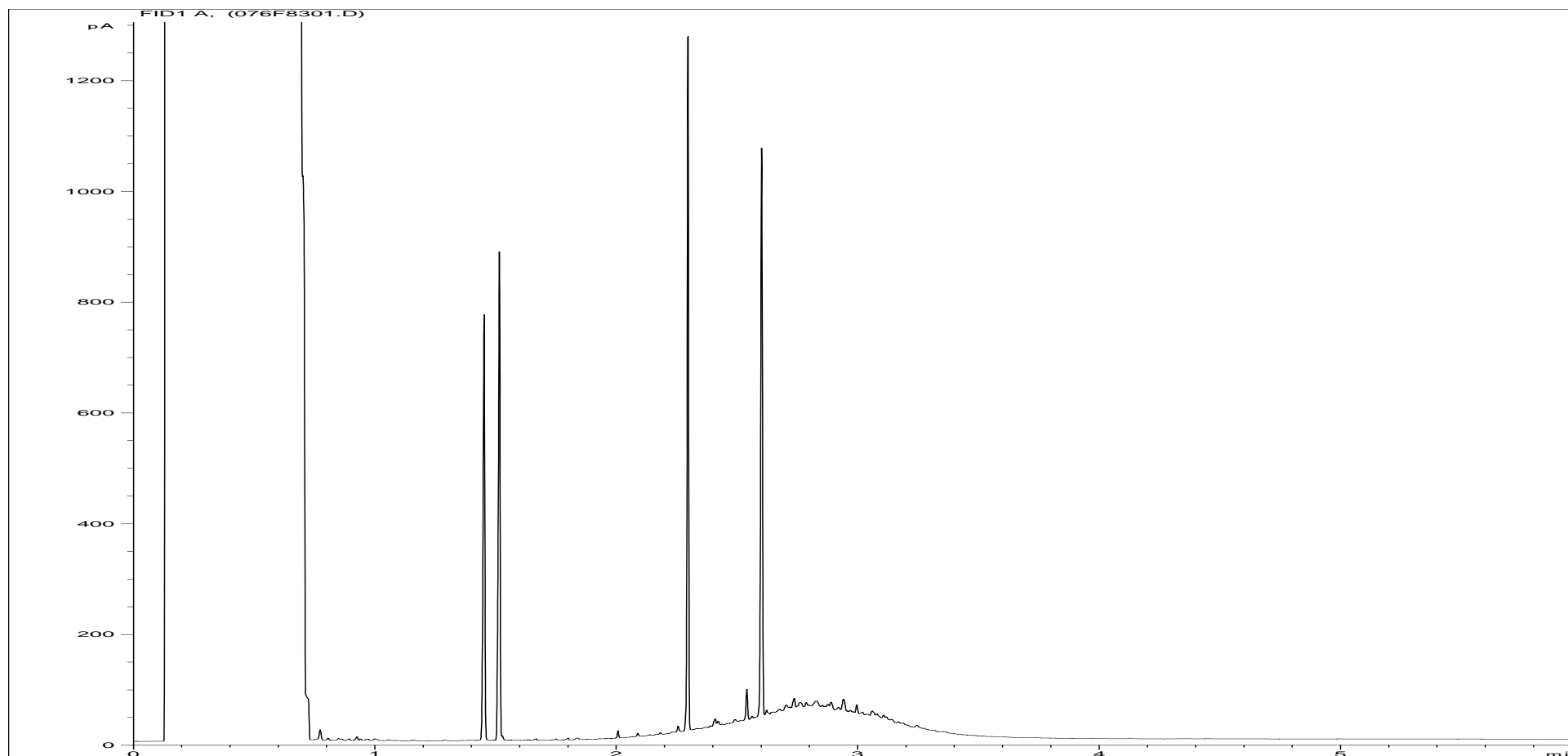
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1764236	Job Number:	W23_4038
Multiplier:	0.005	Client:	Ramboll Environ
Dilution:	1	Site:	SAPA SPMP Round 27
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH4
Acquisition Date/Time:	25-Jan-17, 09:01:02		
Datafile:	D:\TES\DATA\Y2017\012417TPH_GC3\012417 2017-01-24 16-09-46\075F8001.D		

Where individual results are flagged see report notes for status.

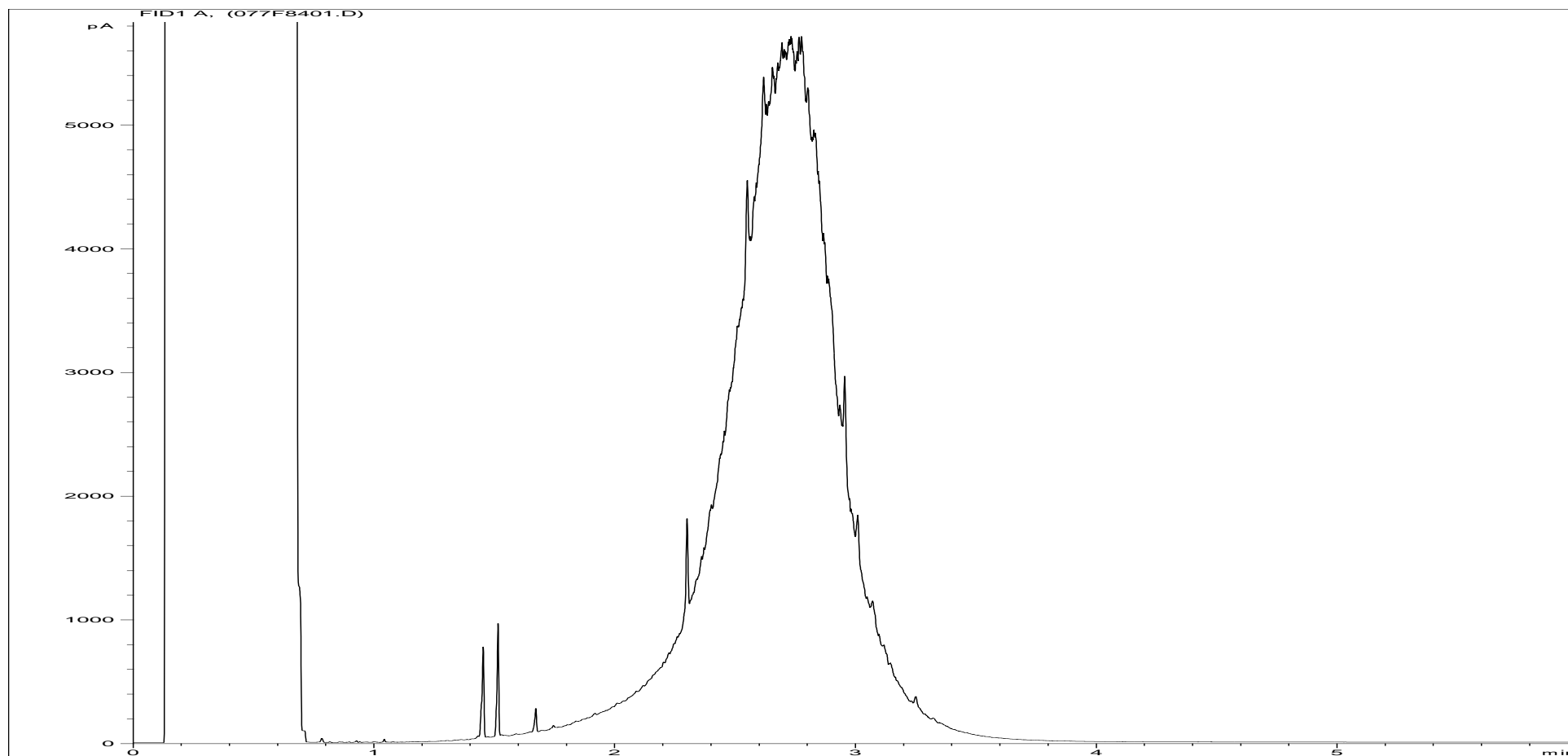
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1764238	Job Number:	W23_4038
Multiplier:	0.005	Client:	Ramboll Environ
Dilution:	1	Site:	SAPA SPMP Round 27
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	MW1
Acquisition Date/Time:	25-Jan-17, 09:38:47		
Datafile:	D:\TES\DATA\Y2017\012417TPH_GC3\012417 2017-01-24 16-09-46\076F8301.D		

Where individual results are flagged see report notes for status.

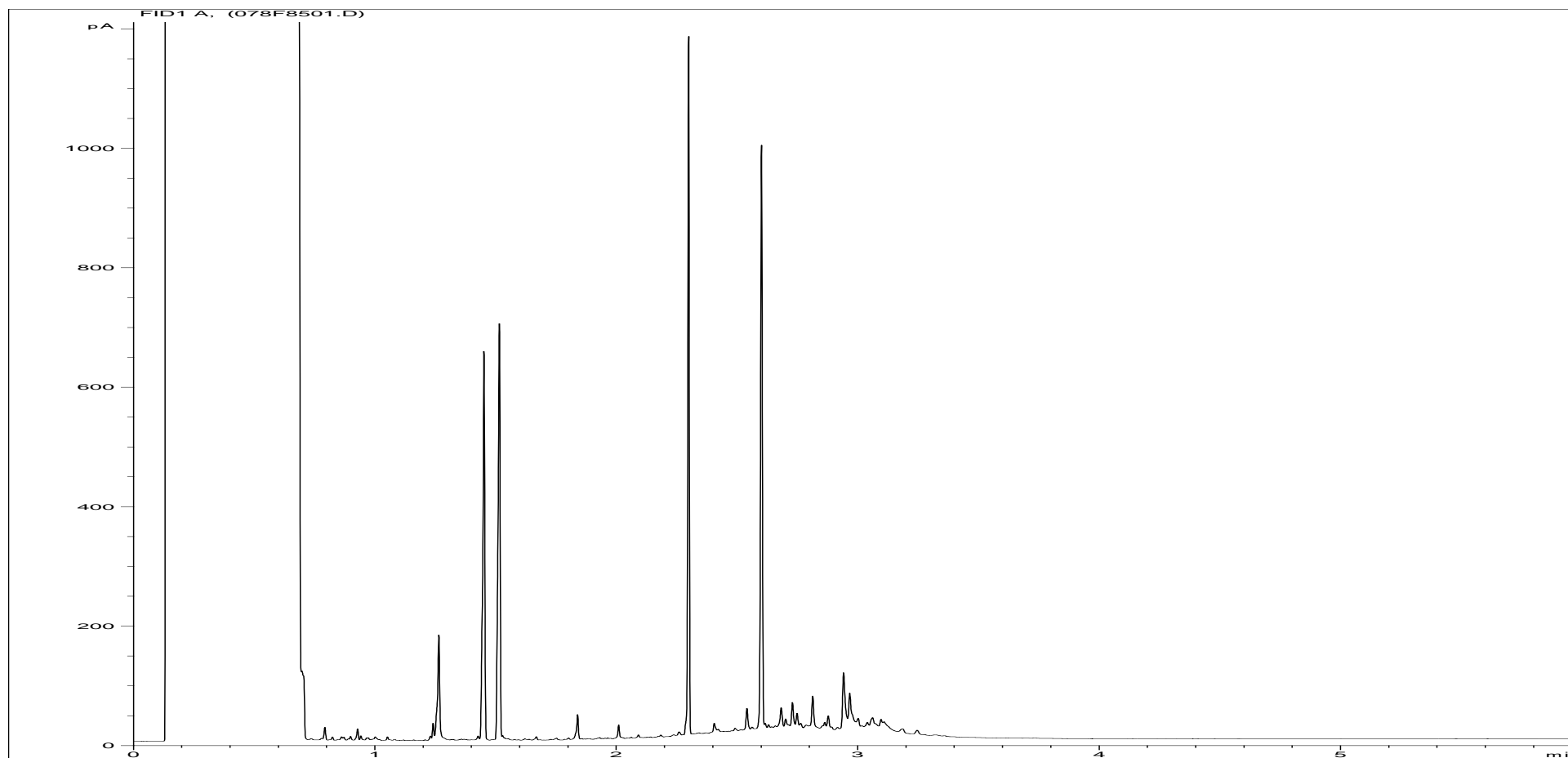
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1764239	Job Number:	W23_4038
Multiplier:	0.005	Client:	Ramboll Environ
Dilution:	1	Site:	SAPA SPMP Round 27
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH1
Acquisition Date/Time:	25-Jan-17, 09:51:32		
Datafile:	D:\TES\DATA\Y2017\012417TPH_GC3\012417 2017-01-24 16-09-46\077F8401.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1764240	Job Number:	W23_4038
Multiplier:	0.005	Client:	Ramboll Environ
Dilution:	1	Site:	SAPA SPMP Round 27
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	MW11
Acquisition Date/Time:	25-Jan-17, 10:04:17		
Datafile:	D:\TES\DATA\Y2017\012417TPH_GC3\012417 2017-01-24 16-09-46\078F8501.D		

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W234038

Customer Ramboll Environ
Site SAPA SPMP Round 27
Report No W234038

Consignment No W114943
Date Logged 20-Jan-2017

Report Due 27-Jan-2017

ID Number	Description	Matrix Type	Sampled	MethodID	Calc_HD	CUSTSERV	ICPMSW	Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Vanadium as V MS (Dissolved)	Total Sulphur as SO4 (Diss) VAR	Calcium as Ca (Dissolved) VAR	Magnesium as Mg (Dissolved) VAR	Iron as Fe (Dissolved) VAR	Boron as B (Dissolved) VAR	Beryllium as Be (Dissolved) VAR
EX/1764233	MW2	Groundwater	19/01/17		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EX/1764234	BH6	Groundwater	19/01/17																				
EX/1764235	BHS6	Groundwater	19/01/17																				
EX/1764236	BH4	Groundwater	19/01/17																				
EX/1764237	BH5	Groundwater	19/01/17																				
EX/1764238	MW1	Groundwater	19/01/17																				
EX/1764239	BH1	Groundwater	19/01/17																				
EX/1764240	MW11	Groundwater	19/01/17																				

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

- A The sample was received in an inappropriate container for this analysis
- B The sample was received without the correct preservation for this analysis
- C Headspace present in the sample container
- D The sampling date was not supplied so holding time may be compromised - applicable to all analysis
- E Sample processing did not commence within the appropriate holding time
- F Sample processing did not commence within the appropriate handling time

Requested Analysis Key

- Analysis Required
- Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
- No analysis scheduled
- Analysis Subcontracted - **Note: due date may vary**

Sample Analysis

ESG Environmental Chemistry Analytical and Deviating Sample Overview

W234038

Customer Ramboll Environ
Site SAPA SPMP Round 27
Report No W234038

Consignment No W114943

Date Logged 20-Jan-2017

Report Due 27-Jan-2017

ID Number	Description	MethodID		KONENS	SFAPI	TPHFD	WSLM10	WSLM13	WSLM25	WSLM27	WSLM3
		Matrix Type	Sampled	Ammoniacal Nitrogen (Kone)	Cyanide (Total) as CN SFA	TPH GC	Suspended Solids	Total Organic Carbon	Redox Potential mV	Total Dissolved Solids	pH units
				✓	✓	✓	✓	✓			✓
EX/1764233	MW2	Groundwater	19/01/17								
EX/1764234	BH6	Groundwater	19/01/17								
EX/1764235	BHS6	Groundwater	19/01/17								
EX/1764236	BH4	Groundwater	19/01/17								
EX/1764237	BH5	Groundwater	19/01/17								
EX/1764238	MW1	Groundwater	19/01/17								
EX/1764239	BH1	Groundwater	19/01/17								
EX/1764240	MW11	Groundwater	19/01/17								

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

- A The sample was received in an inappropriate container for this analysis
- B The sample was received without the correct preservation for this analysis
- C Headspace present in the sample container
- D The sampling date was not supplied so holding time may be compromised - applicable to all analysis
- E Sample processing did not commence within the appropriate holding time
- F Sample processing did not commence within the appropriate handling time

Requested Analysis Key

- Analysis Required
- Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
- No analysis scheduled
- Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	Calc_HD	As Received	Calculation based on Dissolved metals analysis by ICPOES
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM10	As Received	Determination of Suspended Solids in waters by gravimetry
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM25	As Received	Direct determination using Redox Potential Probe
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

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

Waters Analysis

Unless stated otherwise results are expressed as mg/l

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

Oil analysis specific

Unless stated otherwise,

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

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

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

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

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

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

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

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

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

▮ Raised detection limit due to nature of the sample

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

‡ MCERTS accreditation has been removed for this result

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

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

Sample Descriptions

Client : Ramboll Environ
Site : SAPA SPMP Round 27
Report Number : W23_4038

[illegible]