



Neath Port Talbot County Borough Council

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# **PORT TALBOT HARBOURSIDE**

Controlled Waters Detailed Quantitative Risk  
Assessment





Neath Port Talbot County Borough Council

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## **PORT TALBOT HARBOURSIDE**

### **Controlled Waters Detailed Quantitative Risk Assessment**

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#### LEGISLATIVE CONTEXT

# 1. INTRODUCTION

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## 1.1. TERMS OF REFERENCE

WSP UK Limited (WSP) was commissioned by Neath Port Talbot County Borough Council (the Client) to undertake a Detailed Quantitative Risk Assessment (DQRA) for a site off Old Dock Road and Harbour Way, Port Talbot (the site). The necessity of these works was detailed within the site's water quality monitoring strategy:

- i WSP 62253048\_Port Talbot Harbourside\_MEMO\_GI scope\_14062019 approved by Natural Resources Wales (NRW).

Statutory guidance identifies that for the pollution of controlled waters to occur; poisonous, noxious, polluting or solid waste matter must be entering controlled waters or must be considered more likely than not to enter controlled waters in the future.

Site investigation has previously identified several groundwater concentrations in excess of conservative screening criteria. Consequently, based on the available investigations the controlled water risks have previously been identified as being "Moderate".

- i It is possible that either: Harm is being (or may be) caused to one or more receptors by the contamination source(s) identified (although this harm is unlikely to be "significant").

This report refines our understanding of this risk by presentation of a more detailed assessment together with some additional monitoring works that have since been delivered.

Legislative context has been provided in Appendix G.

## 1.2. BACKGROUND

The site was formerly part of the Port Talbot steel works and later a chemical works. It is now an area of derelict land proposed for commercial redevelopment. Previous investigations, most recently by Opus International Consultants (UK) Ltd (Opus), identified heavy metal and benzene contamination on site within the Made Ground. Light Non-Aqueous Phase Liquid (LNAPL) was also noted at a single location.

Consequently, in 2019 WSP delivered further investigation which included the advancement of six additional boreholes (BH101 and BH103 to BH107), a round of groundwater monitoring and sampling together with a Generic Quantitative Risk Assessment (GQRA).

This site investigation confirmed the presence of the LNAPL noted by Opus and highlighted groundwater concentrations again to be in exceedance of generic assessment criteria protective of the surface waters and future resource protection.

## 1.3. SUPPORTING INFORMATION

The following reports have been issued for the site. They are referred to by their corresponding numbers throughout this report and should be considered in full:

1. Opus Phase I Desk Study Report, Ref: V-C8602.01-OIC-00-XX-RP-01, Dated July 2017.
2. Opus International Consultants (UK) Ltd, NPT Harbourside Interpretative Geo-environmental Ground Investigation Report, Ref: V-C8602.01/OIC/00/XX/RP/02, Dated September 2017;

3. Opus International Consultants (UK) Ltd, NPT Harbourside – Addendum Ground Gas Letter Report, Ref: V-C8602.01-OIC-20171012-NPTCBC-01, dated October 2017;
4. Port Talbot Harbourside Generic Quantitative Assessment, Supplementary Site Investigation Report, WSP September 2019, ref 62253048\_001.

## 1.4. AIMS

Part IIA of the Environmental Protection Act 1990 allows consideration of a Detailed Quantitative Risk Assessment (DQRA) should the available data suggest a potential hazard to controlled waters as historically reported on site. A DQRA should aim to make greater use of site-specific data to conduct a more accurate assessment of risk. Such a phased assessment of risk is compliant with the advice of CLR11 Model Procedures for Contaminated land. Note, that should the absence of significant risks be robustly demonstrated the use and development of a DQRA can, on occasion, reduce/negate the need for physical intervention (remediation) at a site.

In summary, the primary aim of the enclosed controlled waters DQRA has been to develop a transparent understanding of the plausibility of controlled water risks at the site encompassing:

- i an overview of our current understanding; and
- i a more detailed assessment of the degree of risk posed to controlled waters.

## 1.5. OBSERVED NAPL

Hydrocarbons can exist as a separate, immiscible phase when in contact with water and/or air often referred to as free product or Non- Aqueous Phase Liquid (NAPL). A release of a non-aqueous phase liquid (NAPL) to near-surface unsaturated soil can result in downward gravity driven migration of the NAPL towards the water table. At the water table, Light Non- Aqueous Phase Liquids (LNAPL), which are less dense than water, may mound and spread horizontally. LNAPL may also move with the groundwater gradient. The volume of mobile NAPL, however depletes as immobile residual chemical is left behind through the soil column in which the NAPL is descending. NAPL migration may be limited by this depletion, or by physical barriers, such as low permeability layers. A thickness of mobile NAPL has been observed during the historical investigations including:

- i Measurable LNAPL at boreholes BH104 and BHC5 with a maximum apparent thickness of 0.78 m and 0.03m respectively (See Figure 2 for locations and Ref. [4]); and
- i LNAPL upon groundwater at Opus trial pit TP5 (See Figure 3 in Appendix B for location and Ref. [2]).

Mobile NAPL on its own can present a direct risk to receptors via its movement through the unsaturated and saturated zones. NAPL also can present a potential secondary source giving rise to dissolution of constituent compounds into groundwater, and their subsequent transport in the dissolved phase to a receptor. Where NAPL is present, the practitioner should consider:

- i Whether the NAPL is expanding, steady or declining;
- i Likelihood and causes of movement of mobile NAPL;
- i Significance and likely longevity of dissolved-phase contamination arising from mobile and / or residual NAPL; and
- i Potential for Volatile Organic Compound (VOC) emissions from the NAPL to indoor air.



Note that reporting herein has focussed solely on the risk to controlled waters from the dissolved phase component of this LNAPL. It is presumed that the observed LNAPL will be subject to further investigation together with recovery/treatment and is to be discussed under separate cover.

## **1.6. LIMITATIONS**

This report is addressed to and may be relied upon by the following party:

- i Neath Port Talbot County Borough Council

The report shall not be relied upon or transferred to any other parties without the express written authorisation of WSP. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

Where this report summarises information provided from others, WSP cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon.

General limitations of the assessment are included in Appendix A.

## **2. SITE INFORMATION AND SETTING**

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### **2.1. SITE DESCRIPTION AND CURRENT USE**

The site is approximately 2.8 Ha and centred upon NGR 276570(E), 189509(N). It is located on its northern boundary adjacent to the Cramic Way to Port Talbot Parkway Railway Station and bound on its southern boundary by Old Dock Road and Harbour Way (A4241).

The location of the site is displayed within Figure 1, Appendix B.

The site is generally flat, except for a raised embankment approximately 2 m in height on its western area. The site is heavily vegetated, especially to the north east and south west. Otherwise the site includes areas of mixed integrity concrete cover, tarmacadam and hardstanding associated with former but now demolished buildings.

Prior to 1876 the site had been marsh and agricultural land. It was later developed with buildings and tanks, including a gas holder on its eastern part. It had been part of the Port Talbot Steel Works by 1921. These works included railway lines to the south and north. By 1964, the site had been further developed and renamed as a chemical works based on the historic mapping. Meanwhile the gas holder and railway lines had been removed, however new above ground tanks had been added. The later were no longer in use by ~1991 mapping. The site was then to become part of an industrial estate. All site buildings were demolished between 1997 and 2007.

The site is now proposed for redevelopment to include commercial units with associated car parking and access roadways.

A site layout plan including exploratory boreholes locations is presented as Figure 2 (Appendix B).

Further details and site description can be found in References [1] and [4].

### **2.2. GEOLOGY**

Published information and previous investigations including the 2019 GQRA Report [Ref. 4] have identified that the site is underlain by Made Ground comprising sands and gravels including ash, slag, brick, concrete and clinker together with occasional fragments of metal, glass and wood to a maximum observed depth of ~3 m below ground level (bgl). This Made Ground is next underlain by Alluvium deposits comprising layers of gravelly sand, gravelly clay and silt and sandy gravels to a maximum explored depth of ~10 m bgl. Bedrock deposits include the South Wales Middle Coal Measures Formation comprising mudstone, siltstone and sandstones with interbedded coal seams.

### **2.3. HYDROGEOLOGY AND HYDROLOGY**

The nearest surface water features to the site are the Port Talbot Docks which lie approximately 60 m to the south and the River Afan some 370 m to the north-west at its closest distance. A small unnamed pond also lies approximately 80 m south-east of the site.

The Port Talbot Dock maybe in continuity with surrounding groundwaters in the area directly south of the site. However, the dock does include a concrete wall to the west. Information provided by the Marine Operation Supervisor of the Port Talbot Dock has confirmed that the water levels of this dock are managed. The Dock is fed by the River Afan through a Dock Feeder located approximately 570 m west of the site. This feeder takes waters from above a weir at a height and as a barrier presumed to be above tidal influence. It is most probable therefore, that the dock is fed principally with fresh waters

as opposed to sea/transitional waters. The port authority manages the water levels in this dock by releasing water to sea when its level is considered too high. In summary, water levels in Port Talbot Dock appear to be fed by River Afan inflow alongside rainfall contributions. Confirmation of the absence of a diurnal tidal cycle in surrounding groundwaters to this dock is discussed in Section 4.4.

The River Afan flows generally north east to south west and has been classified by the Environment Agency as having a River Quality Objective Grade 1, with a Chemistry General Quality Assessment Grade 'A', i.e. of very good quality that is suitable for salmonid fishery.

Licensed surface water abstractions have not been reported within a 500m radius of the site.

The superficial deposits underlying the site have been classified by the Environment Agency (EA) as a Secondary aquifer (undifferentiated) of high permeability and the bedrock as Secondary 'A' aquifer (permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers).

None of the aquifers beneath the site are currently known to be used for potable water resource. Additionally, no licensed groundwater abstractions have been identified within a 1 km radius of the site and no Groundwater Source Protection Zones (SPZ) are not located within 10 km of the site.

Previous investigation by Opus [Ref 4] suggested that the general groundwater flow is towards the south west and towards the Port Talbot Dock with a hydraulic gradient of between 0.0176 and 0.0137. It should be noted that this groundwater vector was based on water levels measured in boreholes screened within the Made Ground. More recent groundwater level monitoring data is discussed in Section 4.2.

## **2.4. THE OBSERVED DISTRIBUTION OF CONTAMINANTS**

Opus 2017 [Ref 2] observed elevated concentrations of benzene above chronic human health screening criteria protective of a commercial worker in shallow soils and Made Ground, across the site. They also reported free phase hydrocarbons in soil and upon groundwater at trial pit TP5. This had been excavated within proximity of a known historic tank farm within the western area of the site. Concentrations of inorganic compounds (chromium (VI), copper and zinc) were furthermore identified within shallow groundwater at concentrations above their respective but conservative water quality standards.

In August 2019 [Ref 4] WSP confirmed further hydrocarbon odours in soil arisings from boreholes BH102, BH103 and BH106 and oil staining in BH104 located 25 m north of TP5 and BH105 50 m north west of TP5 and again within the historic tank farm (Figure 2, Appendix B). Soil laboratory analysis confirmed Total Petroleum Hydrocarbons (TPH) and BTEX (benzene, toluene, ethylbenzene and xylenes) compounds detected with maximum concentrations registered from BH104 at a smear zone at 3 m bgl of TPH 15,300 mg/kg and benzene at 195 mg/kg. Soil PAH concentrations were also detected occasionally across the site above their Limits of Detection (LoD) at between 75.8 mg/kg – 0.143 mg/kg primarily from within the shallow Made Ground.

Groundwater monitoring in August 2019 [Ref 4] also recorded additional free phase LNAPL at boreholes BHC5 (apparent thickness of 0.03 m) located in the western tank farm and BH104 (unknown thickness) located ~30 m north of BHC5. Laboratory analysis indicated that detections of TPH and BTEX concentrations in groundwater were limited to samples taken from BH105 and BHC5 (maximum TPH 180 mg/l and benzene 64.1 mg/l at BHC5). Detections of PAH compounds were lower in



concentration and more widely spread but with maximum concentrations detected from those samples taken from BHC5 and BH105.

Laboratory analysis of a free product sample retrieved from BH104 indicated that the free phase was a petrol range hydrocarbon between C6-C18 and was between 1 and 5 years old.

In summary, the observed TPH and BTEX contamination appears to be limited to the centre and western areas of the site likely associated to a historical tank farm. Metals and PAH impact appear more widely dispersed but generally limited to within the depths of the shallow Made Ground.

### 3. ADDITIONAL SITE WORKS

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#### 3.1. SCOPE OF WORKS

Additional site works have been performed between 21 August and 1 November 2019 including:

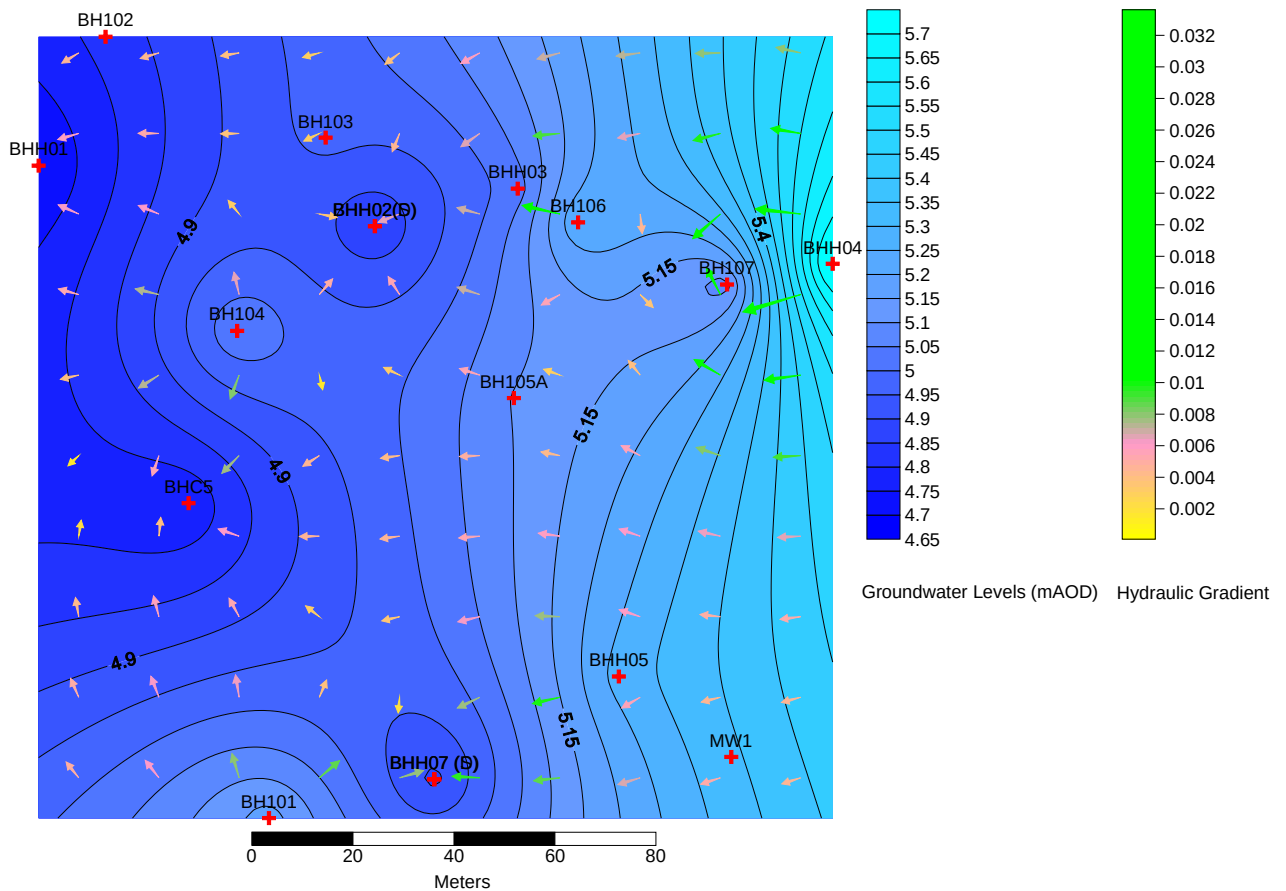
- i Six numbered hydraulic conductivity tests (slug tests) (21 August 2019) for parametrising the DQRA with site specific data;
- i Three rounds of groundwater level monitoring (18, 24 and 27 September 2019). All available boreholes were monitored using an interface probe and evidence of contamination recorded. Borehole logs are included in Appendix C.5 and their respective locations presented in Figure 2, Appendix B. This monitoring was performed to assist in identifying hydraulic gradients for DQRA inclusion;
- i Borehole Tidal monitoring. Stage transducers were installed between 24 and 27 September 2019 to confirm the supposition of limited tidal influence on hydraulic gradients below the site from the Part Talbot Dock. Changing hydraulic gradients can have a significant influence on a DQRA;
- i One round of groundwater sampling (18 September 2019);
- i A bail down test on borehole BH104 (18 September 2019) to support our understanding of LNAPL recovery options albeit to be discussed separately;
- i Field chemistry monitoring of groundwaters from specific wells (1 November 2019);
- i Surface waters observation (1 November 2019) including the Port Talbot Dock and Dock Feeder to confirm channel lining and integrity and;  
Surface water monitoring on 9 January 2020 to confirm or refute any actual surface water impact from the contaminants of concern.

#### 3.2. GROUNDWATER LEVEL MONITORING

A further three rounds of close interval groundwater monitoring were performed in September 2019 inclusive of monitoring from the Opus 2017 boreholes. This data has now suggested lower hydraulic gradients of ~0.006, furthermore a more westward flow direction towards the dock feeder stream. The data has additionally suggested limited differentiation in general groundwater flow direction by lithology. The data consequently suggests that the observed Alluvium and Made Ground may be in hydraulic connection. However, given the potential for historic below ground structures and pockets of clay then shallow waters may at times also be perched and localised flow directions could be variable.

Average groundwater levels from within the Alluvium (four rounds as reported in Ref [4]) are interpolated in Figure 4.1. All groundwater level data is included in Appendix C.1 and groundwater configurations for each of the four rounds is included in Figure 4, Appendix B.

**Figure 4.1 Average groundwater levels observed onsite within the Alluvium dated 2019. Note that the vectors represent hydraulic gradient (scaled) and flow directions.**



### 3.3. TIDAL EFFECT MONITORING

As previously noted, water levels in the adjacent Port Talbot Dock appear to be fed principally by inflow from the River Afan alongside rainfall contributions. However, confirmation of an absence/presence of a diurnal tidal cycle in surrounding groundwaters could have been important in configuring hydraulic gradients within the DQRA.

Three stage transducers were installed in boreholes BH101, BH102 and BH106 (Figure 2, Appendix B), to monitor the effect of the tide on site groundwater levels. Water levels were recorded for three days between 24 and 27 September 2019. Transducer results have been compensated with a barometric logger also installed. Results are included in Appendix C.4.

Should groundwaters be connected to sea waters then evidence of a diurnal tidal signal would have been expected in the groundwater level data. However, water levels registered by the stage transducers have identified no diurnal tidal signal. Nevertheless, a steady increase in groundwater levels of approximately 0.3 m was noted within all the three locations during the period of monitoring. This increase may have been the result of a corresponding increase in the water levels in the Port Talbot Dock as it filled with freshwater inflow from the River Afan to the closed basin.

### 3.4. HYDRAULIC CONDUCTIVITY (K) TESTING

An aquifer's hydraulic conductivity is used to calculate within a DQRA the rate at which groundwater underflows a site and hence the amount of dilution in the aquifer. The values entered should therefore reflect the bulk hydraulic conductivity of the thickness of aquifer in which contaminants are most likely to mix.

In-situ hydraulic conductivity tests were performed 22 September 2019 in six boreholes (BH101, BH102, BH103, BH105, BH02(D) and BHH07(D)). A solid slug of known volume (5.2L) was introduced to the boreholes and the subsequent water level response was recorded with a logger at 0.5 second intervals.

The groundwater recovery data has been analysed using the aquifer property software package AQTESOLV (HydroSOLV, Inc.). Hydraulic conductivity has then been estimated from the in-situ tests by fitting mathematical models to the observed displacement data. The Bower and Rice (1976) straight-line methodology has been applied.

In summary, the displacement created by the volume introduced was generally small (<10cm) and in some cases too low retrospectively to be confidently analysed (BH102, BH103, BH105). In addition, the data showed some irregular oscillations. Consequently, the results of the tests must be considered with caution. Nonetheless a summary of the calculated hydraulic conductivities is presented in Table 3-1 and the data analysis is presented in Appendix C.2.

**Table 3-1 – Summary of Hydraulic Conductivity (k) tests results**

| Borehole | Screen (m bgl) | Lithology (Alluvium) | K range (m/d) |
|----------|----------------|----------------------|---------------|
| BH101    | 2.3 – 8.0      | Coarse gravels       | 3.33 – 9.94   |
| BH106    | 2.3 – 8.0      | Coarse gravels       | 3.8 – 6.56    |
| BH107    | 1.8 – 6.0      | Coarse gravels       | 3.39 – 11.35  |
| BHH02(D) | 5.0 – 7.5      | Sandy gravels        | 2.36 – 4.66   |
| BHH07(D) | 5.0 – 8.0      | Sandy gravels        | 3.7 – 5.54    |
| Geomean  |                |                      | <b>4.81</b>   |

The calculated hydraulic conductivity of the alluvium deposits beneath the site has been observed to range between 2.36 and 11.35 m/d with a geometric mean of 4.81 m/d.

Despite the field uncertainty noted, these values have, however been consistent with those literature values for a sandy gravel. They are also in agreement with literature data from Wates *et al.* (Urban Geology of Swansea and Port Talbot) for the Alluvium deposits within the Port Talbot area that suggests hydraulic conductivity values between 0.251 and 8.64 m/d.

### 3.5. GROUNDWATER SAMPLING

A single further groundwater sampling round was completed on 18 September 2019. The groundwater laboratory results are presented in full in Appendix D. No samples were retrieved from boreholes BH104, BHC5 due to the presence of LNAPL and BHH04 as this monitoring well went dry during purging.

This latest groundwater analysis has reported the following:

- i Metal concentrations were generally low or below their LoD except for detections of arsenic, chromium, copper and zinc;
- i TPH concentrations were only detected in the water sample from BH105 consistent with the hydrocarbon sheen previously noted at this same location (TPH 6.63 mg/l). TPH fractions were reported as light to medium aliphatic (C6-C12) fractions and light to medium (C5-C16) aromatic fractions, consistent with the historic laboratory analysis of a product sample retrieved from BH104 that indicated that the free phase on site is likely petrol range hydrocarbons. All other samples analysed detected TPH below their LoD;
- i VOCs were also generally detected below their respective LoD except for BTEX compounds which were detected only in and unsurprisingly, the sample from BH105, consistent with the TPH fractions (benzene 24.6 mg/l) at this same location;
- i Finally, PAH concentrations were detected in samples from BH105, BH106, BHH02(D), BHH05 and MW1. Detected concentrations were, however, generally low except for BH105 (PAH 7.5 µg/l).

These results have remained consistent with the previous sampling round undertaken in 21 August 2019 [Ref 4].

#### GROUNDWATER SAMPLING QA/QC

All groundwater samples were tested for recovery of surrogate Gasoline Range Organics (GRO) and surrogate toluene. The purpose of this test was to verify that the extraction process used in the laboratory could detect true concentrations in the samples.

GRO and toluene recovery was recorded between the criteria of 70-130% in all the samples analysed, considered to indicate the appropriate reproducibility of the sampling methodology and sample handling.

A duplicate sample was also collected from BHH07(D). A comparison of the parent and duplicate sample analysis indicated that concentrations were within the 30% variability expected to indicate the appropriate reproducibility of the sampling methodology and sample handling.

### 3.6. SURFACE WATER SAMPLING

Surface waters from the Port Talbot Dock and Dock Feeder were sampled in 9 November 2020. Waters were tested for metals and the TPH (CWG) fractions. Laboratory results are included in Appendix D.

Surface water results have reported the following:

- i Hydrocarbon compounds were detected below their respective LoD in both samples analysed;
- i Metals were detected in both samples including arsenic, barium, boron, chromium, copper, lead, nickel and zinc.

### 3.7. EVIDENCE OF LNAPL

Measurable LNAPL has been consistently detected during the 2019 works at monitoring well BH104 screened between the Made Ground and Alluvium, consistent with the evidence of contamination detected in soil during drilling (hydrocarbon odour and visible oil between 1.4 and 4.8 m bgl). Limited LNAPL thickness was also detected in borehole BHC5 during the August 2019 monitoring. Apparent LNAPL thickness measured are included in Table 3-2 noting that the observed apparent thickness within BH104 would likely be considered as materially substantial by the regulator.

**Table 3-2 – Apparent Measured LNAPL Thicknesses**

| Borehole | Apparent LNAPL thickness (m) |           |           |           |
|----------|------------------------------|-----------|-----------|-----------|
|          | 21/8/2019                    | 18/9/2019 | 24/9/2019 | 27/9/2019 |
| BH104    | unknown                      | 0.53      | 0.62      | 0.78      |
| BHC5     | 0.03                         | ND        | ND        | ND        |

It should be noted also that during the last monitoring round, sheen was seen in the water flooded within the cover works of boreholes BH107 and BH103.

In addition to LNAPL encountered in boreholes BH104 and BHC5, Opus 2017 [Ref 2] had previously reported LNAPL in the groundwater within trial pit TP5 (Figure 3). The significance of the observed LNAPL is to be discussed under separate cover within a remediation strategy document following submission of this report.

### 3.8. PRELIMINARY BAILOUT TEST

A single and preliminary bail down test was performed to assist in understanding the potential recovery of the observed LNAPL. The implications of this test upon the selection of remedial options is to be presented separately.

For completeness, a baildown test is a procedure that includes the act of removing a measured volume LNAPL from a well and filter pack to induce a head differential and then undertake follow-up gauging of fluid levels in the well (ASTM E2856-13). The information obtained from a baildown test can provide a means of understanding LNAPL behaviour, mobility and recoverability. Estimates of LNAPL mobility based on apparent thickness, LNAPL specific gravity and soil type as are summarised in Table 3-3 (Alaska Department of Environmental Conservation, 2006<sup>1</sup>).

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<sup>1</sup> Alaska Statement of Cooperation Working Group (SOC), 2016. Maximum Allowable Concentration, Residual Saturation, and Free-Product Mobility, Technical Background Document and Recommendations. (Prepared for the Alaska Department of Environmental Conservation (ADEC)).

**Table 3-3 - LNAPL Mobility based on Soil Type and observed LNAPL Thickness**

| Soil Type  | Observed LNAPL Thickness* (m) |
|------------|-------------------------------|
| Sand       | 0.3 to 0.4                    |
| Silt       | 1.5 to 1.8                    |
| Sandy Clay | 1.2 to 1.5                    |
| Clay       | 2.0 to 2.9                    |

\* LNAPL thickness necessary to overcome water displacement pressure for selected soil textures (Charbeneau et al., 1999<sup>2</sup>). LNAPL specific gravity is assumed to range between 0.775 and 0.85 g/cm<sup>3</sup>.

LNAPL was detected in BH104 at an apparent thickness between 0.53 and 0.79 m and in BHC5 at 0.03 m. Based on the above estimates, the site soil type (a sandy gravel) and measured LNAPL thickness, the LNAPL detected at borehole BH104 has mobility potential. A bail down test was carried out on 18 September 2019 in borehole BH104. Using a bailer, LNAPL was removed and its recovery recorded. The initial apparent LNAPL thickness of 0.53 m was reduced to 0.02 m. The recovery was observed for 40 minutes after which an LNAPL thickness of 0.18 m had been measured. A total of 6 litres of LNAPL and 10 Litres of water were removed. Bail down test data has been processed in the API LNAPL Workbook<sup>3</sup> and analysis results have suggested a potential LNAPL transmissivity of 0.226 m<sup>2</sup>/d with a standard deviation of 0.075 m<sup>2</sup>/d.

The apparent thickness measured at BHC5 located at the site boundary suggests that the LNAPL at this location may have limited potential mobility. Despite the potential mobility of LNAPL from BH104, its distance to the boundary and the limited product detected at BHC5 suggests that off-site migration of LNAPL is unlikely. Further bail down tests will, however, be required to confirm the reproducibility of this result and the applicability of the desired remedial solution.

Bail down test data is included in Appendix C.3.

### 3.9. ADDITIONAL LNAPL SAMPLING

A further LNAPL sample was collected from BH104 on the 18 September 2019. Results are included in Appendix D. The laboratory described the LNAPL as an amber product with a carbon range between C6-C13, a density of 0.89 g/ml and an estimated age of greater than 10 years old.

This result differs from the previous product analysis from the sample collected just one month earlier at the same location [Ref 4]. Those results indicated a slightly wider carbon range, C6-C18, and a younger product estimated between 1 to 5 years of age.

<sup>2</sup> Charbeneau, Randall, R. Johns, L. Lake, and M. McAdams. 1999. Free-Product Recovery of Petroleum Hydrocarbon Liquids. API Publication No. 4682.

<sup>3</sup> API LNAPL Transmissivity Workbook: A Toll for Baildown Test Analysis, Charbeneau R.J., Kirkman A., Muthu R. American Petroleum Institute, June 2012.



The site over ground infrastructure (buildings, tanks, etc) was removed by 2007. It is unknown whether underground infrastructure remains, however, LNAPL detected on site and its laboratory description and age is suggestive of a relatively fresh leak with a potentially on-going source, or two different sources.

In summary, a significant LNAPL thickness has been encountered in BH104. Given the observed distance between LNAPL containing exploratory holes it furthermore remains uncertain if the observed LNAPL represents isolated pockets or a continuous source. Additional intervening boreholes should be considered but to be discussed again under future remediation options appraisal and/or remediation strategy.

## **4. POTENTIAL SOURCE PATHWAY RECEPTOR LINKAGES**

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### **4.1. POTENTIAL ON SITE SOURCES**

The site was once occupied by a steel works, and later its eastern margins were occupied by a chemical works, both of which had known above and potentially also underground storage tanks.

- i Petroleum hydrocarbons (light to medium end TPH fractions) and BTEX compounds have continued to be identified within soils and shallow groundwater beneath the site i.e. within the Secondary (Undifferentiated) aquifer (superficial) at the west and centre of the site (BH104, BHC5, BH105);
- i Dissolved-phase heavy metal and metalloids together with PAH compounds have also been observed within shallow groundwater beneath the site within this Secondary (Undifferentiated) aquifer of the superficial deposits; and finally
- i LNAPL (free phase) has been detected within two boreholes located at the west and centre of the site (BH104 and BHC5).

To reiterate LNAPL recovery is to be discussed separately in a remediation strategy document. It is assumed that the observed LNAPL will be treated/removed from soil and groundwater. Following this remediation, it is considered that the site conditions will improve significantly. For that reason, in order to represent realistic future conditions and avoid over conservatism, only dissolved phase concentrations have been considered later within this assessment.

### **4.2. POTENTIAL POLLUTANT LINKAGE 1 – RECEPTOR: GROUNDWATER**

The Water Framework Directive (WFD) presents the concepts of “prevent” and “limit” in respect to Article 6 of Directive 2006/118/EC (the Groundwater ‘Daughter’ Directive or GWDD). Hazardous substances should be prevented from entering groundwater with an assessment point identified as the base of the unsaturated zone. The observed contamination at Port Talbot is, however, considered as an ‘Accidental Input’ (already within the saturated zone) and a passive input resulting from some previous activity that has now ceased i.e. has already entered the water environment. Focus should, therefore, be on limiting its further impact/damage. i.e. LNAPL recovery to be discussed separately.

### **4.3. POTENTIAL POLLUTANT LINKAGE 2 – RECEPTOR: DOMESTIC GROUNDWATER ABSTRACTION**

No registered potable groundwater abstractions are known to exist within a 1000 m radius of the subject site. This pollutant linkage is consequently not considered plausible under the site’s current setting and has therefore, not been considered further in respect of dissolved phase contamination.

### **4.4. POTENTIAL POLLUTANT LINKAGE 3 – RECEPTOR: DEPENDENT SURFACE WATERS**

No recorded Groundwater Dependent Terrestrial Ecosystems (GWDTE) necessitating further consideration have been reported present within proximity to the site. GWDTE are consequently considered no further.

Next, the River Afan resides approximately 370 m to the north west at its closest distance. Given the distance to this receptor in a direction not consistent with the groundwater flow, then its further

consideration as a plausible receptor post dilution and attenuation from the site has not been considered likely.

The Dock Feeder which connects the River Afan to the Port Talbot Dock, is located ~570 m to the west. This feeder is hydraulically lined along its most northern length in proximity to the River Afan. However, it is not lined (hydraulically isolated from groundwaters) towards the Port Talbot Dock in the area directly west of the site (see photolog included in Appendix C.6).

The Port Talbot Dock to the south is the closest surface water to the site. This water body is fed by the River Afan and likely freshwater. Its wetted perimeter is mostly lined in immediate proximity to the site's southern boundary, however in some parts its wall has failed (likely due to age and subsidence) (see photolog Appendix C.6). Consequently, a degree of hydraulic connection may exist between the Port Talbot Dock and the groundwaters below the target site. The progressive increase in water levels during the August 2019 groundwater level monitoring (Section 3.2) may have been the result of a corresponding increase in the water levels of the Port Talbot Dock with fresh water inflow from the River Afan. Yet despite these observations, groundwater monitoring has not been strongly supportive of flow from site in the direction of the Port Talbot Dock. Meanwhile, attenuation in the hyporheic and riparian zone, and subsequently instantaneous dilution within this very large water body will likely reduce the risk. This assumption is supported by the lack of hydrocarbon impact detected in the surface water samples taken from the Dock Feeder and the Port Talbot Dock (albeit only one round of data). However, as it remains the closest surface water body its consideration in the DQRA pre-dilution could also be argued as protective of the more distant surface waters hence this water body has been taken forward to DQRA under a precautionary approach.

#### **4.5. POTENTIAL POLLUTANT LINKAGE 4 – RECEPTOR: FUTURE RESOURCE PROTECTION**

No groundwater abstractions currently exist on site or under its proposed end use. A pollution assessment point for groundwater must, however, be identified to prevent harm where harm is interpreted by UK TAG to mean 'impairment of either existing human uses or potential future human uses of groundwater'. In effect this means that groundwater resources should be protected to allow future exploitation even where no current abstraction exists or is planned.

The United Kingdom Technical Advisory Group (UK TAG), a partnership of the UK environment and conservation agencies, was set up to interpret and support the implementation of the WFD. UK TAG has determined that to qualify as a body of groundwater an aquifer must be capable of supplying 10 m<sup>3</sup>/day or 50 people (on a continuous basis) and that such aquifers have future resource value which must be protected. Only groundwater fulfilling the UK TAG criteria for a groundwater body is typically considered to have future resource value.

The assessment point for protecting resource potential should be identified within the groundwater body or localised aquifer at a distance from a source beyond which future developers could reasonably expect to abstract groundwater. However, where a major groundwater discharge zone occurs closer to the source than the point selected for resource protection, resource potential considerations are not typically considered as appropriate and assessment points may be derived from factors only related to protection of 'at risk' ecosystems (e.g. the dock) and existing abstractions (absent).

Major groundwater discharge zones are surface water features beyond which groundwater is not expected to flow. The determination of a surface water as a major discharge zone depends on several factors including:

- i Relative water levels in the aquifer and the surface water;
- i Connectivity between the groundwater and the surface water; and
- i the groundwater flow paths within the aquifer.

In summary, it is considered that the proximity to the dock and the sea limit the plausible requirement for consideration of potable resource potential and assessment points should instead be derived from factors only related to protection of 'at risk' ecosystems (the adjacent surface waters of the Port Talbot Dock).

#### **4.6. POTENTIAL POLLUTANT LINKAGE 5 – RECEPTOR: AN ON SITE COMMERCIAL WORKER**

The conceptual model assumes a small to medium sized commercial or light industrial properties will be developed at which the employees spend most of their time indoors and are involved in office based or light physical work. The critical worker is a female adult and exposure pathways include direct soils and indoor dust ingestion, skin contact with soils and dusts together with the inhalation of dusts and vapours. Given the volume of hardstanding direct contact may not, however, be the main pathway for volatile contaminants and hence consideration of indoor air is additionally required from groundwaters.

Note that risks herein focus on chronic risk and exposure, short term exposures to a construction worker are excluded and should be managed with the appropriate use of PPE<sup>4</sup>.

#### **4.7. SUMMARY OF POTENTIAL POLLUTANT LINKAGES (PPL)**

A summary of potential pollutant linkages is given in Table 4-1 noting that PPL3 is to be the priority of reporting herein.

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<sup>4</sup> Construction and maintenance workers may be exposed to subsurface contamination (if present) on an acute basis. These potential acute risks are best managed by health and safety practices during works. Site workers should remain vigilant to the possible risk of encountering isolated areas of contaminated material. Should potentially contaminated material be encountered, further testing may be required to assess the risk to health and safety of the site workers and the environment.

- i Good site working practices should be followed including:
- i Use of appropriately qualified personnel for the task;
- i Use of appropriate PPE;
- i Provision of on-site washing facilities;
- i Maintenance of a high standard of basic hygiene; and,
- i Implementation of a non-smoking and eating policy within the working area, with designated clean areas set aside for these activities

**Table 4-1 – Potential Pollutant Linkages (PPL) modified**

| PPL  | Pollutant                                   | Receptor                                                                     | Assessment Point                                                                                                                                                          | Assessment limit                                                                      | Comment                                                                                                                                                                                                        | Taken to DQRA |
|------|---------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| PPL1 | Hydrocarbon distillates and PAH (hazardous) | Groundwater                                                                  | Base of unsaturated zone                                                                                                                                                  | Minimum Reporting Value/LoD                                                           | Accidental input. “Prevent” not possible as already in groundwaters therefore focus must be on “limit”. PPL taken no further herein albeit LNAPL recovery to be discussed separately thereby giving betterment | N             |
| PPL2 | Hydrocarbon distillates and PAH (hazardous) | Domestic groundwater Abstraction                                             | Abstracted water at ~50m from source boundary.                                                                                                                            | Drinking Water Standard                                                               | No contemporary domestic abstractions exist PPL taken no further as not a plausible PPL                                                                                                                        | N             |
| PPL3 | Hydrocarbon distillates and PAH (hazardous) | Surface Water including Groundwater Dependent Terrestrial Ecosystems (GWDTE) | Pre- dilution within the receiving surface waters                                                                                                                         | Environmental Quality Standard (AA-EQS)                                               | Conservative comparison against AA-EQS made with updated results and DQRA required as herein. GWDTE excluded as absent. Port Talbot Docks to be assumed as the critical receptor given its proximity           | Y             |
| PPL4 | Hydrocarbon distillates and PAH (hazardous) | Groundwater Resource                                                         | In strata and ~50m from source boundary. A distance greater than 50 metres may be agreed according to local circumstances but this should not normally exceed 250 metres. | Drinking Water Standard considering up gradient concentrations.                       | PPL taken no further given site’s setting relative to Docks                                                                                                                                                    | N             |
| PPL5 | Hydrocarbon distillates and PAH (hazardous) | Onsite Commercial Worker / Remediation Operative                             | Office, warehouse and external areas                                                                                                                                      | Ingestion of soils<br>Dermal contact<br>Indoor Vapour Screening<br>Inhalation of dust | See indoor vapour Screening from groundwaters. See REF 9. Risk refuted and discussed no further herein.                                                                                                        | N             |
| PPL7 | Diesel distillate (hazardous)               | Water services                                                               | Groundwater concentrations                                                                                                                                                | UKWIR Screening criteria                                                              | To be discussed under separate cover within Remediation Strategy E.g. in respect of water pipe materials upgrade                                                                                               | N             |

## 5. GENERIC QUANTITATIVE RISK ASSESSMENT

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### 5.1. INTRODUCTION

The UK adopts a tiered risk-based approach with option for the delivery of a:

- i Generic Quantitative Risk Assessment (GQRA) (e.g. the comparison of contaminant concentrations against Generic Assessment Criteria (GAC) as delivered to date at the site); or a
- i Detailed Quantitative Risk Assessment (DQRA) (e.g. the comparison of contaminant concentrations against site specific assessment criteria).

A GQRA is delivered firstly herein by way of update having delivered additional groundwater monitoring in August 2019.

### 5.2. SCREENING VALUES APPLIED TO PPL3 (SURFACE WATERS)

Surface water Environmental Quality Standards (EQS) are primarily designed to support the Environment Agency in classifying and monitoring of the quality of surface water bodies under their WFD and EQSD obligations<sup>5</sup>. Yet these EQS' are also commonly used by contaminated land professionals to quantitatively evaluate the potential impact of site-specific ground contamination to surface waters. WSP selects the annual average (AA-EQS) or long term mean as the target concentration for each priority substance, specific pollutant and other pollutant. Priority substances, other pollutants and specific pollutant EQS' represent the boundary between 'Good' status and failing surface water quality. Therefore, an exceedance highlights a potential risk that a surface water may not achieve or maintain a 'Good' status, which contravenes the requirements of the WFD.

Where an EQS is not available then an alternative standard has been used, where appropriate. With respect to petroleum hydrocarbons, WSP refers to the CL:AIRE 2017 guidance<sup>6</sup> to derive alternative assessment criteria. In cases where no equivalent VOC, SVOC or PAH data is available, the following proxy compounds are used:

- |                       |                       |
|-----------------------|-----------------------|
| i Aromatic EC5-EC7    | benzene (EC6.5);      |
| i Aromatic >EC6-EC7   | benzene (EC6.5);      |
| i Aromatic >EC6-EC8   | benzene (EC6.5);      |
| i Aromatic >EC7-EC8   | toluene (EC7.6);      |
| i Aromatic >EC8-EC10  | ethylbenzene (EC8.5); |
| i Aromatic >EC10-EC12 | naphthalene (EC11.7); |
| i Aromatic >EC12-EC16 | naphthalene (EC11.7); |

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<sup>5</sup> The Environmental Quality Standards Directive (EQSD), also known as the Priority Substances Directive 2008/105/EC (PSD) as amended by 2013/39/EU, lays out the requirement to protect surface waters and defines EQSs for hazardous and non-hazardous priority substances as well as 'other' chemical pollutants that are deemed to pose a threat to the aquatic environment. The WFD, GWDD and EQSD have been transposed into UK law through The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (SI 2017/407).

<sup>6</sup> CL:AIRE 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies' v1.1 March 2017.

- i Aromatic >EC16-EC21 anthracene (EC19.4);
- i Aromatic >EC21-EC35 benzo(a)pyrene (EC31.3).

With regards to metals, copper, zinc, manganese, nickel and lead site specific AA-EQS values can be calculated. Calculations of the bioavailable AA-EQS are included in Appendix E. The Feeder Dock and Port Talbot Dock waters are fed from the River Afan and consequently it has been assumed that freshwater AA-EQS apply.

Note that in respect of fluoranthene and benzo[a]pyrene the standards applied in the historic reports (Ref. 9) for these analytes were taken from guidance based upon the consumption of fishery products i.e. the protection of humans by secondary poisoning rather than direct toxicity to fauna (conservative). However, when adopting values protective of pelagic fauna as a more realistic conceptual model at the site, then AA-EQS of 0.022 µg/l benzo[a]pyrene and 0.12 µg/l fluoranthene may be considered more applicable.

### 5.3. GQRA RESULTS

All available groundwater data from the 2019 investigations have been screened against their AA-EQS for the protection of surface waters (excludes historic Opus data). A summary of the screening results (only detected concentrations included) is presented in Table 5-1. The complete screening is presented in Appendix E.

**Table 5-1 – Exceedances of the GAC for the Protection of Surface Waters**

| Determinand                                    | AA-EQS (µg/l) | Standard Reference | Maximum Concentration (µg/l) | Number Exceedances vs Samples | Location of Exceedance |
|------------------------------------------------|---------------|--------------------|------------------------------|-------------------------------|------------------------|
| Aromatic >EC6-EC7 (benzene as indicator)       | 10            | CL:AIRE 2017       | 58,300                       | 3 / 28                        | BHC5, BH105A           |
| Aromatic >EC7-EC8 (toluene as indicator)       | 74            | CL:AIRE 2017       | 54,500                       | 3 / 28                        | BHC5, BH105A           |
| Aromatic >EC8-EC10 (Ethylbenzene as indicator) | 20            | CL:AIRE 2017       | 21,400                       | 3 / 28                        | BHC5, BH105A           |
| Aromatic >EC10-EC12 (Naphthalene as indicator) | 2             | CL:AIRE 2017       | 15,800                       | 3 / 28                        | BHC5, BH105A           |
| Aromatic >EC12-EC16 (Naphthalene as indicator) | 2             | CL:AIRE 2017       | 758                          | 1 / 28                        | BHC5                   |
| Aromatic >EC16-EC21 (Anthracene as indicator)  | 0.1           | CL:AIRE 2017       | 61                           | 1 / 28                        | BHC5                   |
| Aromatic >EC21-EC35 (BaP as indicator)         | 0.022         | CL:AIRE 2017       | 45                           | 1 / 28                        | BHC5                   |
| Benzene                                        | 10            | EQS 2015           | 64,100                       | 3 / 28                        | BHC5, BH105A           |
| Toluene                                        | 74            | EQS 2015           | 61,100                       | 3 / 28                        | BHC5, BH105A           |
| Ethylbenzene                                   | 20            | Proposed EQS       | 7,060                        | 3 / 28                        | BHC5, BH105A           |
| Total Xylenes                                  | 30            | CL:AIRE 2017       | 25,760                       | 3 / 28                        | BHC5, BH105A           |

| Determinand         | AA-EQS (µg/l) | Standard Reference | Maximum Concentration (µg/l)                                              | Number Exceedances vs Samples | Location of Exceedance    |
|---------------------|---------------|--------------------|---------------------------------------------------------------------------|-------------------------------|---------------------------|
| Hexavalent Chromium | 3.4           | EQS 2015           | 178                                                                       | 6 / 28                        | BHH02(S), BHH05, BHH07(S) |
| Fluoranthene        | 0.12          | EQS 2015           | 0.23                                                                      | 2 / 28                        | BH105A,                   |
| Naphthalene         | 2             | EQS 2015           | 13300 (above its effective solubility most likely contaminated with NAPL) | 3 / 28                        | BHC5, BH105A              |
| Phenol              | 7.7           | EQS 2015           | 50                                                                        | 3 / 28                        | BHC5, BH105A              |

The Part IIA regime as reflected within planning, seeks to avoid disproportionate regulation being applied to contaminated land causing only trivial amounts of pollution to the water environment. Albeit multiple exceedances have been reported in Table 5-1:

- i Some of those listed would appear trivial in respect to their order of exceedance;
- i Some maybe natural background; and,
- i Some are both isolated and infrequent.

To identify which contaminants are important for further DQRA and avoid disproportionate regulation, a discussion of the significance of the detected generic exceedances is presented below.

## 5.4. EXCEEDANCES OF THE AA-EQS FOR THE PROTECTION OF SURFACE WATERS

Groundwater concentrations of 18 No determinands were detected in exceedance of their AA-EQS for the protection of surface waters.

TPH concentrations exceeded their conservative surrogate AA-EQS in samples taken from monitoring wells BH105 and BHC5. Highest concentrations have related to light and medium aromatic fractions (C5-C12). Concentrations of heavier TPH fractions (C12-C35) have been relatively lower and only exceeded the AA-EQS in the sample taken from BHC5. According to the CL:AIRE 2017 the overall relative mobility in groundwater of the heavy TPH fractions (C16-C35) could be anticipated to be low to very low and given their relatively low concentration with respect to the lower more mobile range fractions, the exceedances of aromatics >C16-35 are considered less significant.

Concentrations of BTEX compounds detected in samples taken from BH105A and BHC5 also exceeded their AA-EQS. The exceedances of BTEX and TPH fractions have been very similar in concentration and location indicating that they likely represent the same components. For this reason, only BTEX exceedances have been taken forwards to DQRA. These have higher concentrations and have their own AA-EQS avoiding the need to rely on surrogate indicators for the TPH fractions.

Next, the following PAH compounds have exceeded their AA-EQS:

- i Three concentrations of naphthalene detected in the samples taken from BHC5 and BH105A. The maximum concentration, 13,300 µg/l was detected at BHC5. This concentration is above its effective solubility and indicative of LNAPL contamination within the sample; and
- i Two concentrations of fluoranthene detected in samples taken from BH105A. These exceedances are considered trivial as concentrations are within the same order of magnitude as the AA-EQS.

Regarding metals, six concentrations of hexavalent chromium detected in samples taken from BHH02(S), BHH05 and BHH07(S) all screened within the Made Ground exceeded its AA-EQS and will require DQRA consideration.

Phenol concentrations detected in samples taken from BH105A and BHC5 have exceeded the relevant AA-EQS by one order of magnitude.

In summary, exceedances of AA-EQS for the protection of surface waters appear related primarily to, BTEX compounds, hexavalent chromium, naphthalene and phenol. These exceedances have been taken for further assessment by DQRA in the next chapter.

## 6. DETAILED QUANTITATIVE RISK ASSESSMENT (PPL3)

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### 6.1. INTRODUCTION

A DQRA has been performed using the modelling software ConSim Version 2.5 to assess the exceedances identified through GQRA. A DQRA aims to further assess the effects of dilution, dispersion, sorption and biodegradation in attenuating and reducing the flux and risk of a contaminant as it travels towards a receptor.

A detailed description together with the supporting information for the controlled waters assessment is presented in Appendix F.

#### MODEL APPROACH

ConSim is a probabilistic model. Parameter uncertainty (and to some extent conceptual and model uncertainty) is dealt with by allowing the specification of a range of values for each input parameter rather than a single number.

The model uses the Monte Carlo simulation technique to select parameter values randomly from user defined input distribution ranges. By cross calculating different parameters using values from within a predefined statistical distribution (Probability Distribution Functions or PDF), parameter uncertainty can be accounted for and parameter variability as applied to the natural system can be more confidently modelled. Iterating each calculation many times (1001 iterations) gives a range of output values, the distribution of which reflects the uncertainty inherent in the input value ranges. This enables a determination of the likelihood that an estimated projection of risk may be realised.

Based on the CSM and the GQRA results, a model has been built to project concentrations at a location beside the Port Talbot docks pre- dilution in receiving waters. The built model assumes that:

- i The sandy gravels within the Alluvium deposits are the most likely groundwater pathway therefore, aquifer parameters are based on sandy gravel properties;
- i The main groundwater flow direction is towards the closest surface water (the Port Talbot dock);
- i The source is non-depleting (conservative); and  
Source does not include residual LNAPL as it is presumed that the site will undergo remediation and observed LNAPL will be treated/removed from soil and groundwater.

### 6.2. MODEL INPUT PARAMETERS

Model input parameters have been derived from site specific data where possible or from published values where necessary.

The input parameters, the range of values and sources of the data are defined in Appendix F. Contaminant specific input parameter values are presented in Table F.1. Site specific environmental input parameter values are presented in Table F.2. Notwithstanding, a summary of the of critical parameters is presented below.

#### 6.2.1. THE MODELLED SOURCE

Evidence of hydrocarbon contamination has been detected within monitoring wells BH104, BH105 and BHC5 coincident with the observed LNAPL. The implications of the ongoing presence of this free product and its treatment are to be discussed in a remediation strategy document. It is assumed that the observed LNAPL will be treated/removed, hence limited residual product will be expected to

remain at the site. For that reason, dissolved phase concentrations only have been included within the source term and the high concentrations observed within borehole BHC5 indicative of LNAPL have been discounted. However, the source dimensions have been selected to contain an area delineated by the current observed groundwater impact (area within BH104, BHC5 and BH105) of approximately 1,800 m<sup>2</sup> at 60 m length and 50 m wide with respect to a southerly groundwater flow direction (180 degrees).

Details of the source concentrations input into the model and the effective solubility calculations are included in Table F.1 and F.2 respectively in Appendix F.

### **Infiltration Rate**

According to the Hydrometric Register the mean annual rainfall at the site area is ~2128 mm (from Marcroft Weir gauging station at River Afan (SS771910)). Assuming a 40% rainfall loss due to evapotranspiration (typical UK average) the effective rainfall in the area is estimated at 1276 mm. Based on the development plans 80% of the source area is to be covered by hardstanding. Based on the above then the future infiltration at above the source has been estimated as 255 mm/y. Infiltration has been introduced into the model as a normal probability distribution with a mean of 255 mm/y and a 36.5 mm/y standard deviation (30%).

## **6.2.2. AQUIFER PROPERTIES**

The sandy gravels of the Alluvium deposits are considered the most likely groundwater pathway therefore the aquifer properties have been based on this lithology (bulk density, effective porosity, etc).

### **Hydraulic Conductivity (K)**

In-situ hydraulic conductivity tests have been conducted within the Alluvium deposits beneath the site (see Section 3.4). Results have provided a range of hydraulic conductivity values between 2.36 and 11.35 m/d with a geometric mean of 4.81 m/d. Literature data from Wates *et al.* (Urban Geology of Swansea and Port Talbot) indicates hydraulic conductivity of the Alluvium deposits in the Port Talbot area of between 0.251 and 8.64 m/d. A range of hydraulic conductivity inclusive of these values has been selected as input into the model using a log triangular probability distribution i.e. inclusive of the minimum and maximum values from the literature data and a likely value as the geometric mean of the site-specific tests.

### **Hydraulic Gradient**

The hydraulic gradient of the groundwater within the Alluvium deposits beneath the site has been extrapolated from Surfer Figure 4.1 to range between 0.002 and 0.03 with a typical value of 0.006. However, it is noted that the maximum hydraulic gradient in the downgradient area of the site is approximately 0.008, for this reason the maximum gradient of 0.03 suggested only towards the eastern boundary of the site has been excluded.

As such a range of hydraulic gradients has been input in the model, using a triangular distribution that includes the maximum and minimum values observed at the downgradient boundary (0.002, 0.008) and a likely value represented by the geometric mean of all the data set (0.006).

### **Aquifer Thickness**

An effective aquifer thickness is needed to model the available aquifer that is likely to be in hydraulic connection with the surface water receptor.

The aquifer thickness has been selected based on the observed thickness of the alluvium in the borehole logs including WSP investigation [Ref 4] and Opus [Ref 2] and the anticipated available aquifer that is likely to be in hydraulic connection with the Port Talbot Dock. Generally, the base of the Alluvium has not been encountered during drilling except for Opus borehole BHH04 [Ref 2] which detected the top of the bedrock at 6.5 m bgl. The water table at that location was measured as 2 m bgl providing a saturated aquifer thickness of 5.5 m. This thickness has been considered as the minimum saturated thickness of the aquifer. The maximum aquifer thickness based on the wetter perimeter of the Dock is assumed to be approximately 15 m.

Based on the above, the aquifer thickness has been input in the model as a uniform distribution between 6.5 and 15 m.

### **Effective Porosity**

The Alluvium on site has been described predominately as a sandy gravel. Opus particle size distribution analysis [Ref. 2] from samples taken from this alluvium (three samples) confirms a coarse sandy fine to coarse gravel with a range of 63 to 86% of gravels and 10 to 28% of sands.

Total porosity of a coarse gravel ranges between 0.24 and 0.36 (Domenico Schwartz, 1990<sup>7</sup>). However, to determine travel times for contaminant transport within the aquifer, the effective porosity, as opposed to the total porosity, is required; this represents the interconnected porosity available for fluid flow. An effective porosity has been assumed to range between 0.14 and 0.21 assuming 60% of total porosity.

### **6.2.3. ASSESSMENT POINTS**

The Port Talbot Dock has been assumed to be the main surface water receptor for the site. The closest distance from the site to the Port Talbot Dock, 60 m from the south site boundary or ~130 m from the observed source area has been selected as assessment point for the model. As explained in Section 4.4 localised groundwater flow direction is variable. The closest distance to this receptor has been selected. However, it should be noted that this assessment point lies in a southerly groundwater flow direction whilst site specific data is suggestive of a more westerly groundwater flow direction towards the dock feeder stream at 570m distant.

### **6.2.4. LONGITUDINAL AND LATERAL DISPERSION (M)**

ConSim guidance advises that longitudinal dispersion is typically assumed to be 10% of the pathway length. Similarly, lateral dispersion of a plume is assumed to be 30% of the longitudinal dispersion. Longitudinal dispersion typically levels off at the approximate scale of between 100m and 1,000m.

### **6.2.5. RETARDATION AND BIODEGRADATION**

Understanding and confirming natural attenuation provides an assessment of the potential for naturally occurring physical, chemical and biological processes (or any combination of these) to reduce the load, concentration, flux or toxicity of the polluting substances identified in groundwater.

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<sup>7</sup> Domenico, P.A. and F.W. Schwartz, 1990. *Physical and Chemical Hydrogeology*, John Wiley & Sons, New York, 824 p

Consequently, the consideration of sorption and biodegradation can have an order of magnitude effect on a model's output.

Retardation of organic species by sorption is a function of the organic carbon partition coefficient (Koc) of a species and the amount of organic carbon within the aquifer (FoC, or Fraction of Organic Carbon). FoC values have been selected based on six soil laboratory results obtained during the 2019 site investigation which range between 0.2 and 0.38 %. Selected literature values of Koc are shown in Appendix F.2.

To assess the effects of biodegradation on projected concentrations, contaminant half-life data may be applied within a DQRA as selected from available literature sources. In the absence of site-specific degradation rates, literature-based values have been utilised (sources are presented in Appendix F). Oxygen levels of the groundwater within the Alluvium deposits have been recorded between 0.42 mg/l and 0.78 mg/l (Appendix C.1), indicating aerobic conditions at the time of monitoring. For this reason, a range of literature values inclusive of aerobic conditions have been identified and input in the model as a uniform probability distribution.

Finally, it should be noted that the model has been run to account for degradation of hydrocarbons in the dissolved phase only (conservative).

#### **6.2.6. INPUT CORRELATIONS AND TIME PROJECTIONS**

Some model parameters require correlation to ensure that 'unrealistic' scenarios are avoided within the model iterations. The following correlations have been included within the model runs so that relationships between interdependent parameters may be realistically modelled:

- i Lateral vs longitudinal dispersion (+1.0 correlation);
- i Aquifer hydraulic gradient vs hydraulic conductivity (-0.8 correlation);
- i Aquifer effective porosity vs hydraulic conductivity (+0.8 correlation); and
- i Hydraulic conductivity vs longitudinal dispersion (+0.8 correlation);

Each model simulation has been used to project receptor contaminant concentrations at 50, 300 and 1000 years After Present (AP).

### **6.3. MODEL RESULTS**

Results of the projected groundwater concentrations are shown as 95 percentiles, meaning that 95 % of the values in 1001 iterations are lower than the 95%ile.

Projected groundwater concentrations have been screened against their relevant AA-EQS and presented in Table 6-1. Model outputs are included in Appendix F.

Projected concentrations of benzene, toluene, ethylbenzene, xylenes, naphthalene and hexavalent chromium exceed the AA-EQS in 95% of 1001 runs.

**Table 6-1 – Projected Concentrations (95% of values less than) at Port Talbot Dock and 50, 300 and 1000 years (AP)**

| Determinand         | AA-EQS (µg/l) | 95 %ile Projected Concentration (µg/l) |              |               |
|---------------------|---------------|----------------------------------------|--------------|---------------|
|                     |               | 50 years AP                            | 300 years AP | 1000 years AP |
| Benzene             | 10            | 1168                                   | 1168         | 1168          |
| Hexavalent Chromium | 3.4           | 1.60E-14                               | 1.47E-07     | 3.32          |
| Ethylbenzene        | 20            | 1.86                                   | 2.04         | 2.04          |
| Naphthalene         | 2             | 6.95                                   | 11.1         | 11.1          |
| Phenol              | 7.7           | 0.035                                  | 0.035        | 0.035         |
| Toluene             | 74            | 13.0                                   | 13.0         | 13.0          |
| Xylene              | 30            | 8.95                                   | 10.3         | 10.3          |

Red cells indicate projected concentrations exceeds GAC.

## 6.4. SENSITIVITY ASSESSMENT

The sensitivity function within ConSim indicates that the projected concentrations are controlled mainly by the degradation rates and to a lesser extent by the hydraulic conductivity of the aquifer. Hydraulic conductivity at the site has been relatively well constrained by site-specific values. The degradation rates used on the model have been taken from literature data inclusive of aerobic conditions based on measured field parameters.

## 6.5. DQRA SUMMARY AND DISCUSSION

Based on the CSM and model results, detected groundwater concentrations beneath the site would continue to suggest an unacceptable risk if assuming the Port Talbot Dock as the critical receptor.

However, it should be noted that the model projections include the following limitations and assumptions:

- i A non-depleting source;
- i Unimpeded hydraulic connection between the groundwater and the surface waters, yet the latter is known to be lined to the west albeit some areas where the wall has collapsed;
- i Groundwater flow to the south as the closest surface water yet groundwater level monitoring has suggested a more westerly flow;
- i No dilution in the receiving waters that would likely mitigate many of the projected exceedances; and
- i No attenuation in the hyporheic zone.

The precautionary approach in the existing DQRA has established the compliance point within the groundwater body immediately up-gradient of the Port Talbot Dock and fixed the target groundwater concentration as being equal to the target concentrations that would be applied in the watercourse (the relevant AA-EQS). By this means, no matter what volume of groundwater enters the Port Talbot Dock, the AA-EQS could not be compromised.

A second iteration could, however, be to consider the potential interaction between the groundwater body and the Port Talbot Dock and the effects of attenuation in the hyporheic zone, and subsequently instantaneous dilution within the watercourse. However, riparian and hyporheic zones are typically highly heterogeneous and relatively thin. Pollutant movement times may be small and variable. If such was to be considered, then investigations of natural attenuation processes at the groundwater surface water interface would need to be established. Consequently, quantifying the effects of attenuation in the hyporheic zone has been ignored despite their potential to reduce flux.

A dilution factor may still however be calculated such are normally calculated at low river flows – typically the river flow exceeded 95 per cent of the time (Q95 flow) taken from an up-stream location. However, the Port Talbot Dock is a controlled basin isolated from the sea by control gates drained when inflows get to high. It is however a significant body of water and dilution ratios are expected to be very high most likely negating the conservative risk projection. This assumption is supported by the absence of hydrocarbon impact detected in the surface water samples taken from the Port Talbot Dock and the Dock Feeder. (Section 3.6).

More importantly, model projections have assumed the Port Talbot Dock to be the critical receptor simply given its proximity and the potential for local variabilities in shallow groundwaters. #Monitoring wells BH101 and MW1 are located downgradient of the source area assumed in the model but towards the dock. The model over predicts concentrations at these wells i.e. cannot be validated. Laboratory results indicate that concentrations at these locations are below their LoD for all contaminants of concern whilst model projections indicate concentrations of between 4.36 mg/l and 323 mg/l of benzene and 46 mg/l and 4 mg/l of naphthalene within 50 years.

This discrepancy and the lack of impact detected in the Port Talbot Dock surface water sample suggests that the actual groundwater flow direction may not be towards the south as assumed in the model but towards the west as suggested by the WSP 2019 groundwater data.

If assuming groundwater flow direction is to the west and selecting the Dock Feeder as the closest receptor in that direction (approximately 570 m west). Results of this updated model are the presented in Table 6-2.

**Table 6-2 – Projected Concentrations (95% of values less than) at Dock Feeder and 50, 300 and 1000 years (AP)**

| Determinand         | AA-EQS (µg/l) | 95 %ile Projected Concentration (µg/l) |              |               |
|---------------------|---------------|----------------------------------------|--------------|---------------|
|                     |               | 50 years AP                            | 300 years AP | 1000 years AP |
| Benzene             | 10            | 0.76                                   | 0.76         | 0.76          |
| Hexavalent Chromium | 3.4           | 2.94E-27                               | 1.15E-11     | 1.04E-10      |
| Ethylbenzene        | 20            | 1.92E-07                               | 6.18E-05     | 6.18E-05      |
| Naphthalene         | 2             | 2.75E-09                               | 4.62E-03     | 4.74E-03      |
| Phenol              | 7.7           | 2.71E-09                               | 2.71E-09     | 2.71E-09      |
| Toluene             | 74            | 1.32E-04                               | 2.44E-04     | 2.44E-04      |

| Determinand | AA-EQS (µg/l) | 95 %ile Projected Concentration (µg/l) |              |               |
|-------------|---------------|----------------------------------------|--------------|---------------|
|             |               | 50 years AP                            | 300 years AP | 1000 years AP |
| Xylene      | 30            | 2.81E-07                               | 4.95E-04     | 4.95E-04      |

Projected concentrations of the updated model no longer exceed the selected AA-EQS assuming protection of the Dock Feeder instead of Port Talbot basin.

In summary:

- i Assuming the LNAPL is removed, on site hydrocarbon sources should in the future be depleting;
- i If groundwater flow passes south (conservative) then dilution ratios in the Port Talbot Dock would likely be high reducing the potential for a dissolved phase risk as suggested by the available surface water analysis (Port Talbot Dock);
- i If the groundwater vector is towards the west not south, then dilution and attenuation are projected to mitigate the observed hazard, also suggested by the lack of impact in the Dock Feeder surface water sample.

The balance of probabilities suggests that risk from the observed dissolved phase contaminants to controlled surface waters may now be considered low i.e.

- i Low - It is considered unlikely that either: Significant harm is being caused (or will be caused) to one or more receptors by contamination source(s) identified.

## 7. SUMMARY AND CONCLUSIONS

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### 7.1. SUMMARY

WSP was commissioned by Neath and Port Talbot County Borough Council to undertake a detailed controlled waters risk assessment at the site. Additional site works were also instructed to help parametrise the model. These site works have identified:

- i Variable shallow groundwater flow directions yet an absence of a tidal influence on groundwater levels and gradients;
- i Hydraulic conductivities of between 2.5 and 11.6 m/d consistent with an aquifer lithology description of a sandy gravel as observed beneath the site;
- i The presence of hydrocarbon impact within the centre and west of the site with a significant apparent LNAPL thickness of between 0.53 and 0.78 m observed at borehole BH104;
- i Dissolved phase concentrations in groundwater albeit mainly limited to TPH, PAH and BTEX species and at locations generally coincident with the LNAPL and historical tank farms;
- i The LNAPL to be of a carbon band range C6-C12 and more than 10 years old; meanwhile
- i No hydrocarbon impacts noted in the available surface water analysis from the Dock Feeder and the Port Talbot Dock.

#### **Risk Assessment**

Our DQRA model has been set up using the probabilistic modelling software ConSim. Initial model results have suggested a potentially unacceptable risk if assuming the Port Talbot Dock to be the critical receptor. Yet in 2019, WSP monitoring of groundwaters have suggested a more westward flow. If consequently assuming this groundwater flow and selecting the Dock Feeder as the closest receptor in that direction (approximately 570 m west) then risk projections no longer arise. Furthermore, should a component of groundwater flow pass south then dilution ratios in the Port Talbot Dock would likely be very high reducing the potential for the projected dissolved phase risk. This is supported by a lack of hydrocarbon impact in the surface water samples taken from the Port Talbot Dock and the Dock Feeder.

### 7.2. RECOMMENDATIONS

As indicated throughout the report, this DQRA has only assessed those risks from for the dissolved phase. LNAPL has been encountered for example at BH104 at a significant apparent thickness (0.78 m). Additional delineation of this source will be required. Furthermore, multiple bail down transmissivity tests will be required from it and from additional surrounding new wells, to identify and assess the best options for its recovery. Subsequently a remediation strategy document will be necessitated for the NAPL. The enclosed DQRA has assumed that the observed LNAPL will be removed/treated.

### 7.3. CONCLUSIONS

In summary, the Part 2A regime as reflected within planning seeks to avoid disproportionate regulation being applied to contaminated land causing only trivial amounts of pollution to the water environment. A consideration of certainty and reasonableness is expected. Post the removal of the LNAPL then upon the balance of probabilities dissolved phase contributions to risk based on the data available is considered to be low.

# Appendix A

## REPORT LIMITATIONS



## REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

### GENERAL

1. WSP UK Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under WSP UK Limited standard Terms and Conditions as included within our proposal to the Client.
3. Project specific appointment documents may be agreed at our discretion and a charge may be levied for both the time to review and finalise appointments documents and also for associated changes to the appointment terms. WSP UK Limited reserves the right to amend the fee should any changes to the appointment terms create an increase risk to WSP UK Limited.
4. The report needs to be considered in the light of the WSP UK Limited proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

### PHASE 1 GEO ENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

**Coverage:** *This section covers reports with the following titles or combination of titles: phase 1; desk top study; geo environmental assessment; development appraisal; preliminary environmental risk assessment; constraints report; due diligence report; geotechnical development review; environmental statement; environmental chapter; project scope summary report (PSSR), program environmental impact report (PEIR), geotechnical development risk register; and, baseline environmental assessment.*

5. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. WSP UK Limited cannot be held responsible for any disclosures that are provided post production of our report and will not automatically update our report.
6. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP UK Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.
7. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.
8. WSP UK Limited does not warrant work / data undertaken / provided by others.

## REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

### INTRUSIVE INVESTIGATION REPORTS

**Coverage:** *The following report titles (or combination) may cover this category of work: geo environmental site investigation; geotechnical assessment; GIR (Ground Investigation reports); preliminary environmental and geotechnical risk assessment; and, geotechnical risk register.*

9. The investigation has been undertaken to provide information concerning either:
  - i. The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
  - ii. Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.
10. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.
11. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.
12. For geotechnical investigations the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.
13. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.
14. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.
15. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, WSP UK Limited has used reasonable skill and care to extrapolate conditions between these points based upon assumptions to develop our interpretation and conclusions. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation. Conditions can change between investigation points and these interpretations should be considered indicative.
16. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated

## REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

with the WSP UK Limited risk assessment process have been outlined within the body or associated appendix of the report.

17. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.
18. Where soil contamination concentrations recorded as part of this investigation are used for commentary on potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed.
19. The results of the asbestos testing are factually reported and interpretation given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and / or trace loose asbestos fibres within the soil matrix at the site.
20. If costs have been included in relation to additional site works, and / or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

## EUROCODE 7: GEOTECHNICAL DESIGN

21. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.
22. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

## DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIAL STRATEGY REPORTS

23. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected on the basis of the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.



## REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

- 24. The outputs of the Detailed Quantitative Risk Assessments are based upon WSP UK Limited manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.
- 25. Prior to adoption on site they will need discussing and agreeing with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of WSP UK Limited. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

### GEOTECHNICAL DESIGN REPORT (GDR)

- 26. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

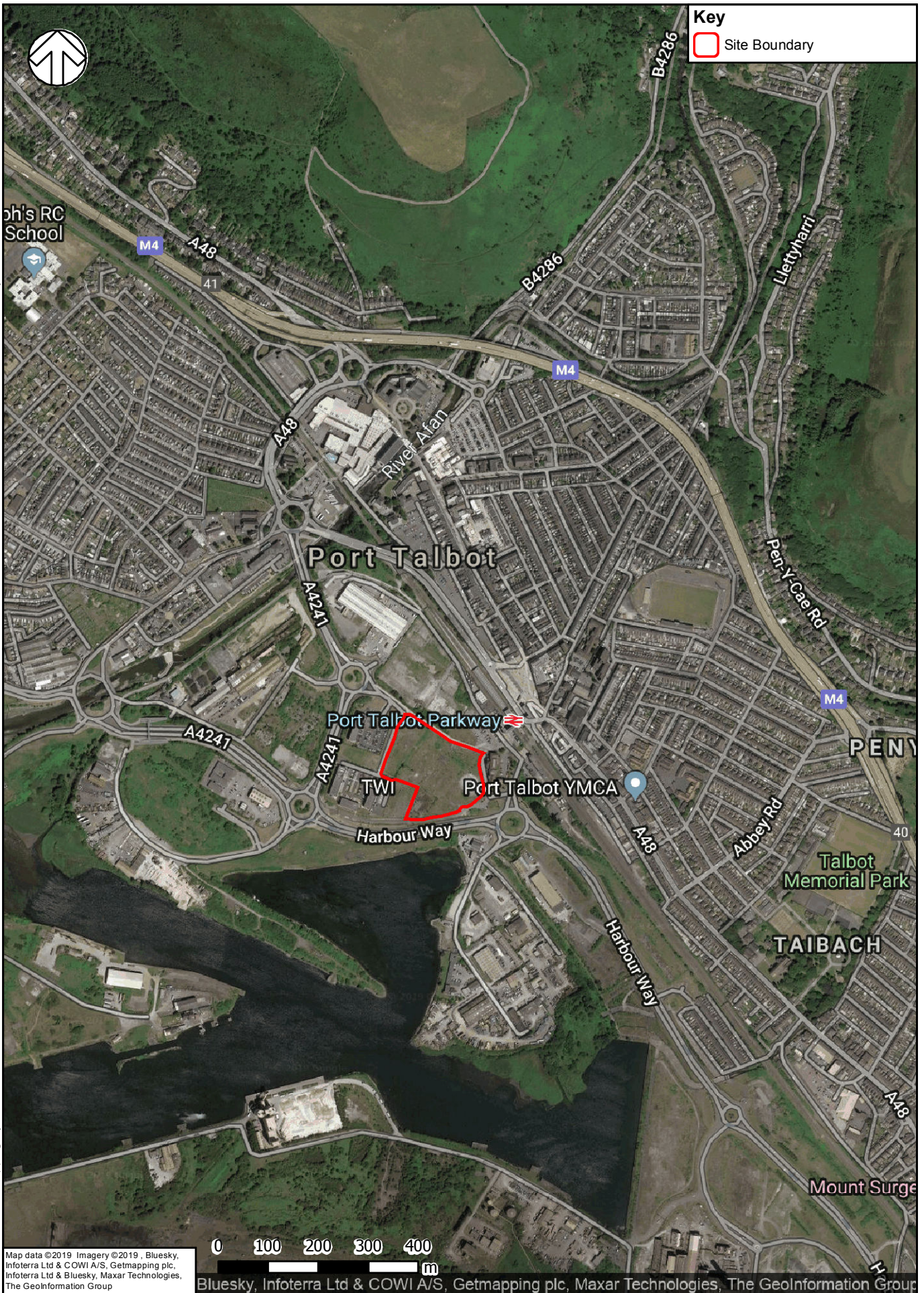
### MONITORING (INCLUDING REMEDIATION MONITORING REPORTS)

- 27. These reports are factual in nature and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of an earthworks or remedial works.
- 28. The data is presented and will be compared with assessment criteria.

# Appendix B

DRAWINGS





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| Rev | Date | Description | By | Chk | App | Notes |
|-----|------|-------------|----|-----|-----|-------|
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Kings Orchard  
1 Queen Street  
Bristol BS2 0HQ

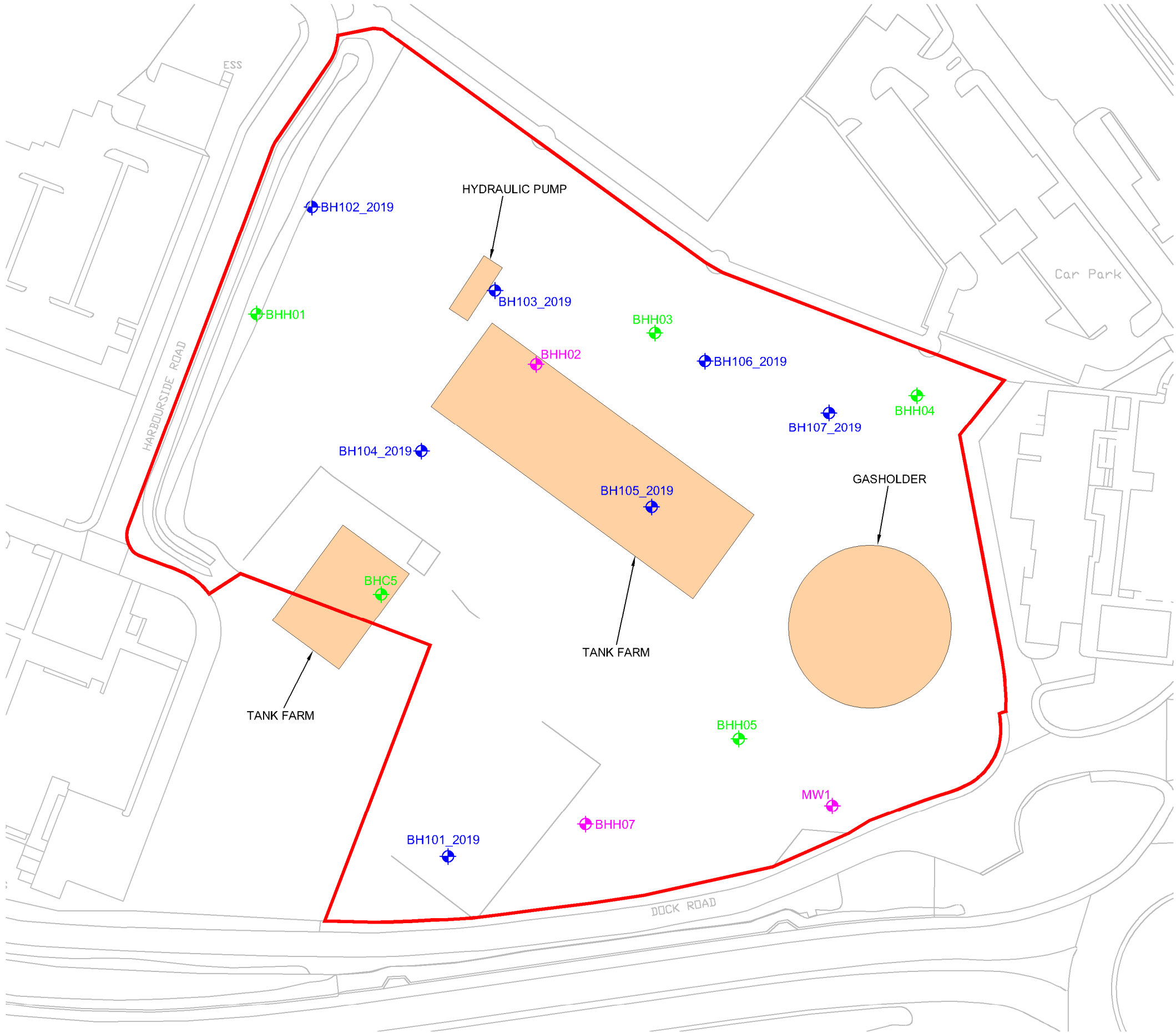


Tel: 44-(0)1179-306200

Client:  
**NEATH PORT TALBOT COUNTY BOROUGH COUNCIL**  
Project:  
**PORT TALBOT HARBOURSIDE**

Title:  
**EXPLORATORY HOLE LOCATIONS**

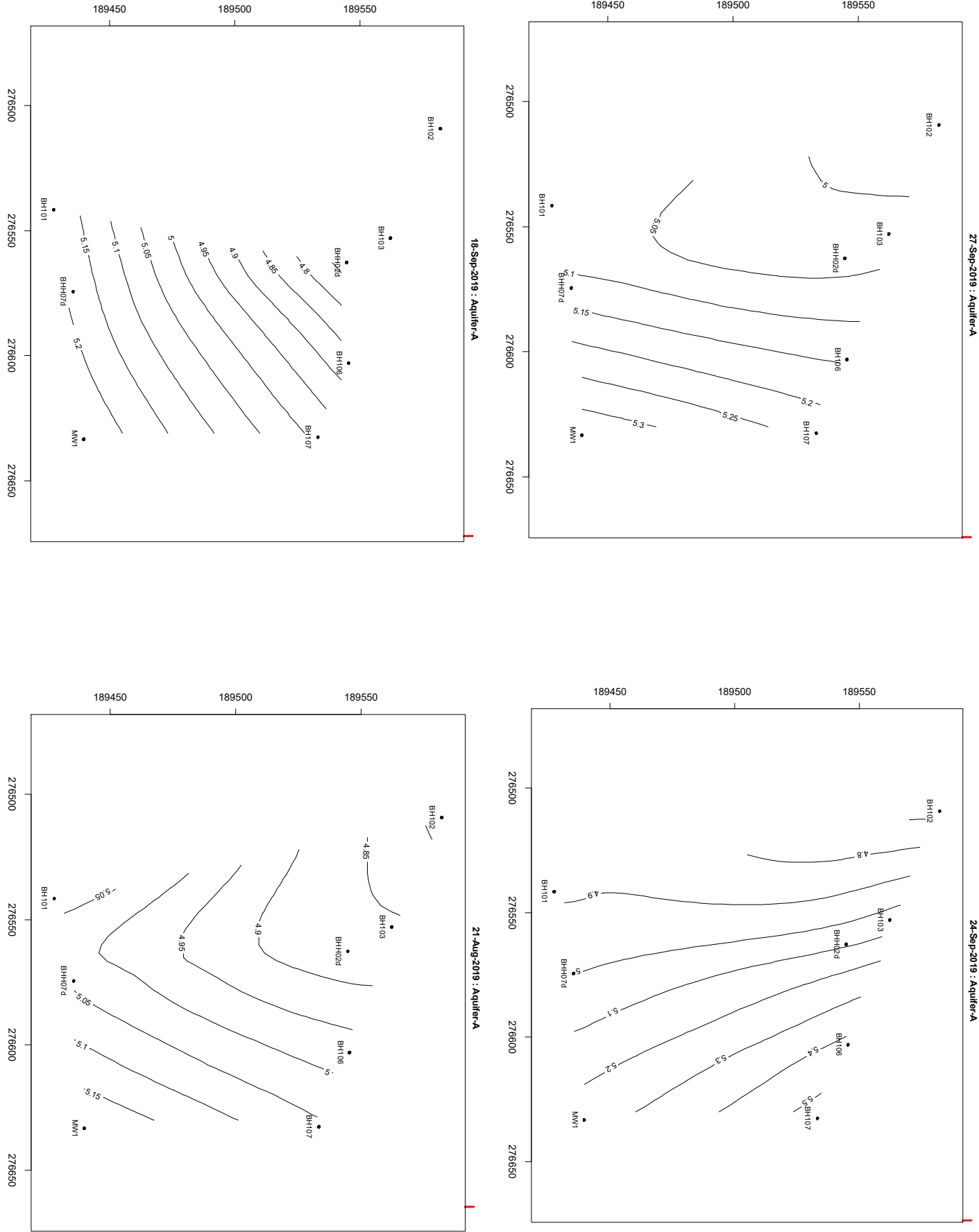
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|--------------------------|---------------|--------------------------|-----------|
| Drawn: CEW               | Checked: RE   |                          |           |
| Designed: RE             | Approved:     |                          |           |
| Date: 20/08/2019         | Scale: 1:1000 | A3                       | Sheet     |
| Project Number: 62253048 |               | Drawing Number: FIGURE 2 | Revision: |
| © Copyright WSP          |               |                          |           |



| KEY |                                   |
|-----|-----------------------------------|
|     | SITE BOUNDARY                     |
|     | BOREHOLE (MG)                     |
|     | BOREHOLE (DUAL MG & SF)           |
|     | BOREHOLE (2019)                   |
|     | POTENTIAL HISTORICAL SOURCE AREAS |



Figure 4: Alluvium Groundwater Configurations, August and September 2019



# Appendix C

## SITE INFORMATION



# Appendix C.1

GROUNDWATER MONITORING DATA



Appendix C.1 Groundwater Monitoring

| Borehole ID | Datum m<br>AOD | Depth to Product<br>m bgl | Depth to Water<br>m bgl | Groundwater Level<br>m AOD | Depth to Base<br>m bgl | Depth to Product<br>m bgl | Depth to Water<br>m bgl | Groundwater Level<br>m AOD | Depth to Base<br>m bgl | Depth to Product<br>m bgl | Depth to Water<br>m bgl | Groundwater Level<br>m AOD | Depth to Base<br>m bgl | Depth to Product<br>m bgl | Depth to Water<br>m bgl | Groundwater Level<br>m AOD | Depth to Base<br>m bgl |
|-------------|----------------|---------------------------|-------------------------|----------------------------|------------------------|---------------------------|-------------------------|----------------------------|------------------------|---------------------------|-------------------------|----------------------------|------------------------|---------------------------|-------------------------|----------------------------|------------------------|
|             |                | 21/08/2019                |                         |                            |                        | 18/09/2019                |                         |                            |                        | 24/09/2019                |                         |                            |                        | 27/09/2019                |                         |                            |                        |
| BH101       | 7.002          | -                         | 1.77                    | 5.232                      | 8                      | -                         | 1.790                   | 5.212                      | 8.000                  | -                         | 1.94                    | 5.06                       | 8.22                   | -                         | 1.81                    | 5.192                      | 8.23                   |
| BH102       | 8.890          | -                         | 4.13                    | 4.760                      | 10.3                   | -                         | -                       | -                          | -                      | -                         | 4.12                    | 4.77                       | 10.33                  | -                         | 3.96                    | 4.930                      | 10.34                  |
| BH103       | 6.491          | -                         | 1.59                    | 4.901                      | 6.24                   | -                         | -                       | -                          | -                      | -                         | 1.555                   | 4.94                       | 6.27                   | -                         | 1.42                    | 5.071                      | 6.25                   |
| BH104       | 7.016          | 2.13                      | -                       | -                          | 5.17                   | 2.7                       | 2.17                    | 5.316*                     | -                      | 2.1                       | 2.72                    | 4.84*                      | 5.18                   | 1.940                     | 2.720                   | 4.99*                      | 5.180                  |
| BH105A      | 6.727          | -                         | 1.73                    | 4.997                      | 8                      | -                         | 1.520                   | 5.207                      | 7.830                  | -                         | 1.68                    | 5.05                       | 8.1                    | -                         | 1.56                    | 5.167                      | 3.29                   |
| BH106       | 6.304          | -                         | 1.34                    | 4.964                      | 8.25                   | -                         | 1.380                   | 4.924                      | 8.190                  | -                         | 0.27                    | 6.03                       | 8.25                   | -                         | 1.17                    | 5.134                      | 8.24                   |
| BH107       | 6.079          | -                         | 1.06                    | 5.019                      | 6.25                   | -                         | 1.110                   | 4.969                      | 6.140                  | -                         | 0.94                    | 5.14                       | 6.29                   | -                         | 0.88                    | 5.199                      | 6.29                   |
| BHH01       | 8.900          | -                         | Dry                     |                            |                        | -                         |                         |                            |                        | -                         | -                       |                            | -                      | -                         | 4.2                     | 4.700                      | 4.44                   |
| BHH02(S)    | 6.733          | -                         | 1.93                    | 4.803                      | 2.43                   | -                         | 1.950                   | 4.783                      | 2.390                  | -                         | 1.9                     | 4.83                       | 2.46                   | -                         | 1.72                    | 5.013                      | 2.46                   |
| BHH02(D)    | 6.733          | -                         | 1.93                    | 4.803                      | 8.82                   | -                         | 2.030                   | 4.703                      | 8.760                  | -                         | 1.91                    | 4.82                       | 8.83                   | -                         | 1.77                    | 4.963                      | 8.83                   |
| BHH03       | 6.229          | -                         | 1.47                    | 4.759                      | 2.85                   | -                         | 1.550                   | 4.679                      | 1.750                  | -                         | 0.42                    | 5.81                       | 2.9                    | -                         | 1.3                     | 4.929                      | 2.87                   |
| BHH04       | 6.930          | -                         | 1.26                    | 5.670                      | 1.51                   | -                         | 0.950                   | 5.980                      | 1.190                  | -                         | 1.14                    | 5.79                       | 1.53                   | -                         | 1.18                    | 5.750                      | 1.55                   |
| BHH05       | 6.925          | -                         | 1.79                    | 5.135                      | 2.56                   | -                         | 1.380                   | 5.545                      | 2.150                  | -                         | 1.71                    | 5.22                       | 2.6                    | -                         | 1.72                    | 5.205                      | 2.61                   |
| BHH07 (S)   | 7.022          | -                         | 2.31                    | 4.712                      | 3.65                   | -                         | 1.830                   | 5.192                      | 3.170                  | -                         | 2.26                    | 4.76                       | 3.65                   | -                         | 2.13                    | 4.892                      | 4.64                   |
| BHH07 (D)   | 7.022          | -                         | 2.31                    | 4.712                      | 8.92                   | -                         | 1.860                   | 5.162                      | 8.470                  | -                         | 2.28                    | 4.74                       | 8.93                   | -                         | 2.14                    | 4.882                      | 9.94                   |
| MW1         | 6.920          | -                         | 1.6                     | 5.320                      | 9.85                   | -                         | 1.670                   | 5.250                      | 9.860                  | -                         | 1.58                    | 5.34                       | 9.89                   | -                         | 1.47                    | 5.450                      | 9.9                    |
| BHC5        | 6.806          | 2.1                       | 2.13                    | 4.676                      | 2.54                   | -                         | -                       | -                          | -                      | -                         | 2.08                    | 4.73                       | 2.63                   | -                         | 1.93                    | 4.876                      | 3.63                   |

\* Corrected to Product density 0.887 mg/l

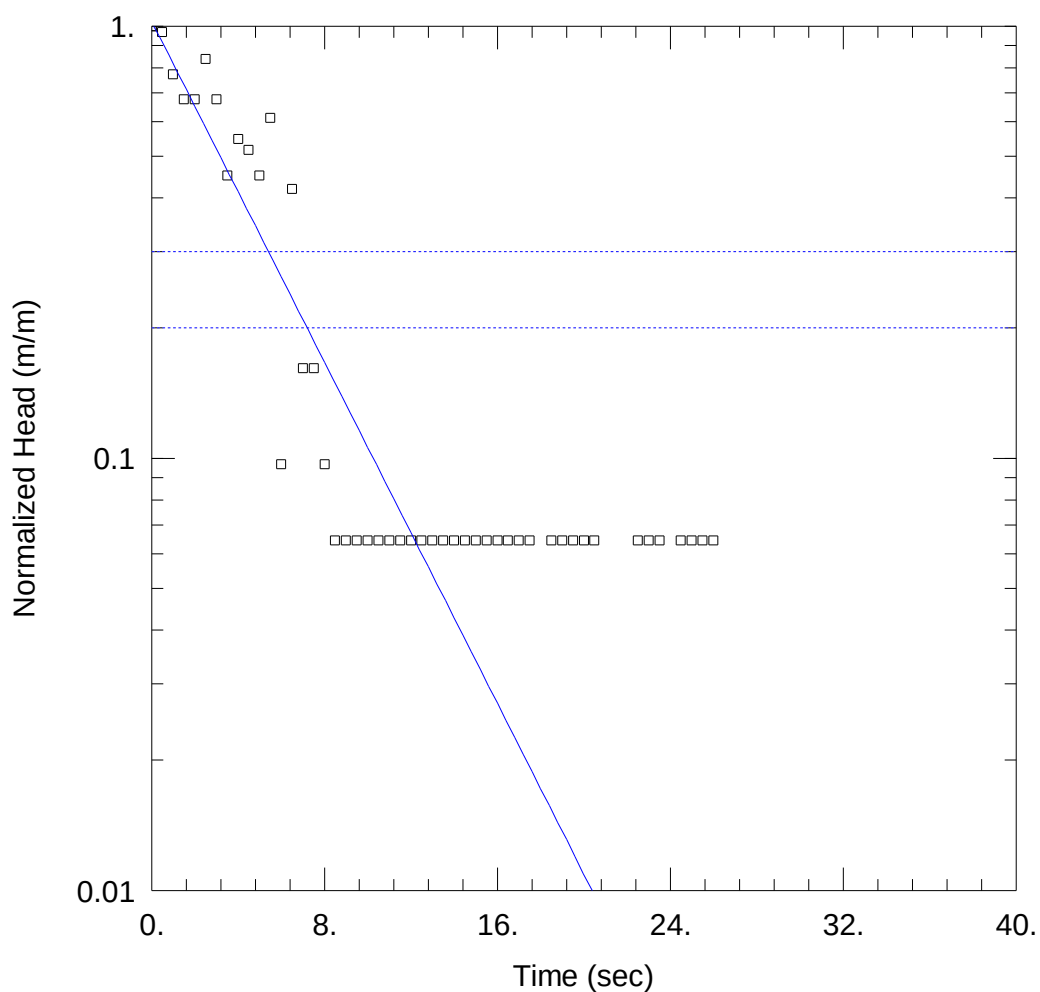
## Appendix C1: Field Parameters 1 November 2019

| BH      | EC (μS/cm) | ORP (mV) | DO (mg/l) | pH    | Temp (°C) |
|---------|------------|----------|-----------|-------|-----------|
| BH102   | 753        | -368.8   | 0.77      | 6.63  | 13.5      |
| BH103   | 717        | -389.1   | 0.55      | 6.97  | 13.4      |
| BHC5    | 2810       | -414.2   | 0.78      | 11.51 | 14        |
| BH105A  | 850        | -370.3   | 0.42      | 6.94  | 14.1      |
| BH101   | 632        | -379.8   | 0.46      | 6.9   | 14.3      |
| BHH07 S | 402.3      | -369.3   | 1.8       | 7.63  | 14        |
| BHH07 D | 486.6      | -369.1   | 0.61      | 6.88  | 14        |

# Appendix C.2

## PERMEABILITY TESTS





### BH101 FALLING HEAD TEST 1

Data Set: \\...\BH101\_FH1.aqt

Date: 10/11/19

Time: 16:00:29

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BH101

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BH101)

Initial Displacement: 0.031 m

Total Well Penetration Depth: 6.2 m

Casing Radius: 0.025 m

Static Water Column Height: 6.2 m

Screen Length: 6.2 m

Well Radius: 0.05 m

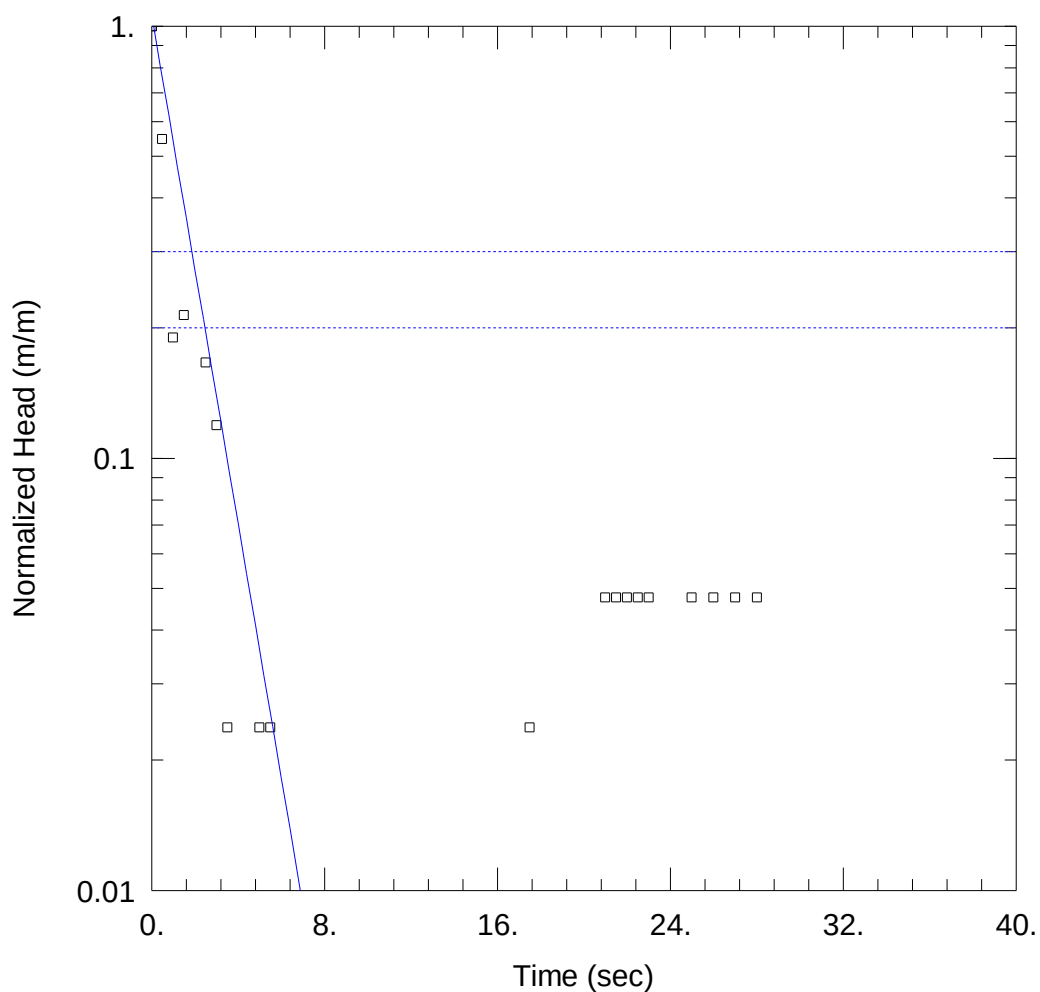
### SOLUTION

Aquifer Model: Unconfined

$K = 3.333$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.03182$  m



### BH101 RISING HEAD TEST 1

Data Set: \\...\BH101\_RH1.aqt

Date: 10/11/19

Time: 16:00:50

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BH101

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BH101)

Initial Displacement: 0.042 m

Static Water Column Height: 6.2 m

Total Well Penetration Depth: 6.2 m

Screen Length: 6.2 m

Casing Radius: 0.025 m

Well Radius: 0.05 m

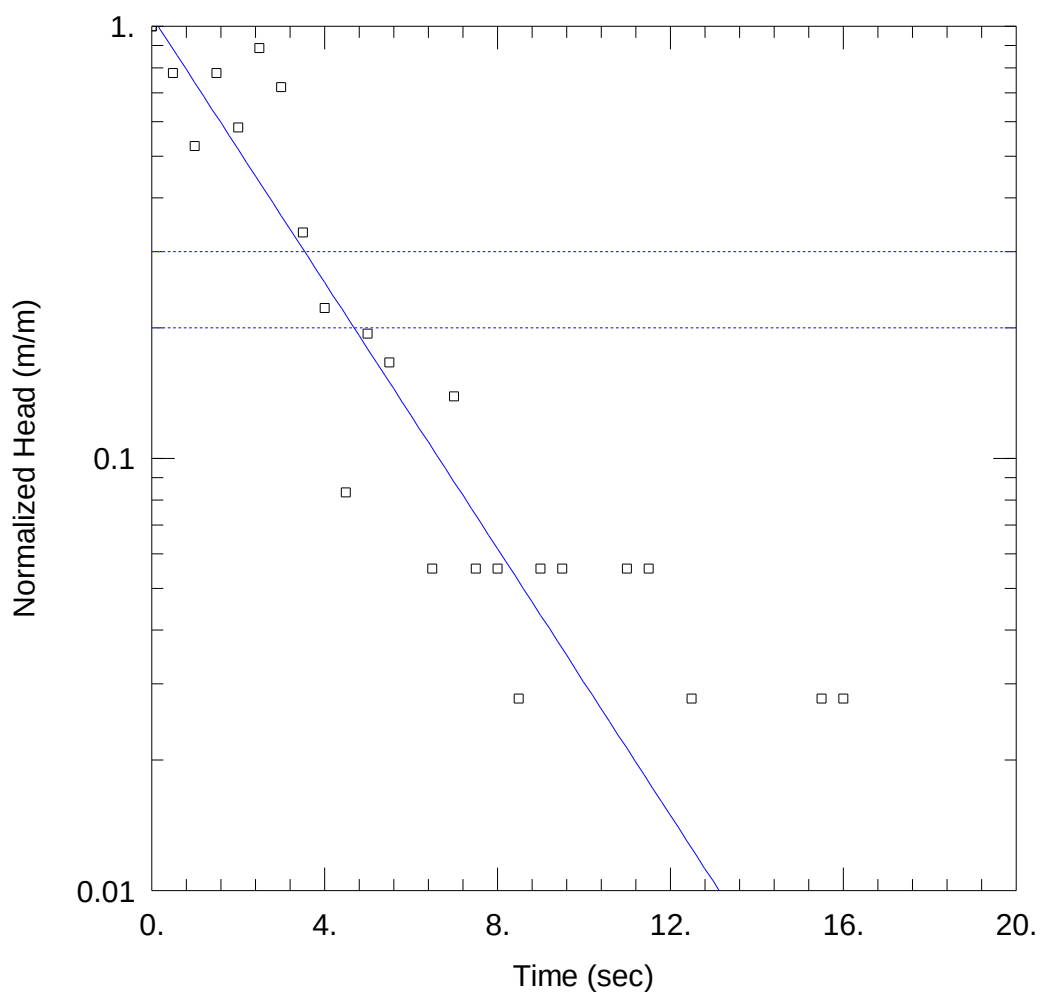
### SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 9.943$  m/day

$y_0 = 0.0447$  m



### BH106 FALLING HEAD TEST 1

Data Set: \\...\BH106\_FH1.aqt

Date: 10/11/19

Time: 16:01:03

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BH106

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BH106)

Initial Displacement: 0.036 m

Total Well Penetration Depth: 6.86 m

Casing Radius: 0.025 m

Static Water Column Height: 6.86 m

Screen Length: 6.86 m

Well Radius: 0.05 m

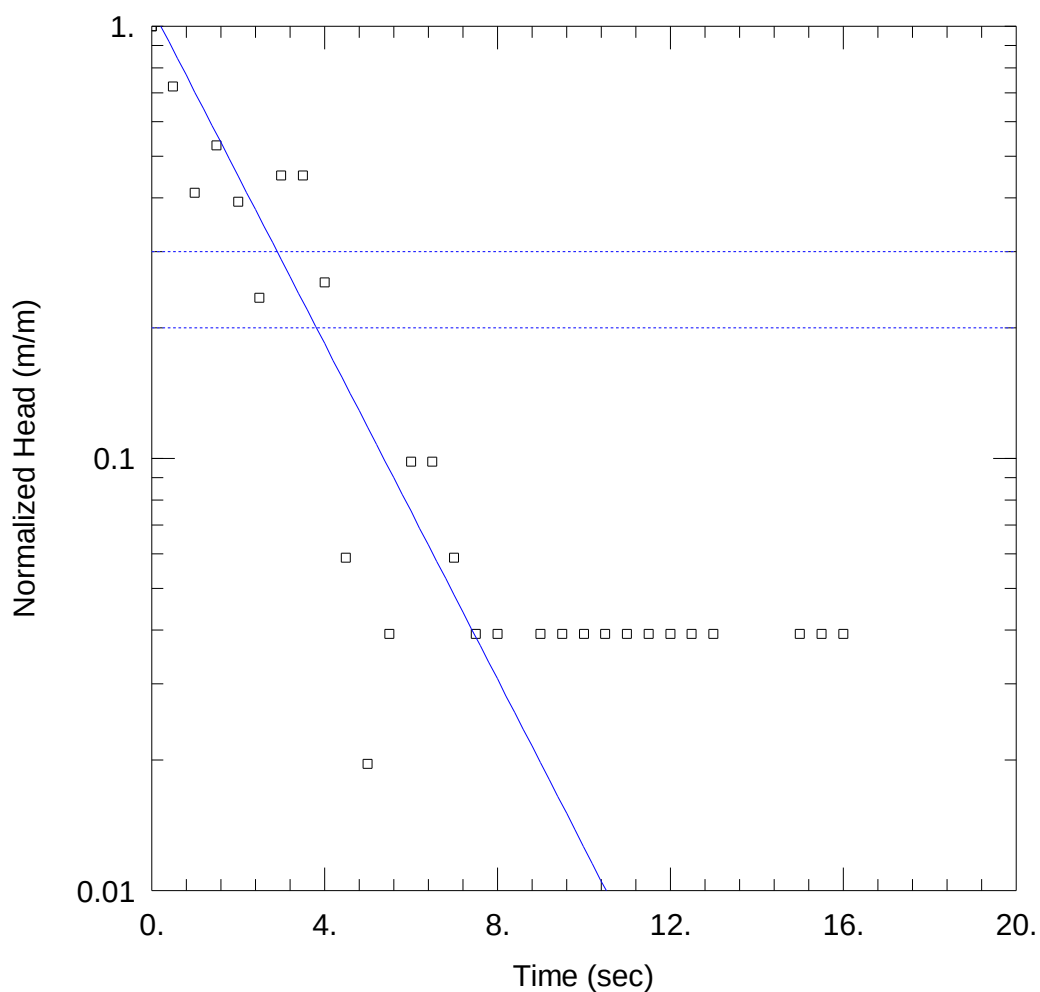
### SOLUTION

Aquifer Model: Unconfined

$K = 4.847$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.03795$  m



### BH106 RISING HEAD TEST 1

Data Set: \\...\BH106\_RH1.aqt

Date: 10/11/19

Time: 16:01:14

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BH106

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BH106)

Initial Displacement: 0.051 m

Static Water Column Height: 6.86 m

Total Well Penetration Depth: 6.86 m

Screen Length: 6.86 m

Casing Radius: 0.025 m

Well Radius: 0.05 m

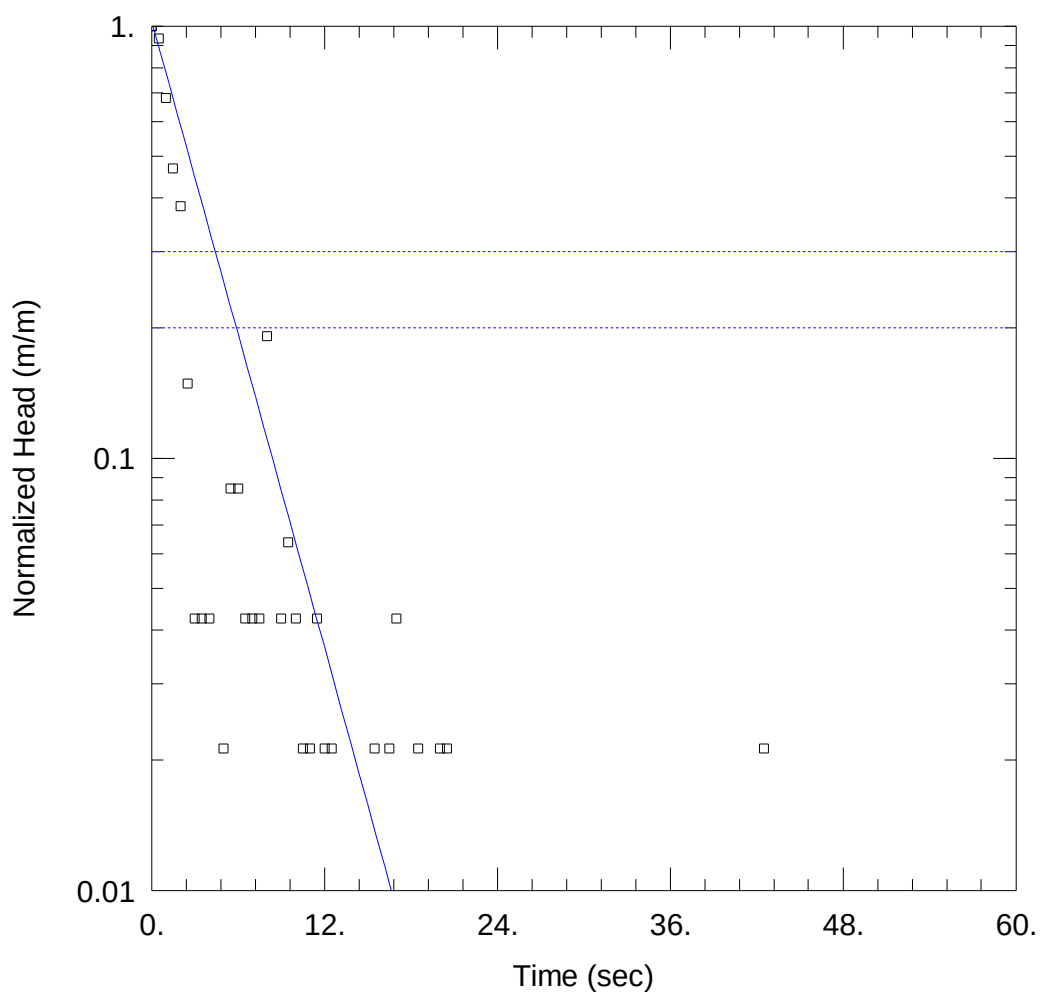
### SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 6.107$  m/day

$y_0 = 0.0561$  m



### BH106 FALLING HEAD TEST 2

Data Set: \\...\BH106\_FH2.aqt

Date: 10/11/19

Time: 16:01:25

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BH106

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BH106)

Initial Displacement: 0.047 m

Total Well Penetration Depth: 6.86 m

Casing Radius: 0.025 m

Static Water Column Height: 6.86 m

Screen Length: 6.86 m

Well Radius: 0.05 m

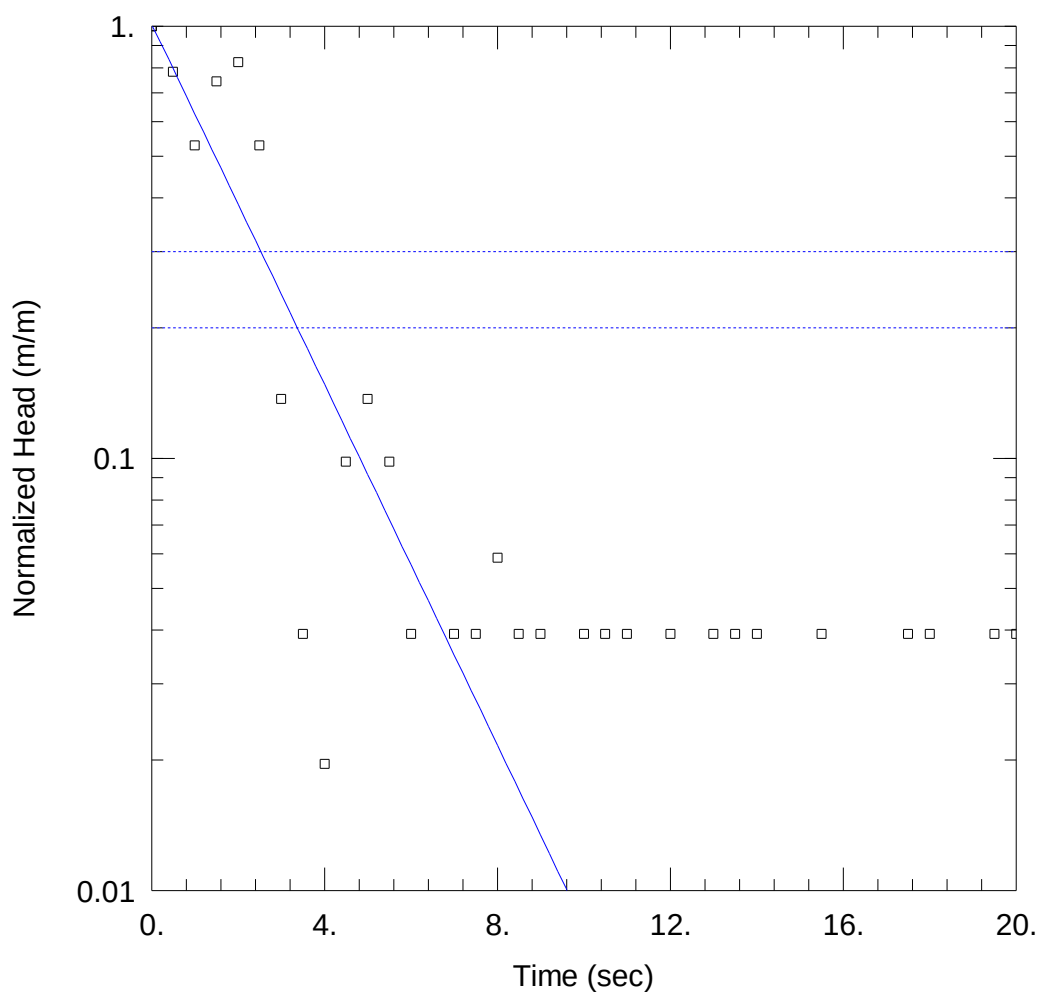
### SOLUTION

Aquifer Model: Unconfined

$K = 3.8$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.04832$  m



### BH106 RISING HEAD TEST 2

Data Set: \\...\BH106\_RH2.aqt

Date: 10/11/19

Time: 16:01:36

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BH106

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BH106)

Initial Displacement: 0.051 m

Total Well Penetration Depth: 6.86 m

Casing Radius: 0.025 m

Static Water Column Height: 6.86 m

Screen Length: 6.86 m

Well Radius: 0.05 m

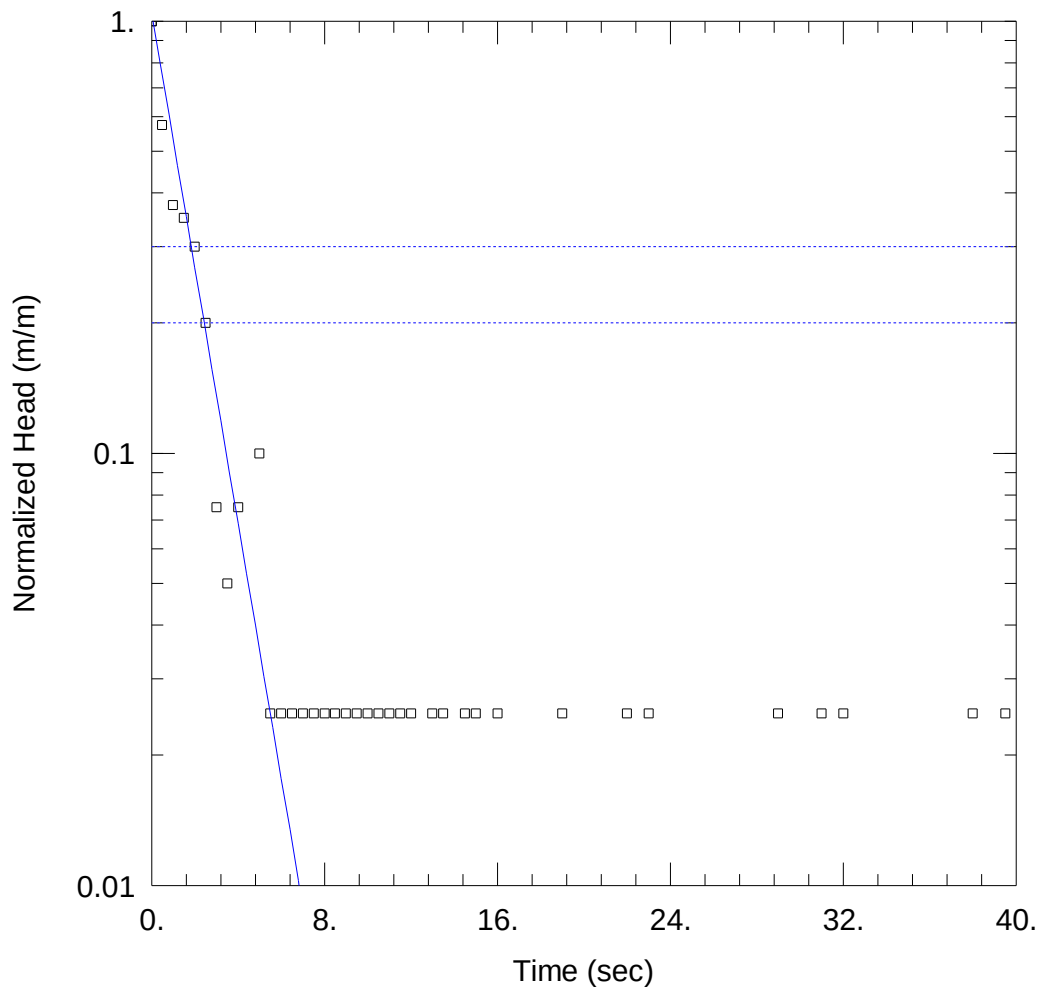
### SOLUTION

Aquifer Model: Unconfined

$K = 6.566$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.05161$  m



### BH107 FALLING HEAD TEST 1

Data Set: \\...\BH107\_FH1.aqt

Date: 10/11/19

Time: 16:01:59

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BH107

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BH107)

Initial Displacement: 0.04 m

Total Well Penetration Depth: 5.17 m

Casing Radius: 0.025 m

Static Water Column Height: 5.17 m

Screen Length: 5.17 m

Well Radius: 0.05 m

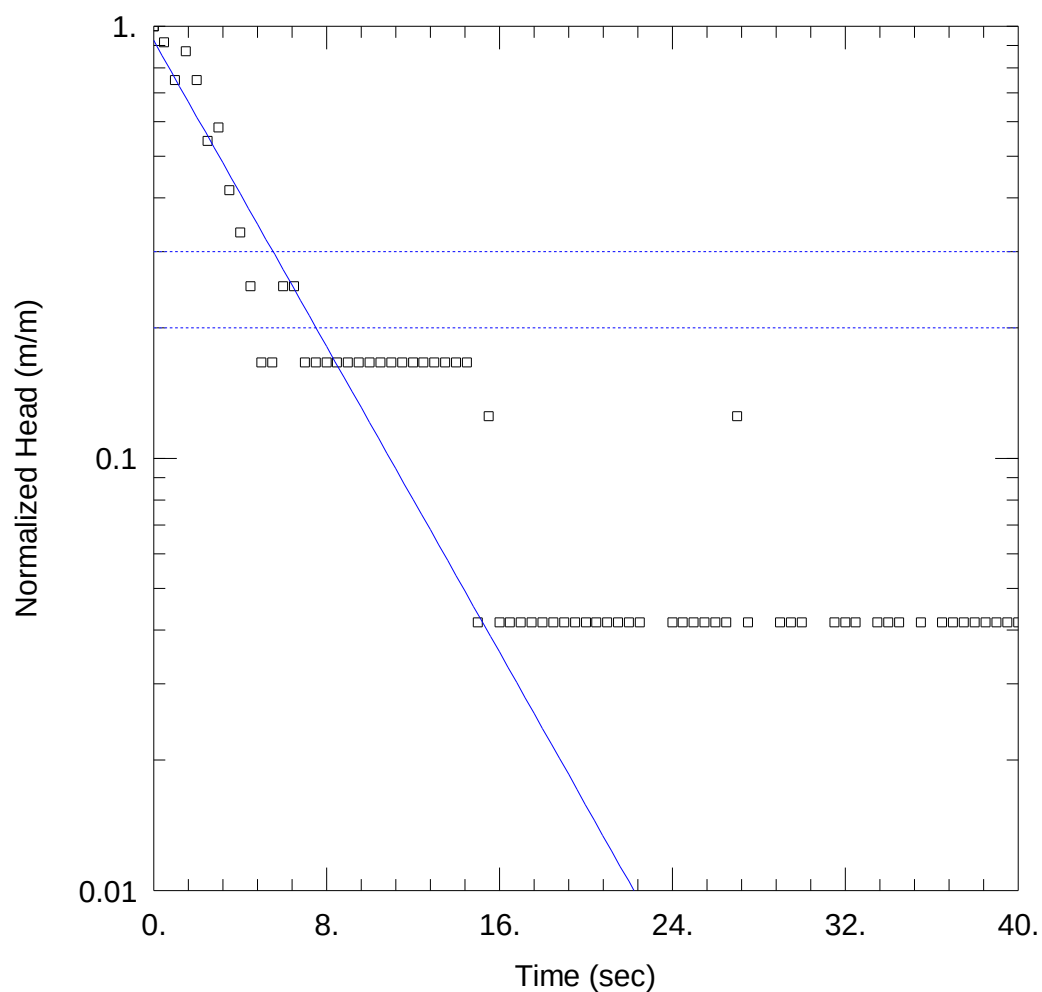
### SOLUTION

Aquifer Model: Unconfined

$K = 11.35$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.04193$  m



### BH107 RISING HEAD TEST 1

Data Set: \\...\BH107\_RH1.aqt

Date: 10/11/19

Time: 16:02:17

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BH107

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BH107)

Initial Displacement: 0.024 m

Total Well Penetration Depth: 5.17 m

Casing Radius: 0.025 m

Static Water Column Height: 5.17 m

Screen Length: 5.17 m

Well Radius: 0.05 m

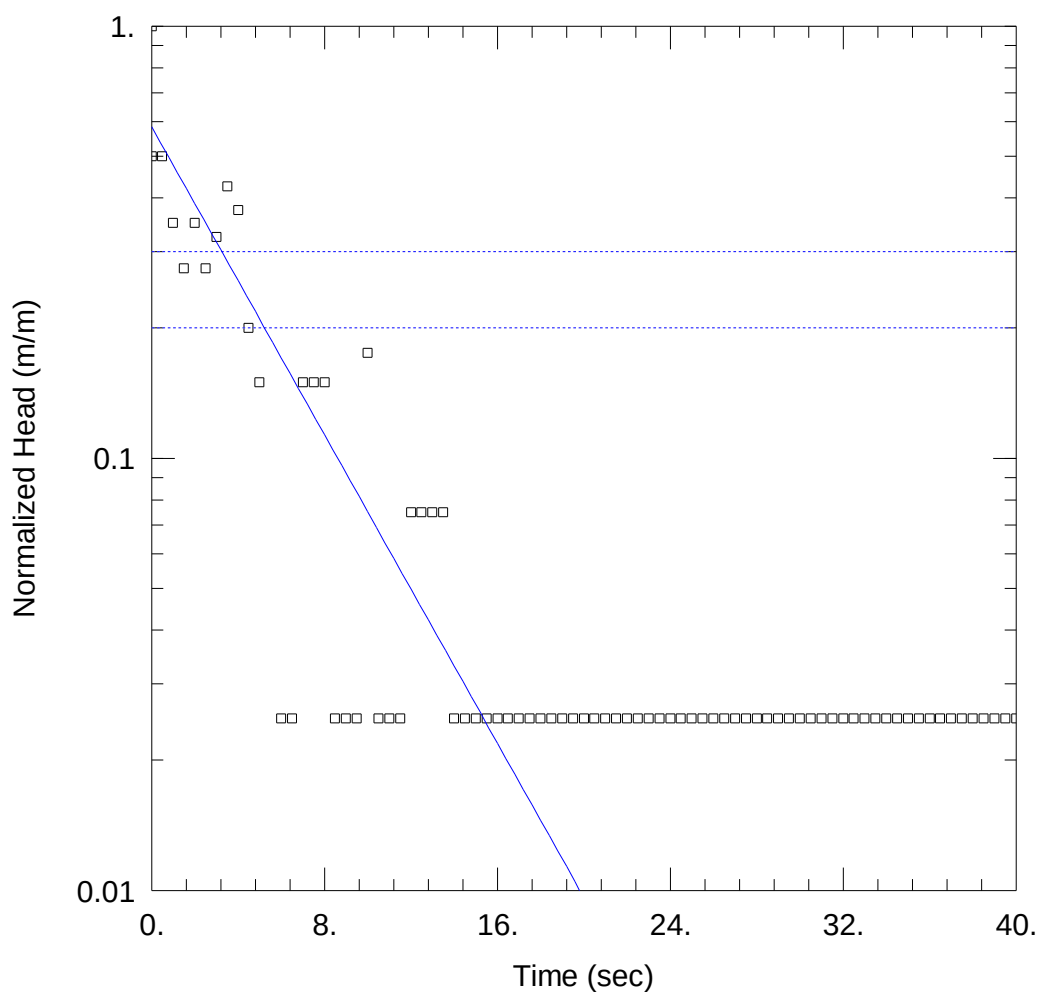
### SOLUTION

Aquifer Model: Unconfined

$K = 3.397$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.02221$  m



### BH107 FALLING HEAD TEST 2

Data Set: \\...\BH107\_FH2.aqt

Date: 10/11/19

Time: 16:02:32

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BH107

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BH107)

Initial Displacement: 0.04 m

Total Well Penetration Depth: 5.17 m

Casing Radius: 0.025 m

Static Water Column Height: 5.17 m

Screen Length: 5.17 m

Well Radius: 0.05 m

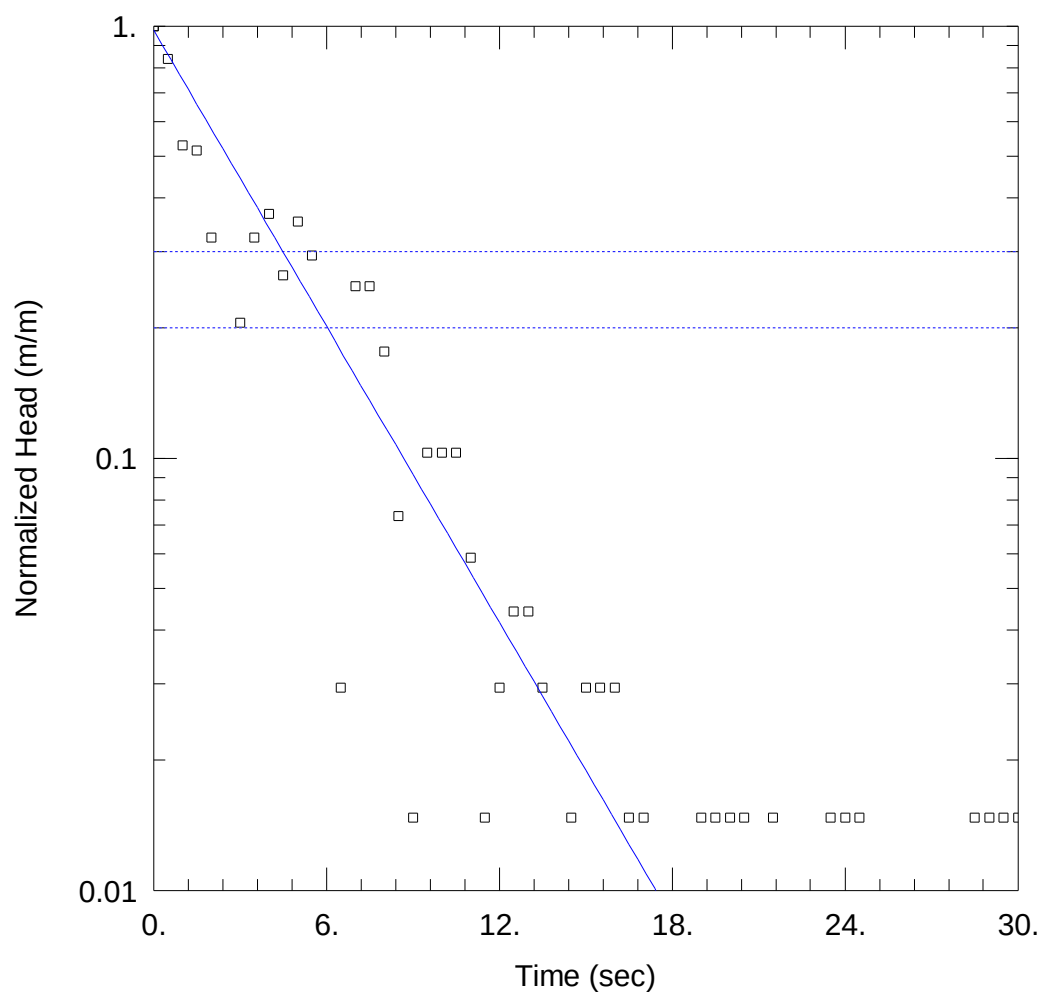
### SOLUTION

Aquifer Model: Unconfined

$K = 3.425$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.02341$  m



### BHH07D FALLING HEAD TEST 1

Data Set: \\...\BHH07D\_FH1.aqt

Date: 10/11/19

Time: 16:02:46

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BHH07D

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BHH07D)

Initial Displacement: 0.068 m

Total Well Penetration Depth: 6.58 m

Casing Radius: 0.025 m

Static Water Column Height: 6.58 m

Screen Length: 6.58 m

Well Radius: 0.05 m

Gravel Pack Porosity: 0.

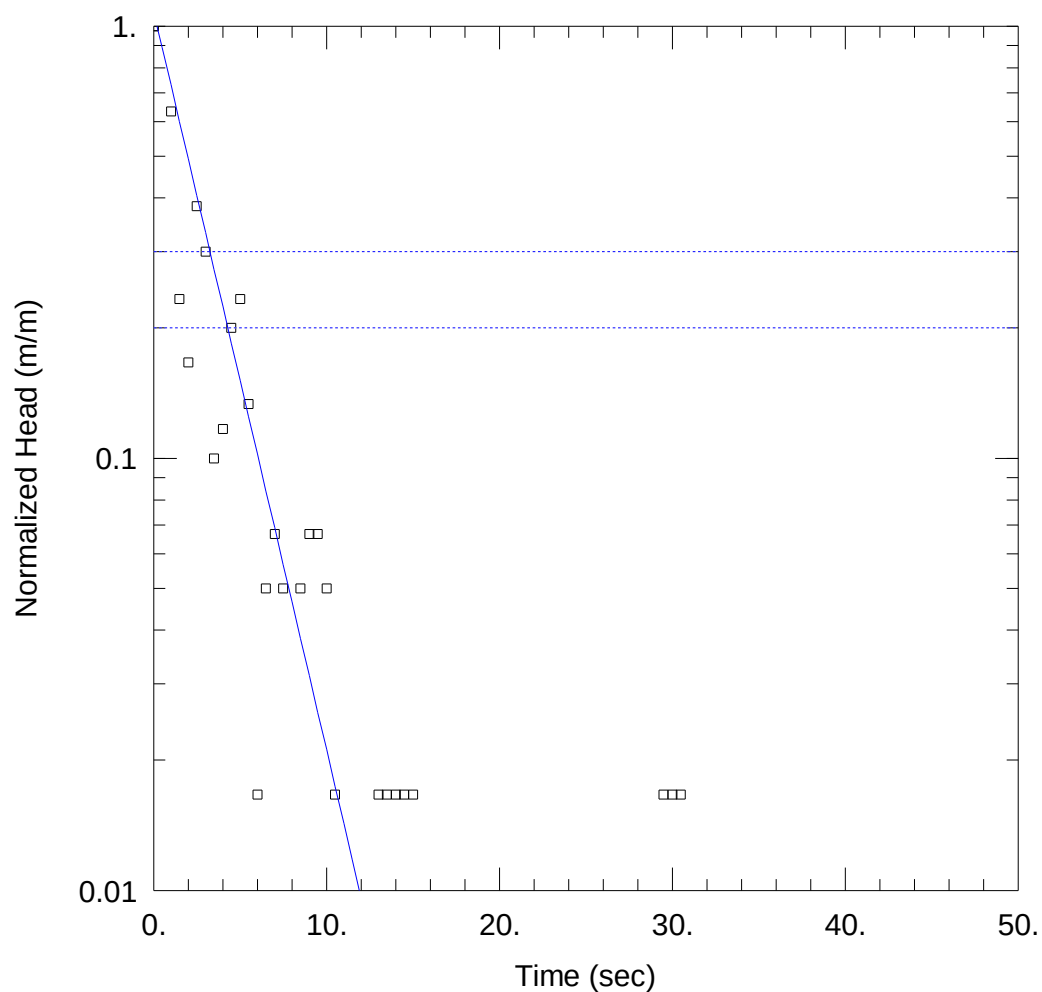
### SOLUTION

Aquifer Model: Unconfined

$K = 3.7$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.06654$  m



### BHH07D RISING HEAD TEST 1

Data Set: \\...\BHH07D\_RH1.aqt

Date: 10/11/19

Time: 16:02:59

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BHH07D

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BHH07D)

Initial Displacement: 0.06 m

Total Well Penetration Depth: 6.58 m

Casing Radius: 0.025 m

Static Water Column Height: 6.58 m

Screen Length: 6.58 m

Well Radius: 0.05 m

Gravel Pack Porosity: 0.

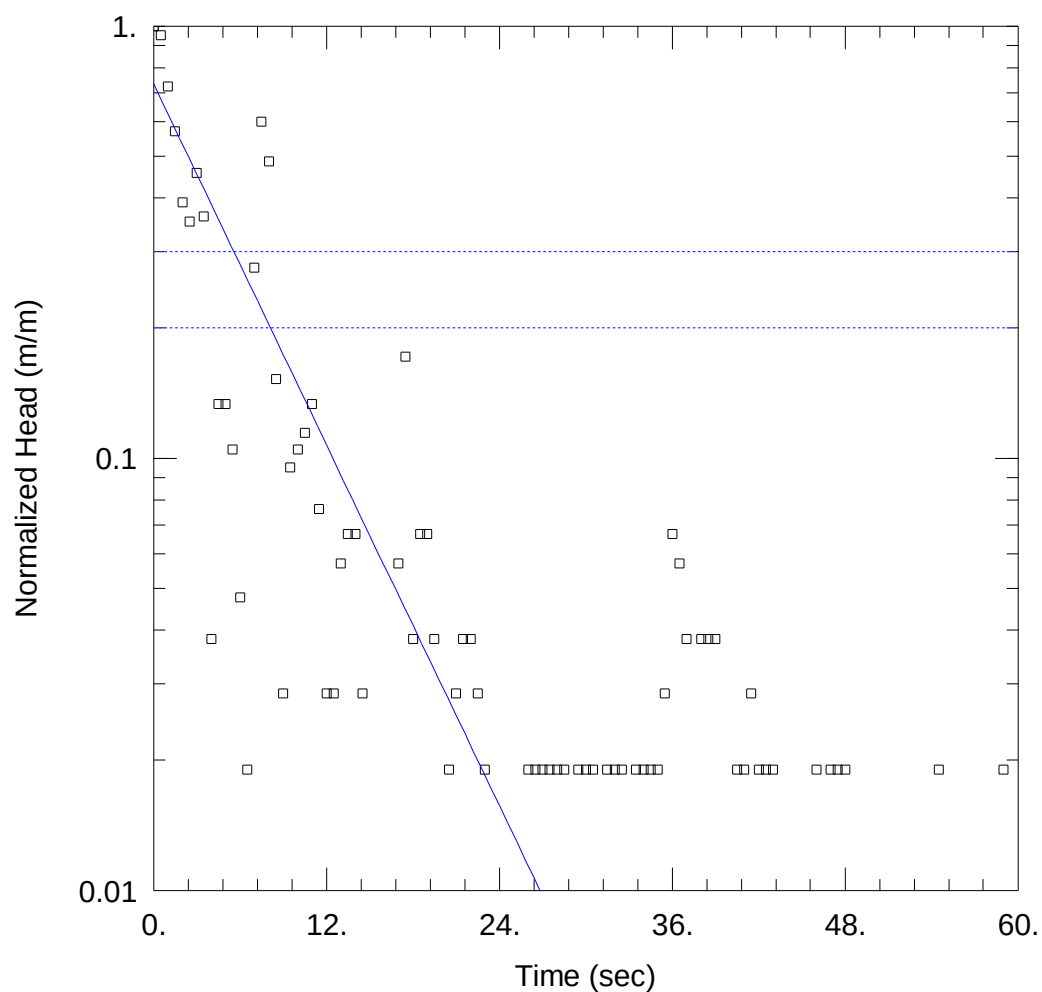
### SOLUTION

Aquifer Model: Unconfined

$K = 5.537$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.06505$  m



### BHH02D FALLING HEAD TEST 1

Data Set: \\...\BHH02D\_FH1.aqt

Date: 10/11/19

Time: 16:03:10

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BHH02D

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BHH02D)

Initial Displacement: 0.105 m

Total Well Penetration Depth: 6.15 m

Casing Radius: 0.025 m

Static Water Column Height: 6.15 m

Screen Length: 6.15 m

Well Radius: 0.05 m

Gravel Pack Porosity: 0.

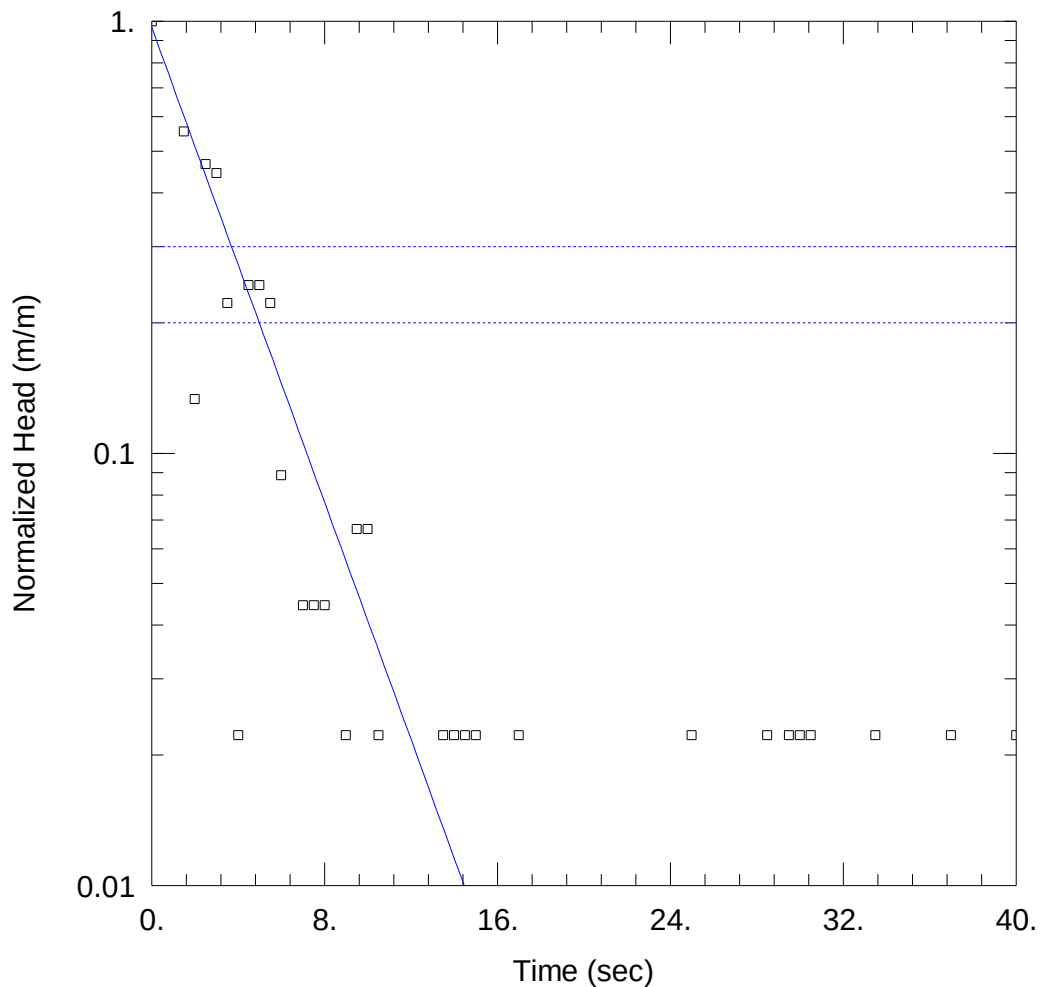
### SOLUTION

Aquifer Model: Unconfined

$K = 2.363$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.07704$  m



### BHH02D RISING HEAD TEST 1

Data Set: \\...\BHH02D\_RH1.aqt

Date: 10/11/19

Time: 16:03:21

### PROJECT INFORMATION

Company: WSP

Client: Neath Port Talbot CBC

Project: 62253048

Location: Port Talbot

Test Well: BHH02D

Test Date: 22/8/2019

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio ( $K_z/K_r$ ): 1.

### WELL DATA (BHH02D)

Initial Displacement: 0.045 m

Total Well Penetration Depth: 6.15 m

Casing Radius: 0.025 m

Static Water Column Height: 6.15 m

Screen Length: 6.15 m

Well Radius: 0.05 m

Gravel Pack Porosity: 0.

### SOLUTION

Aquifer Model: Unconfined

$K = 4.665$  m/day

Solution Method: Bouwer-Rice

$y_0 = 0.04352$  m

# Appendix C.3

## BAILDOWN TESTS



Appendix C.3: Bail Down Tests

Date: 24/07/2019

Time Start: 14.30

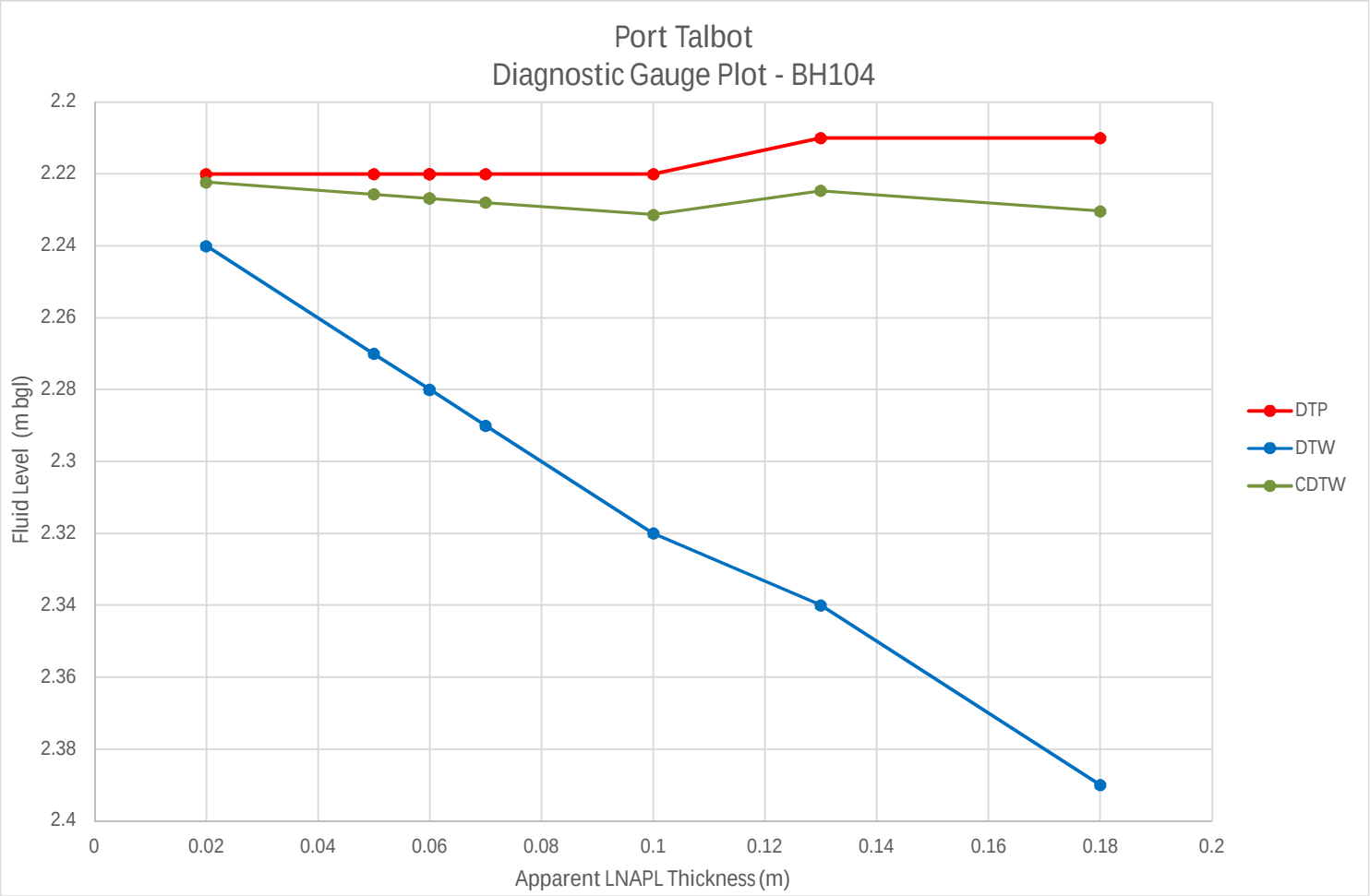
16.20

BH Number: BH104

| Prior to purging         |              |
|--------------------------|--------------|
| Datum                    | Ground Level |
| Depth to Product (m bgl) | 2.7          |
| Depth to Water (m bgl)   | 2.17         |
| Product Thickness (m)    | 0.53         |

| During Purging              |    |
|-----------------------------|----|
| Volume of Oil Removed (L)   | 6  |
| Volume of Water Removed (L) | 10 |

| Baildown Test mins after Pumping | Depth to Product<br>m bgl | Depth To Water<br>m bgl | Product Thickness<br>m | Corrected Depth To Water<br>m bgl |
|----------------------------------|---------------------------|-------------------------|------------------------|-----------------------------------|
| 0                                | 2.22                      | 2.24                    | 0.02                   | 2.22                              |
| 0.5                              | 2.220                     | 2.270                   | 0.05                   | 2.23                              |
| 1                                | 2.220                     | 2.280                   | 0.06                   | 2.23                              |
| 2                                | 2.220                     | 2.280                   | 0.06                   | 2.23                              |
| 5                                | 2.220                     | 2.290                   | 0.07                   | 2.23                              |
| 10                               | 2.220                     | 2.320                   | 0.1                    | 2.23                              |
| 20                               | 2.210                     | 2.340                   | 0.13                   | 2.22                              |
| 40                               | 2.210                     | 2.390                   | 0.18                   | 2.23                              |

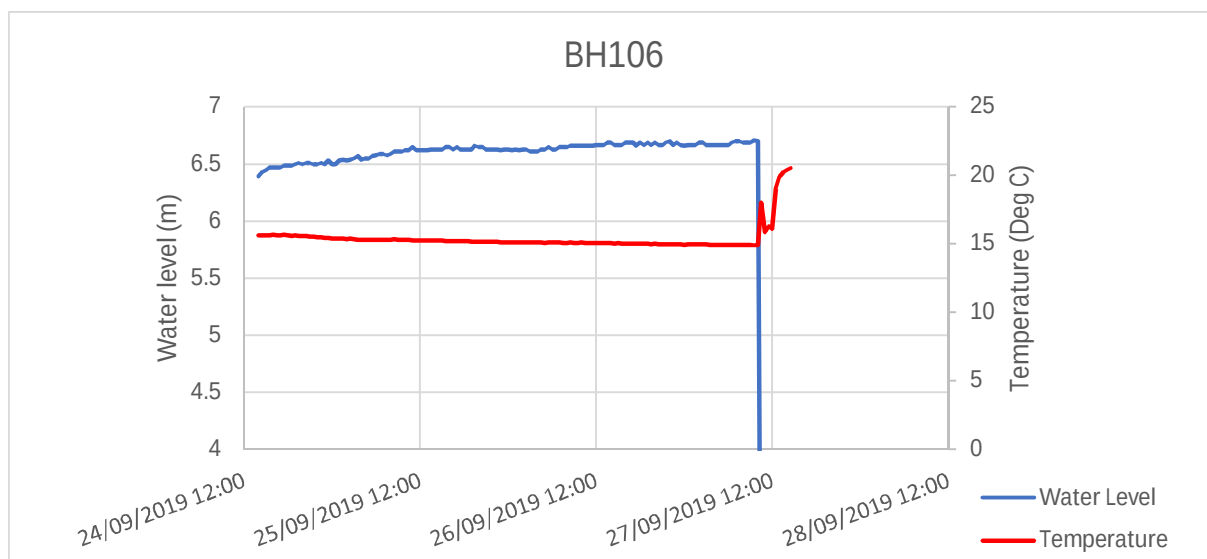
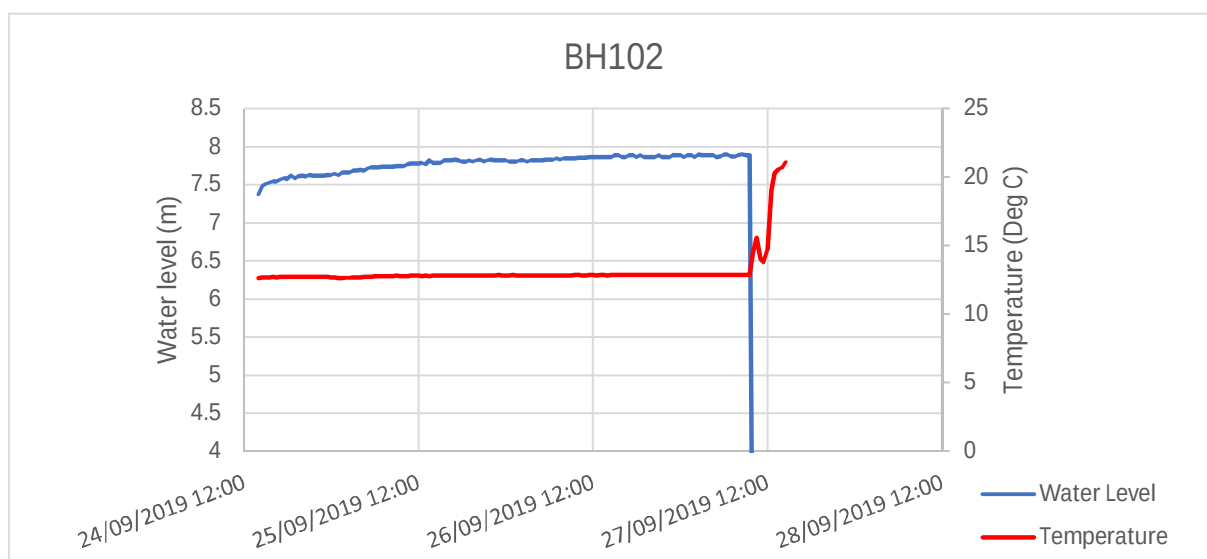
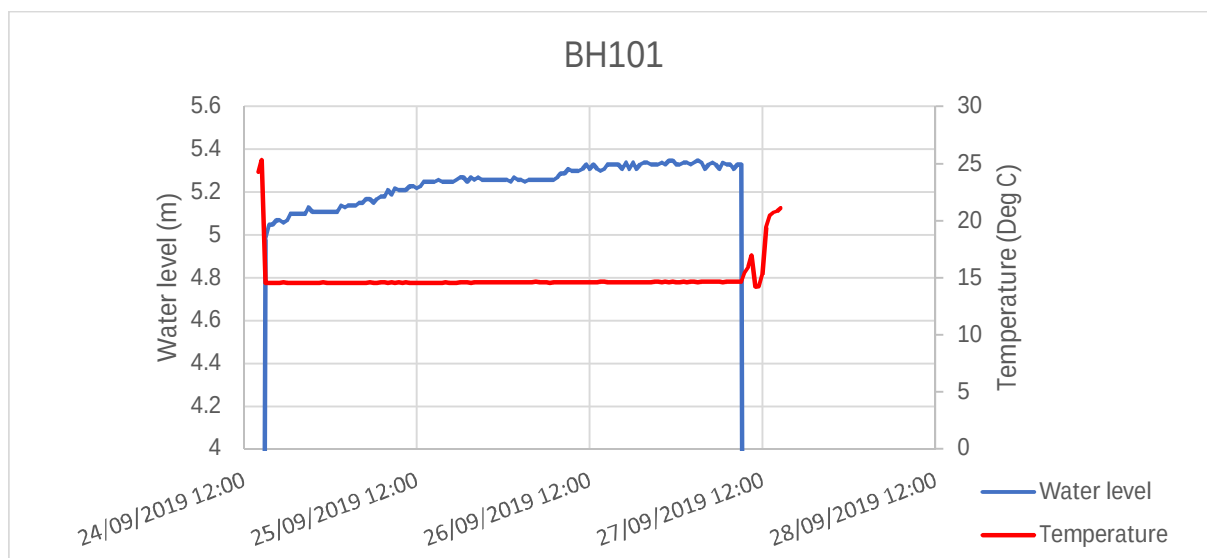


# Appendix C.4

STAGE TRANSDUCER DATA



## Appendix C4: Stage Transducers Data



# Appendix C.5

BOREHOLE LOGS





|                                                                                                              |                                            |                                      |                                                            |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------|------------------------------------------------------------|
| <br><b>WSP</b><br>Telephone: | <b>BOREHOLE LOG</b>                        |                                      | Hole No.<br><b>BH102</b>                                   |
|                                                                                                              | Project<br><b>Port Talbot Harbourside</b>  |                                      | Sheet<br><b>1 of 2</b>                                     |
| Job No<br><b>62253048</b>                                                                                    | Client<br><b>Neath Port Talbot Council</b> |                                      | Date<br><b>08-08-19<br/>09-08-19</b>                       |
| Contractor / Driller<br><b>Apex</b>                                                                          | Method/Plant Used<br><b>Dando 3000</b>     | Logged By<br><b>JL/JT</b>            | Co-Ordinates (NGR)<br><b>E 276509.272<br/>N 189427.592</b> |
|                                                                                                              |                                            | Ground Level (m AOD)<br><b>8.890</b> |                                                            |

| SAMPLES & TESTS |      |             |            |             |               |       | STRATA       |                   |                                                                                                                                                                                                                                           |                                                                                       |         | Install / Backfill |
|-----------------|------|-------------|------------|-------------|---------------|-------|--------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------|--------------------|
| Depth           | Type | Test Result | PID (ppmV) | HSV (kN/m2) | P Pen (kN/m2) | Water | Elev. (mAOD) | Depth (Thickness) | Description                                                                                                                                                                                                                               | Legend                                                                                | Geology | Dia. 50 mm         |
| 0.70-0.80       | ES   |             |            |             |               |       | 8.59         | 0.30              | Soft brown slightly sandy slightly gravelly SILT. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of sandstone and mudstone. (TOPSOIL)                                                                          |    | TS      |                    |
|                 |      |             |            |             |               |       | (0.70)       |                   | Black/dark grey sandy angular to subangular fine to coarse GRAVEL of slag, clinker, brick and concrete. Sand is fine to coarse. (MADE GROUND)                                                                                             |    | MG      |                    |
|                 |      |             |            |             |               |       | 7.89         | 1.00              | Soft brown slightly sandy slightly gravelly SILT. Sand is fine to medium. Gravel is subangular to rounded fine to medium of brick, sandstone and mudstone. (MADE GROUND)                                                                  |    | MG      |                    |
| 3.50-3.80       | ES   |             | 29.1       |             |               |       | (1.50)       |                   |                                                                                                                                                                                                                                           |                                                                                       |         |                    |
|                 |      |             | 13.3       |             |               |       | 6.39         | 2.50              |                                                                                                                                                                                                                                           |                                                                                       |         |                    |
|                 |      |             | 39.7       |             |               |       | (0.50)       |                   | Brown gravelly slightly clayey medium to coarse SAND with low cobble content. Gravel is subangular to rounded fine to coarse of brick, mudstone and sandstone. Cobbles are subangular to subrounded of sandstone and brick. (MADE GROUND) |    | MG      |                    |
|                 |      |             | 0.0        |             |               |       | 5.89         | 3.00              |                                                                                                                                                                                                                                           |                                                                                       |         |                    |
|                 |      |             | 0.0        |             |               |       | (0.50)       |                   | Light brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is subrounded to rounded medium to coarse of mudstone and sandstone. Occasional gravel sized fragments of brick. Occasional pockets of black ash. (MADE GROUND) |    | MG      |                    |
|                 |      |             | 45.1       |             |               |       | 5.39         | 3.50              |                                                                                                                                                                                                                                           |                                                                                       |         |                    |
| 6.50-6.70       | ES   |             | 0.0        |             |               |       | (0.50)       |                   | Brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is rounded fine to medium of sandstone and mudstone. (ALLUVIUM)                                                                                               |   | ALV     |                    |
|                 |      |             | 2.8        |             |               |       | 4.89         | 4.00              |                                                                                                                                                                                                                                           |                                                                                       |         |                    |
|                 |      |             | 6.7        |             |               |       | (0.50)       |                   | Dark grey gravelly clayey fine to coarse SAND. Gravel is subrounded to rounded fine to coarse of sandstone and mudstone. Slight hydrocarbon odour from 4.30m bgl. (ALLUVIUM)                                                              |  | ALV     |                    |
|                 |      |             | 4.5        |             |               |       | 4.39         | 4.50              |                                                                                                                                                                                                                                           |                                                                                       |         |                    |
|                 |      |             | 5.2        |             |               |       | (2.90)       |                   | Dark grey sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with low cobble content. Sand is medium to coarse. Cobbles are subrounded of sandstone. Slight hydrocarbon odour. (ALLUVIUM)                        |  | ALV     |                    |
|                 |      |             | 3.7        |             |               |       | (2.40)       |                   | Dark grey gravelly medium to coarse SAND with low cobble content. Gravel is subrounded to rounded fine to coarse of sandstone and mudstone. Cobbles are subrounded of sandstone. Faint hydrocarbon odour. (ALLUVIUM)                      |  | ALV     |                    |
|                 |      |             | 2.2        |             |               |       | 1.49         | 7.40              |                                                                                                                                                                                                                                           |                                                                                       |         |                    |
|                 |      |             |            |             |               |       | 1.29         | 7.60              |                                                                                                                                                                                                                                           |                                                                                       |         |                    |
|                 |      |             |            |             |               |       | -1.11        | 10.00             |                                                                                                                                                                                                                                           |                                                                                       |         |                    |

| Boring Progress |      |                                                                                                                                                       |            |           |             | Water Strikes |                                                                                |        |         |          |        |
|-----------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|-------------|---------------|--------------------------------------------------------------------------------|--------|---------|----------|--------|
| Date            | Time | Depth                                                                                                                                                 | Casing Dpt | Dia. (mm) | Water Dpt   | Date          | Time                                                                           | Strike | Minutes | Standing | Casing |
|                 |      |                                                                                                                                                       |            |           |             |               |                                                                                | 4.30   | 20      | 4.00     |        |
| Chiselling      |      |                                                                                                                                                       |            |           | Water Added |               | General Remarks<br>Borehole terminated at 10.00mbgl on engineer's instruction. |        |         |          |        |
| From            | To   | Hours                                                                                                                                                 | Tool       | From      | To          |               |                                                                                |        |         |          |        |
|                 |      |                                                                                                                                                       |            |           |             |               |                                                                                |        |         |          |        |
| Scale 1:62.5    |      | Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification. |            |           |             |               |                                                                                |        |         |          |        |

17 WSP BH LOG 62253048 - PORT TALBOT HARBOURSIDE.GPJ WSPTEMPLATE7.00.GDT 19/9/19

|                                                                                                                  |                                            |                                      |                                                            |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------|------------------------------------------------------------|
| <br><b>WSP</b><br><br>Telephone: | <b>BOREHOLE LOG</b>                        |                                      | Hole No.<br><b>BH103</b>                                   |
|                                                                                                                  | Project<br><b>Port Talbot Harbourside</b>  |                                      | Sheet<br><b>1 of 2</b>                                     |
| Job No<br><b>62253048</b>                                                                                        | Client<br><b>Neath Port Talbot Council</b> |                                      | Date<br><b>07-08-19<br/>08-08-19</b>                       |
| Contractor / Driller<br><b>Apex</b>                                                                              | Method/Plant Used<br><b>Dando 3000</b>     | Logged By<br><b>JT/JL</b>            | Co-Ordinates (NGR)<br><b>E 276552.862<br/>N 189562.356</b> |
|                                                                                                                  |                                            | Ground Level (m AOD)<br><b>6.491</b> |                                                            |

| SAMPLES & TESTS |      |             |            |             |               |       | STRATA       |                    |                                                                                                                                                                                                      |                                                                                       |         | Install / Backfill                                                                  |
|-----------------|------|-------------|------------|-------------|---------------|-------|--------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------|
| Depth           | Type | Test Result | PID (ppmV) | HSV (kN/m2) | P Pen (kN/m2) | Water | Elev. (mAOD) | Depth (Thick-ness) | Description                                                                                                                                                                                          | Legend                                                                                | Geology | Dia. 50 mm                                                                          |
| 1.00-1.10       | ES   |             |            |             |               |       | 5.79         | 0.70               | Dark brown sandy angular to subangular fine to coarse GRAVEL of limestone, concrete, brick and slag. Sand is fine to coarse. (MADE GROUND)                                                           |    | MG      |  |
|                 |      |             |            |             |               |       | 5.09         | 1.40               | Black sandy angular to subangular fine to coarse GRAVEL of clinker, slag, brick and concrete with low cobble content. Sand is fine to coarse. Cobbles are angular of slag and clinker. (MADE GROUND) |    | MG      |                                                                                     |
|                 |      |             |            |             |               |       | 4.89         | 1.60               | Soft brownish grey slightly gravelly sandy SILT. Sand is fine to medium. Gravel is subrounded to rounded fine to medium of sandstone and mudstone. (ALLUVIUM)                                        |    | ALV     |                                                                                     |
| 3.80-3.90       | ES   |             |            |             |               |       |              |                    | Dark grey sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with low cobble content. Sand is fine to coarse. Slight hydrocarbon odour. (ALLUVIUM)                          |    | ALV     |  |
|                 |      |             |            |             |               |       | 1.49         | 5.00               | Dark grey very sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. (ALLUVIUM)          |  | ALV     |                                                                                     |
|                 |      |             |            |             |               |       | 0.49         | 6.00               |                                                                                                                                                                                                      |                                                                                       |         |                                                                                     |

| Boring Progress |      |                                                                                                                                                       |            |             |           | Water Strikes                                                                                                                                             |      |        |         |          |        |
|-----------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|---------|----------|--------|
| Date            | Time | Depth                                                                                                                                                 | Casing Dpt | Dia. (mm)   | Water Dpt | Date                                                                                                                                                      | Time | Strike | Minutes | Standing | Casing |
|                 |      |                                                                                                                                                       |            |             |           |                                                                                                                                                           |      | 3.50   | 20      | 3.00     |        |
| Chiselling      |      |                                                                                                                                                       |            | Water Added |           | General Remarks<br>Borehole terminated at 6.00mbgl on engineer's instruction due to refusal.<br>Cohesive soil strengths based on engineer's observations. |      |        |         |          |        |
| From            | To   | Hours                                                                                                                                                 | Tool       | From        | To        |                                                                                                                                                           |      |        |         |          |        |
|                 |      |                                                                                                                                                       |            |             |           |                                                                                                                                                           |      |        |         |          |        |
| Scale 1:62.5    |      | Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification. |            |             |           |                                                                                                                                                           |      |        |         |          |        |

|                                                                                                              |                                            |                           |                                                            |                                      |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------|------------------------------------------------------------|--------------------------------------|
| <br><b>WSP</b><br>Telephone: | <b>BOREHOLE LOG</b>                        |                           | Hole No. <b>BH104</b>                                      |                                      |
|                                                                                                              | Project<br><b>Port Talbot Harbourside</b>  |                           | Sheet<br><b>1 of 2</b>                                     |                                      |
| Job No<br><b>62253048</b>                                                                                    | Client<br><b>Neath Port Talbot Council</b> |                           | Date<br><b>05-08-19<br/>06-08-19</b>                       |                                      |
| Contractor / Driller<br><b>Apex</b>                                                                          | Method/Plant Used<br><b>Danda 3000</b>     | Logged By<br><b>JL/JT</b> | Co-Ordinates (NGR)<br><b>E 276535.341<br/>N 189524.076</b> | Ground Level (m AOD)<br><b>7.016</b> |

| SAMPLES & TESTS |      |             |            |             |               |       | STRATA       |                    |                                                                                                                                                                                                                                                                   |                                                                                       |         | Install / Backfill                                                                    |
|-----------------|------|-------------|------------|-------------|---------------|-------|--------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------------------|
| Depth           | Type | Test Result | PID (ppmV) | HSV (kN/m2) | P Pen (kN/m2) | Water | Elev. (mAOD) | Depth (Thick-ness) | Description                                                                                                                                                                                                                                                       | Legend                                                                                | Geology | Dia. 50 mm                                                                            |
| 0.85-0.90       | ES   |             | 12.4       |             |               |       | 6.82         | 0.20               | Light grey gravelly medium to coarse SAND. Gravel is subangular to subrounded fine to coarse of limestone, concrete and macadam. (MADE GROUND)                                                                                                                    |    | MG      |    |
|                 |      |             |            |             |               |       | 6.72         | 0.30               |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       | 6.42         | 0.60               |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       |              |                    | CONCRETE (MADE GROUND)                                                                                                                                                                                                                                            |    | CONC    |    |
|                 |      |             | 25.4       |             |               |       |              | (0.80)             | Very dark brown gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium of brick, concrete, macadam and clinker. (MADE GROUND)                                                                                                               |    | MG      |    |
|                 |      |             |            |             |               |       | 5.62         | 1.40               |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       |              | (0.80)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       | 4.82         | 2.20               | Black gravelly medium to coarse SAND. Gravel is angular to subangular fine to medium of brick, concrete, clinker and macadam. Strong hydrocarbon odour. (MADE GROUND)                                                                                             |    | MG      |    |
|                 |      |             | 4431       |             |               |       |              | (0.80)             | Soft very dark brown slightly gravelly sandy CLAY. Sand is medium to coarse. Gravel is angular to subangular fine to coarse of slag, macadam and clinker. Strong hydrocarbon odour. (MADE GROUND)                                                                 |    | MG      |    |
|                 |      |             |            |             |               |       |              | (0.80)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       |              | (0.80)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       | 4.02         | 3.00               | 1.40 - 4.80 m bgl Free product visible in borehole. Soft black slightly sandy gravelly CLAY. Sand is medium to coarse. Gravel is angular to subangular fine to coarse of slag and clinker. Very strong hydrocarbon odour. Tar/oil staining visible. (MADE GROUND) |    | MG      |    |
| 3.00-3.10       | ES   |             | >5000      |             |               |       |              | (0.80)             | Soft black slightly sandy slightly gravelly CLAY with low cobble content. Sand is medium to coarse. Gravel is subrounded fine to coarse of sandstone. Cobbles are subrounded of sandstone. (ALLUVIUM)                                                             |    | ALV     |    |
|                 |      |             |            |             |               |       | 3.22         | 3.80               |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       |              | (1.00)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       | 2.22         | 4.80               | Black sandy subangular to subrounded fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. Faint tar odour. (Alluvium)                                                                         |    | ALV     |    |
| 4.90-5.00       | ES   |             | 74         |             |               |       |              | (0.50)             | Black gravelly medium to coarse SAND with low cobble content. Gravel is subrounded fine to coarse of sandstone. Cobbles are subrounded of sandstone. Faint tar odour. (ALLUVIUM)                                                                                  |    | ALV     |    |
|                 |      |             |            |             |               |       | 1.72         | 5.30               |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       |              | (0.70)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       | 1.02         | 6.00               | Dark grey sandy subrounded fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. Faint hydrocarbon odour. (ALLUVIUM)                                                                           |   | ALV     |   |
|                 |      |             | 77.4       |             |               |       |              | (1.70)             | Dark grey slightly sandy subrounded to rounded fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. (ALLUVIUM)                                                                                |  | ALV     |  |
|                 |      |             |            |             |               |       |              | (1.70)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       |              | (1.70)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       | -0.68        | 7.70               | Dark grey gravelly medium to coarse SAND with medium cobble content. Gravel is subrounded fine to coarse of sandstone. Cobbles are subrounded of sandstone. (ALLUVIUM)                                                                                            |  | ALV     |  |
|                 |      |             | 60.7       |             |               |       |              | (1.70)             | Dark grey gravelly medium to coarse SAND with medium cobble content. Gravel is subrounded fine to coarse of sandstone. Cobbles are subrounded of sandstone. (ALLUVIUM)                                                                                            |  | ALV     |  |
|                 |      |             |            |             |               |       |              | (1.70)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       |              | (1.70)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       | -0.98        | 8.00               | Dark grey gravelly medium to coarse SAND with medium cobble content. Gravel is subrounded fine to coarse of sandstone. Cobbles are subrounded of sandstone. (ALLUVIUM)                                                                                            |  | ALV     |  |
|                 |      |             | 3.4        |             |               |       |              | (1.70)             | Dark grey gravelly medium to coarse SAND with medium cobble content. Gravel is subrounded fine to coarse of sandstone. Cobbles are subrounded of sandstone. (ALLUVIUM)                                                                                            |  | ALV     |  |
|                 |      |             |            |             |               |       |              | (1.70)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       |              | (1.70)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |
|                 |      |             |            |             |               |       |              | (1.70)             |                                                                                                                                                                                                                                                                   |                                                                                       |         |                                                                                       |

| Boring Progress |      |                                                                                                                                                       |            |             |           | Water Strikes                                                                                                           |      |        |         |          |        |
|-----------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|-----------|-------------------------------------------------------------------------------------------------------------------------|------|--------|---------|----------|--------|
| Date            | Time | Depth                                                                                                                                                 | Casing Dpt | Dia. (mm)   | Water Dpt | Date                                                                                                                    | Time | Strike | Minutes | Standing | Casing |
|                 |      |                                                                                                                                                       |            |             |           |                                                                                                                         |      | 3.50   | 20      | 3.00     |        |
| Chiselling      |      |                                                                                                                                                       |            | Water Added |           | General Remarks                                                                                                         |      |        |         |          |        |
| From            | To   | Hours                                                                                                                                                 | Tool       | From        | To        |                                                                                                                         |      |        |         |          |        |
|                 |      |                                                                                                                                                       |            |             |           | Borehole terminated at 8.00mbgl on engineer's instruction.<br>Cohesive soil strengths based on engineer's observations. |      |        |         |          |        |
|                 |      |                                                                                                                                                       |            |             |           |                                                                                                                         |      |        |         |          |        |
| Scale 1:62.5    |      | Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification. |            |             |           |                                                                                                                         |      |        |         |          |        |

|                                                                                                                  |                                            |                                      |                                                            |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------|------------------------------------------------------------|
| <br><b>WSP</b><br><br>Telephone: | <b>BOREHOLE LOG</b>                        |                                      | Hole No.<br><b>BH105A</b>                                  |
|                                                                                                                  | Project<br><b>Port Talbot Harbourside</b>  |                                      | Sheet<br><b>1 of 2</b>                                     |
| Job No<br><b>62253048</b>                                                                                        | Client<br><b>Neath Port Talbot Council</b> |                                      | Date<br><b>09-08-19<br/>12-08-19</b>                       |
| Contractor / Driller<br><b>Apex</b>                                                                              | Method/Plant Used<br><b>Dando 3000</b>     | Logged By<br><b>JL/JT</b>            | Co-Ordinates (NGR)<br><b>E 276590.148<br/>N 189510.773</b> |
|                                                                                                                  |                                            | Ground Level (m AOD)<br><b>6.727</b> |                                                            |

| SAMPLES & TESTS |      |             |            |             |               |       | STRATA       |                   |                                                                                                                                                                                                                                                         |                                                                                     |         | Install / Backfill                                                                   |
|-----------------|------|-------------|------------|-------------|---------------|-------|--------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------|--------------------------------------------------------------------------------------|
| Depth           | Type | Test Result | PID (ppmV) | HSV (kN/m2) | P Pen (kN/m2) | Water | Elev. (mAOD) | Depth (Thickness) | Description                                                                                                                                                                                                                                             | Legend                                                                              | Geology | Dia. 50 mm                                                                           |
| 1.30-1.40       | ES   |             |            |             |               |       | 6.63         | 0.10              | MACADAM. (MADE GROUND)                                                                                                                                                                                                                                  |  | MG      |   |
|                 |      |             |            |             |               |       |              | (0.50)            | Black gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium of brick, slag, ballast and clinker. (MADE GROUND)                                                                                                                   |  | MG      |                                                                                      |
|                 |      |             |            |             |               |       | 6.13         | 0.60              | Dark brown sandy slightly clayey angular to subangular fine to coarse GRAVEL of slag, brick, concrete and clinker with high cobble and boulder content. Sand is medium to coarse. Cobbles and boulders are angular to subangular of slag. (MADE GROUND) |  | MG      |                                                                                      |
|                 |      |             |            |             |               |       | 5.13         | 1.60              | Soft brown slightly gravelly sandy SILT. sand is fine to medium. Gravel is subrounded to rounded fine to coarse of sandstone and mudstone. Hydrocarbon odour. (ALLUVIUM)                                                                                |  | ALV     |                                                                                      |
| 4.10-4.20       | ES   |             |            |             |               |       | 4.93         | 1.80              | Dark brownish grey sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with medium cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. Strong hydrocarbon odour between 1.80 and 5.50m bgl. (ALLUVIUM) |  | ALV     |  |
|                 |      |             |            |             |               |       |              | (6.20)            | 2.40 - 3.00 m bgl Free product visible of arisings.                                                                                                                                                                                                     |  |         |                                                                                      |
|                 |      |             |            |             |               |       | -1.27        | 8.00              |                                                                                                                                                                                                                                                         |                                                                                     |         |                                                                                      |

| Boring Progress |      |                                                                                                                                                       |            |             |           | Water Strikes                                                                                                                              |      |        |         |          |        |
|-----------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------|------|--------|---------|----------|--------|
| Date            | Time | Depth                                                                                                                                                 | Casing Dpt | Dia. (mm)   | Water Dpt | Date                                                                                                                                       | Time | Strike | Minutes | Standing | Casing |
|                 |      |                                                                                                                                                       |            |             |           |                                                                                                                                            |      | 3.00   | 20      | 2.50     |        |
| Chiselling      |      |                                                                                                                                                       |            | Water Added |           | General Remarks<br>Borehole terminated at 8.00mbgl on engineer's instruction.<br>Cohesive soil strengths based on engineer's observations. |      |        |         |          |        |
| From            | To   | Hours                                                                                                                                                 | Tool       | From        | To        |                                                                                                                                            |      |        |         |          |        |
|                 |      |                                                                                                                                                       |            |             |           |                                                                                                                                            |      |        |         |          |        |
| Scale 1:62.5    |      | Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification. |            |             |           |                                                                                                                                            |      |        |         |          |        |

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|------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------|------------------------------------------------------------|
| <br><b>WSP</b><br><br>Telephone: | <b>BOREHOLE LOG</b>                        |                                      | Hole No.<br><b>BH106</b>                                   |
|                                                                                                                  | Project<br><b>Port Talbot Harbourside</b>  |                                      | Sheet<br><b>1 of 2</b>                                     |
| Job No<br><b>62253048</b>                                                                                        | Client<br><b>Neath Port Talbot Council</b> |                                      | Date<br><b>12-08-19<br/>13-08-19</b>                       |
| Contractor / Driller<br><b>Apex</b>                                                                              | Method/Plant Used<br><b>Dando 3000</b>     | Logged By<br><b>JL/JT</b>            | Co-Ordinates (NGR)<br><b>E 276602.871<br/>N 189545.566</b> |
|                                                                                                                  |                                            | Ground Level (m AOD)<br><b>6.304</b> |                                                            |

| SAMPLES & TESTS |      |             |            |             |               |       | STRATA       |                    |                                                                                                                                                                                                                 |                                                                                       |         | Install / Backfill |
|-----------------|------|-------------|------------|-------------|---------------|-------|--------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------|--------------------|
| Depth           | Type | Test Result | PID (ppmV) | HSV (kN/m2) | P Pen (kN/m2) | Water | Elev. (mAOD) | Depth (Thick-ness) | Description                                                                                                                                                                                                     | Legend                                                                                | Geology | Dia. 50 mm         |
|                 |      |             |            |             |               |       | 6.10         | 0.20               | CONCRETE. (MADE GROUND)                                                                                                                                                                                         |    | MG      |                    |
|                 |      |             |            |             |               |       | (0.90)       |                    | Dark brown sandy angular to subangular fine to coarse GRAVEL of slag, ballast, clinker and brick with low cobble content. Sand is fine to coarse. Cobbles are angular of slag. (MADE GROUND)                    |    | MG      |                    |
| 1.50-1.60       | ES   |             | 0.0        |             |               |       | 5.20         | 1.10               | Dark grey and black slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subangular to subrounded medium to coarse of brick, slag and clinker. Hydrocarbon odour. (MADE GROUND)             |    | MG      |                    |
|                 |      |             | 23.7       |             |               |       | 4.30         | 2.00               | Dark grey sandy silty subrounded to rounded fine to coarse GRAVEL of mudstone and sandstone. Sand is fine to coarse. (ALLUVIUM)                                                                                 |    | ALV     |                    |
| 2.40-2.50       | ES   |             |            |             |               |       | 3.80         | 2.50               | Dark grey sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone. Sand is fine to coarse. (ALLUVIUM)                                                                                       |    | ALV     |                    |
|                 |      |             | 2.1        |             |               |       | (2.00)       |                    |                                                                                                                                                                                                                 |                                                                                       | ALV     |                    |
|                 |      |             | 0.0        |             |               |       | 1.80         | 4.50               | Dark brown sandy subrounded to rounded fine to coarse GRAVEL of mudstone and sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded to rounded of sandstone and mudstone. (ALLUVIUM) |  | ALV     |                    |
|                 |      |             | 0.0        |             |               |       | (3.50)       |                    |                                                                                                                                                                                                                 |                                                                                       | ALV     |                    |
|                 |      |             | 0.0        |             |               |       | -1.70        | 8.00               |                                                                                                                                                                                                                 |                                                                                       |         |                    |

| Boring Progress |      |                                                                                                                                                       |            |           |             | Water Strikes |                                                                               |        |         |          |        |
|-----------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|-------------|---------------|-------------------------------------------------------------------------------|--------|---------|----------|--------|
| Date            | Time | Depth                                                                                                                                                 | Casing Dpt | Dia. (mm) | Water Dpt   | Date          | Time                                                                          | Strike | Minutes | Standing | Casing |
|                 |      |                                                                                                                                                       |            |           |             |               |                                                                               | 2.00   | 20      | 2.00     |        |
| Chiselling      |      |                                                                                                                                                       |            |           | Water Added |               | General Remarks<br>Borehole terminated at 8.00mbgl on engineer's instruction. |        |         |          |        |
| From            | To   | Hours                                                                                                                                                 | Tool       | From      | To          |               |                                                                               |        |         |          |        |
|                 |      |                                                                                                                                                       |            |           |             |               |                                                                               |        |         |          |        |
| Scale 1:62.5    |      | Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification. |            |           |             |               |                                                                               |        |         |          |        |

|                                                                                                       |                                     |                               |                                                    |
|-------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------|----------------------------------------------------|
| <br>WSP<br>Telephone: | <b>BOREHOLE LOG</b>                 |                               | Hole No.<br><b>BH107</b>                           |
|                                                                                                       | Project<br>Port Talbot Harbourside  |                               | Sheet<br>1 of 2                                    |
| Job No<br>62253048                                                                                    | Client<br>Neath Port Talbot Council |                               | Date<br>13-08-19<br>14-08-19                       |
| Contractor / Driller<br>Apex                                                                          | Method/Plant Used<br>Dando 3000     | Logged By<br>JL/JT            | Co-Ordinates (NGR)<br>E 276632.376<br>N 189533.265 |
|                                                                                                       |                                     | Ground Level (m AOD)<br>6.079 |                                                    |

| SAMPLES & TESTS |      |             |            |             |               |       | STRATA       |                   |                                                                                                                                                                                                                                                |                                                                                       |         | Install / Backfill |
|-----------------|------|-------------|------------|-------------|---------------|-------|--------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------|--------------------|
| Depth           | Type | Test Result | PID (ppmV) | HSV (kN/m2) | P Pen (kN/m2) | Water | Elev. (mAOD) | Depth (Thickness) | Description                                                                                                                                                                                                                                    | Legend                                                                                | Geology | Dia. 50 mm         |
| 0.10-0.30       | ES   |             |            |             |               |       | 5.98         | 0.10              | TOPSOIL.                                                                                                                                                                                                                                       |    | TS      |                    |
|                 |      |             |            |             |               |       | 5.68         | 0.40              | Brown slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of slag, brick, concrete and clinker. (MADE GROUND)                                                                                                |    | MG      |                    |
|                 |      |             |            |             |               |       | 5.58         | 0.50              |                                                                                                                                                                                                                                                |                                                                                       | CONC    |                    |
|                 |      |             |            |             |               |       | 5.48         | 0.60              | CONCRETE. (MADE GROUND)                                                                                                                                                                                                                        |    | MG      |                    |
|                 |      |             | 0.2        |             |               |       |              | (0.90)            | Black sandy CLAY. Sand is fine to medium. (MADE GROUND)                                                                                                                                                                                        |    | MG      |                    |
|                 |      |             |            |             |               |       | 4.58         | 1.50              | Dark grey slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is angular to subangular fine of mixed lithologies. (MADE GROUND)                                                                                              |    |         |                    |
|                 |      |             |            |             |               |       | 4.08         | (0.50) 2.00       | Soft dark grey slightly sandy gravelly SILT with low cobble content. Sand is fine to medium. Gravel is subrounded to rounded fine to coarse of sandstone and mudstone. Cobbles are subrounded to rounded of sandstone and mudstone. (ALLUVIUM) |    | ALV     |                    |
|                 |      |             | 13.8       |             |               |       |              | (1.10)            | Dark grey sandy locally very sandy subrounded to rounded fine to coarse GRAVEL of mudstone and sandstone. Sand is fine to coarse. Hydrocarbon odour. (ALLUVIUM)                                                                                |    | ALV     |                    |
| 2.90-3.00       | ES   |             |            |             |               |       | 2.98         | 3.10              | Dark greyish brown sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with medium cobble content. Sand is fine to coarse. Cobbles are subrounded to rounded of sandstone. (ALLUVIUM)                                  |    |         |                    |
|                 |      |             | 0.5        |             |               |       |              |                   |                                                                                                                                                                                                                                                |                                                                                       | ALV     |                    |
|                 |      |             | 0.0        |             |               |       |              | (2.70)            |                                                                                                                                                                                                                                                |                                                                                       |         |                    |
|                 |      |             |            |             |               |       | 0.28         | 5.80              |                                                                                                                                                                                                                                                |                                                                                       |         |                    |
|                 |      |             | 0.0        |             |               |       | 0.08         | 6.00              | Sandstone BOULDER (Drillers Description). (ALLUVIUM)                                                                                                                                                                                           |  | ALV     |                    |

| Boring Progress |      |                                                                                                                                                       |            |             |           | Water Strikes                                                                                                                                  |      |        |         |          |        |
|-----------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|---------|----------|--------|
| Date            | Time | Depth                                                                                                                                                 | Casing Dpt | Dia. (mm)   | Water Dpt | Date                                                                                                                                           | Time | Strike | Minutes | Standing | Casing |
|                 |      |                                                                                                                                                       |            |             |           |                                                                                                                                                |      | 2.00   | 20      | 1.80     |        |
| Chiselling      |      |                                                                                                                                                       |            | Water Added |           | General Remarks                                                                                                                                |      |        |         |          |        |
| From            | To   | Hours                                                                                                                                                 | Tool       | From        | To        |                                                                                                                                                |      |        |         |          |        |
| 5.8             | 6    | 01:00                                                                                                                                                 | Chisel     |             |           | Borehole terminated at 6.00mbgl on engineer's instruction due to obstruction.<br><br>Cohesive soil strengths based on engineer's observations. |      |        |         |          |        |
| Scale 1:62.5    |      | Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification. |            |             |           |                                                                                                                                                |      |        |         |          |        |

# Appendix C.6

PHOTOLOG

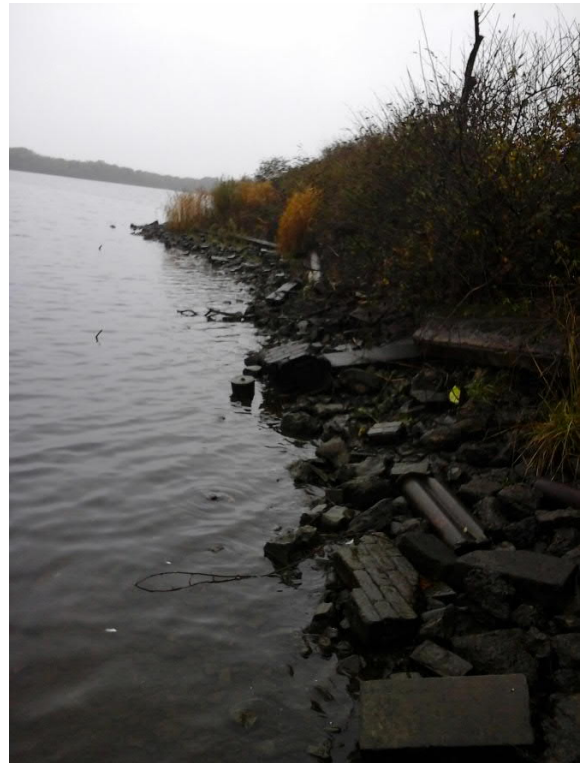


## APPENDIX C.6 PHOTOLOG

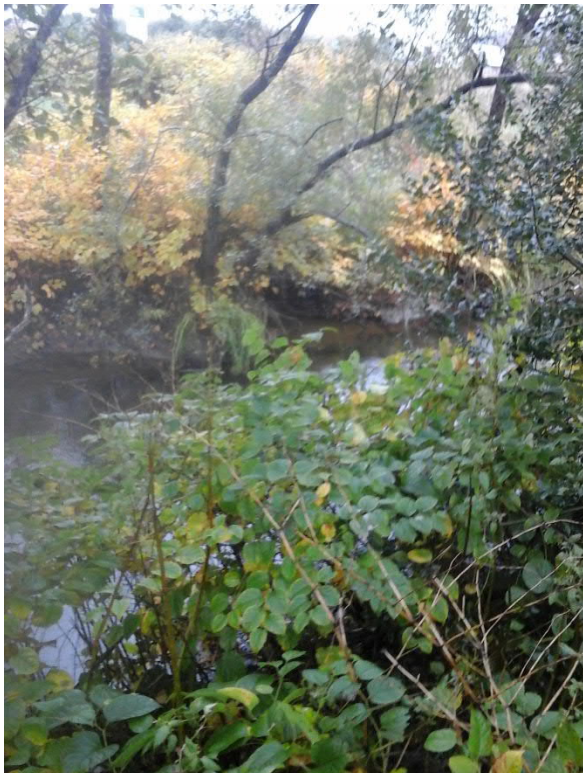
**Photo 1:** Port Talbot Dock wall, located south west of the site.



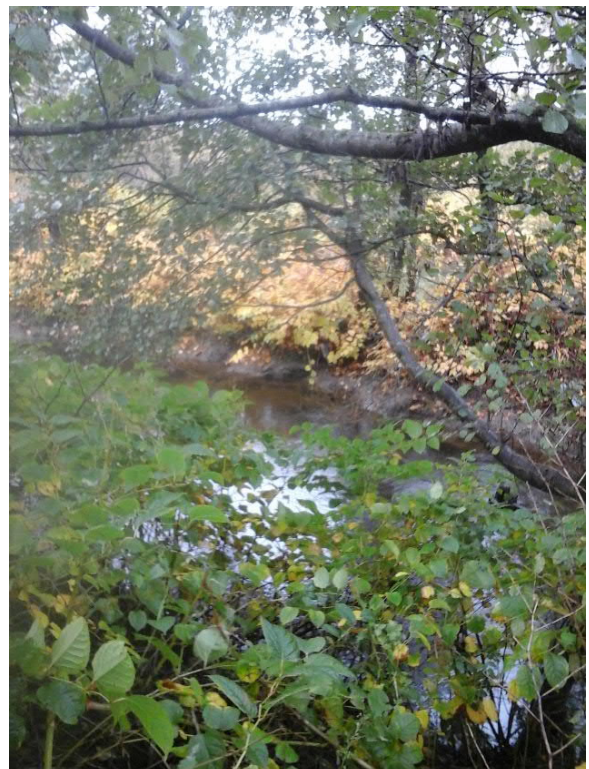
**Photo 2:** Port Talbot Dock collapsed wall at the area directly south of the site.



**Photo 3:** Dock Feeder natural bank, area directly west of the site and closer to the Port Talbot Dock connection.



**Photo 4:** Another view of the Dock Feeder natural bank, area directly west of the site and closer to the Port Talbot Dock connection.



## APPENDIX C.6 PHOTOLOG

**Photo 5:** Dock Feeder south view from the roundabout located north in proximity to the River Afan. Bank wall visible at the end.



**Photo 6:** Dock Feeder Bank Wall



# Appendix D

LABORATORY CERTIFICATES





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BS2 0HQ

**Attention:** Jack Lott

## CERTIFICATE OF ANALYSIS

|                                     |                         |
|-------------------------------------|-------------------------|
| <b>Date of report Generation:</b>   | 02 October 2019         |
| <b>Customer:</b>                    | WSP PB BBC              |
| <b>Sample Delivery Group (SDG):</b> | 190920-25               |
| <b>Your Reference:</b>              | 62253048-GI2            |
| <b>Location:</b>                    | Port Talbot Harbourside |
| <b>Report No:</b>                   | 523853                  |

**This report has been revised and directly supersedes 523696 in its entirety.**

We received 16 samples on Friday September 20, 2019 and 16 of these samples were scheduled for analysis which was completed on Wednesday October 02, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

**Sonia McWhan**

Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

|                  |                         |                          |              |                           |        |
|------------------|-------------------------|--------------------------|--------------|---------------------------|--------|
| <b>SDG:</b>      | 190920-25               | <b>Client Reference:</b> | 62253048-GI2 | <b>Report Number:</b>     | 523853 |
| <b>Location:</b> | Port Talbot Harbourside | <b>Order Number:</b>     | 62253048-GI2 | <b>Superseded Report:</b> | 523696 |

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m)   | Sampled Date |
|------------------|----------------------|----------|-------------|--------------|
| 20760684         | BH101                | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760803         | BH102                | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760820         | BH103                | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760790         | BH104                | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760844         | BH106                | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760852         | BH107                | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760836         | BH105A               | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760762         | BHC5                 | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760887         | BHH03                | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760703         | BHH05                | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760874         | BHH02(D)             | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760736         | BHH07(D)             | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760770         | BHH07(D) Dup         | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760860         | BHH02(S)             | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760717         | BHH07(S)             | EW       | 0.00 - 0.00 | 18/09/2019   |
| 20760746         | MW1                  | EW       | 0.00 - 0.00 | 18/09/2019   |

**Maximum Sample/Coolbox Temperature (°C) :** 10.4

### ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

**Only received samples which have had analysis scheduled will be shown on the following pages.**



# CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25 Client Reference: 62253048-GI2 Report Number: 523853  
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report: 523696

## Results Legend

**X** Test  
**N** No Determination Possible

## Sample Types -

S - Soil/Solid  
UNS - Unspecified Solid  
GW - Ground Water  
SW - Surface Water  
LE - Land Leachate  
PL - Prepared Leachate  
PR - Process Water  
SA - Saline Water  
TE - Trade Effluent  
TS - Treated Sewage  
US - Untreated Sewage  
RE - Recreational Water  
DW - Drinking Water Non-regulatory  
UNL - Unspecified Liquid  
SL - Sludge  
G - Gas  
OTH - Other

| Results Legend                     | Lab Sample No(s)        |                                        | Customer Sample Reference | AGS Reference | Depth (m) | Container | Sample Type |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                                    | <div>X</div> Test       | <div>N</div> No Determination Possible |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | Sample Types -          |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | S - Soil/Solid          |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | UNS - Unspecified Solid |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | GW - Ground Water       |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | SW - Surface Water      |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| LE - Land Leachate                 |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PL - Prepared Leachate             |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR - Process Water                 |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SA - Saline Water                  |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TE - Trade Effluent                |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TS - Treated Sewage                |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| US - Untreated Sewage              |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| RE - Recreational Water            |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DW - Drinking Water Non-regulatory |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| UNL - Unspecified Liquid           |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SL - Sludge                        |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| G - Gas                            |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OTH - Other                        |                         |                                        |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Anions by ion Chromatography       | All                     | NDPs: 0<br>Tests: 14                   |                           |               |           |           |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

[illegible]



# CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25 Client Reference: 62253048-GI2 Report Number: 523853  
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report: 523696

## Results Legend

**X** Test  
**N** No Determination Possible

## Sample Types -

S - Soil/Solid  
UNS - Unspecified Solid  
GW - Ground Water  
SW - Surface Water  
LE - Land Leachate  
PL - Prepared Leachate  
PR - Process Water  
SA - Saline Water  
TE - Trade Effluent  
TS - Treated Sewage  
US - Untreated Sewage  
RE - Recreational Water  
DW - Drinking Water Non-regulatory  
UNL - Unspecified Liquid  
SL - Sludge  
G - Gas  
OTH - Other

|                                     | Lab Sample No(s) |                   | Customer Sample Reference |             | AGS Reference              |    | Depth (m) |  | Container |  | Sample Type |  |
|-------------------------------------|------------------|-------------------|---------------------------|-------------|----------------------------|----|-----------|--|-----------|--|-------------|--|
|                                     | 20760717         | BHH07(S)          | EW                        | 0.00 - 0.00 | H2SO4 (ALE244)             | GW |           |  |           |  |             |  |
|                                     | 20760860         | BHH02(S)          | EW                        | 0.00 - 0.00 | 500ml Plastic (ALE208)     | GW |           |  |           |  |             |  |
|                                     | 20760770         | BHH07(D) Dup      | EW                        | 0.00 - 0.00 | 0.5l glass bottle (ALE227) | GW |           |  |           |  |             |  |
|                                     | 20760736         | BHH07(D)          | EW                        | 0.00 - 0.00 | Vial (ALE297)              | GW |           |  |           |  |             |  |
|                                     | 20760874         | BHH02(D)          | EW                        | 0.00 - 0.00 | HNO3 Filtered (ALE204)     | GW |           |  |           |  |             |  |
| Anions by Ion Chromatography        | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| Dissolved Metals by ICP-MS          | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| EPH CWG (Aliphatic) Filtered GC (W) | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| EPH CWG (Aromatic) Filtered GC (W)  | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| GRO by GC-FID (W)                   | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| Low Level Hexavalent Chromium (w)   | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| Mercury Dissolved                   | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| PAH Spec MS - Aqueous (W)           | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| Phenols by HPLC (W)                 | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| TPH CWG Filtered (W)                | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |
| VOC MS (W)                          | All              | NDPs: 0 Tests: 14 |                           |             |                            |    |           |  |           |  |             |  |

|          |          |    |             |                            |    |   |   |   |   |  |  |  |  |  |   |   |  |   |  |   |   |
|----------|----------|----|-------------|----------------------------|----|---|---|---|---|--|--|--|--|--|---|---|--|---|--|---|---|
| 20760746 | MMT      | EW | 0.00 - 0.00 | Vial (ALE297)              | GW |   |   |   | X |  |  |  |  |  |   |   |  |   |  |   | X |
|          |          |    |             | HNO3 Filtered (ALE204)     | GW |   |   | X |   |  |  |  |  |  | X |   |  |   |  |   |   |
|          |          |    |             | H2SO4 (ALE244)             | GW |   |   |   |   |  |  |  |  |  |   |   |  | X |  |   |   |
|          |          |    |             | 500ml Plastic (ALE208)     | GW | X |   |   |   |  |  |  |  |  |   |   |  |   |  |   |   |
|          |          |    |             | 0.5l glass bottle (ALE227) | GW |   | X |   | X |  |  |  |  |  |   |   |  |   |  | X |   |
| 20760717 | BHH07(S) | EW | 0.00 - 0.00 | Vial (ALE297)              | GW |   |   |   | X |  |  |  |  |  |   |   |  |   |  |   | X |
|          |          |    |             | HNO3 Filtered (ALE204)     | GW |   |   | X |   |  |  |  |  |  |   | X |  |   |  |   |   |















# CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25  
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2  
Order Number: 62253048-GI2

Report Number: 523853  
Superseded Report: 523696

## TPH CWG (W)

| Results Legend                                  |                                                                                                                                                                  |        | Customer Sample Ref. |                   |              |              |           |                   |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|-------------------|--------------|--------------|-----------|-------------------|
| #                                               | ISO17025 accredited.                                                                                                                                             |        | BH101                |                   |              |              |           |                   |
| M                                               | mCERTS accredited.                                                                                                                                               |        | BH102                |                   |              |              |           |                   |
| aq                                              | Aqueous / settled sample.                                                                                                                                        |        | BH103                |                   |              |              |           |                   |
| diss.filt                                       | Dissolved / filtered sample.                                                                                                                                     |        | BH106                |                   |              |              |           |                   |
| tot.unfilt                                      | Total / unfiltered sample.                                                                                                                                       |        | BH107                |                   |              |              |           |                   |
| *                                               | Subcontracted - refer to subcontractor report for accreditation status.                                                                                          |        | BH105A               |                   |              |              |           |                   |
| **                                              | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |        |                      |                   |              |              |           |                   |
| (F)                                             | Trigger breach confirmed                                                                                                                                         |        |                      |                   |              |              |           |                   |
| 1-3+5@                                          | Sample deviation (see appendix)                                                                                                                                  |        |                      |                   |              |              |           |                   |
| Component                                       | LOD/Units                                                                                                                                                        | Method | Depth (m)            | Sample Type       | Date Sampled | Sampled Time | SDG Ref   | Lab Sample No.(s) |
| GRO Surrogate % recovery**                      | %                                                                                                                                                                | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760684          |
| GRO >C5-C12                                     | <50<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760803          |
| Methyl tertiary butyl ether (MTBE)              | <3<br>µg/l                                                                                                                                                       | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760820          |
| Benzene                                         | <7<br>µg/l                                                                                                                                                       | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760844          |
| Toluene                                         | <4<br>µg/l                                                                                                                                                       | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760852          |
| Ethylbenzene                                    | <5<br>µg/l                                                                                                                                                       | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| m,p-Xylene                                      | <8<br>µg/l                                                                                                                                                       | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| o-Xylene                                        | <3<br>µg/l                                                                                                                                                       | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Sum of detected Xylenes                         | <11<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Sum of detected BTEX                            | <28<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aliphatics >C5-C6                               | <10<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aliphatics >C6-C8                               | <10<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aliphatics >C8-C10                              | <10<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aliphatics >C10-C12                             | <10<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aliphatics >C12-C16 (diss.filt)                 | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aliphatics >C16-C21 (diss.filt)                 | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aliphatics >C21-C35 (diss.filt)                 | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Total Aliphatics >C12-C35 (diss.filt)           | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aromatics >EC5-EC7                              | <10<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aromatics >EC7-EC8                              | <10<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aromatics >EC8-EC10                             | <10<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aromatics >EC10-EC12                            | <10<br>µg/l                                                                                                                                                      | TM245  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aromatics >EC12-EC16 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aromatics >EC16-EC21 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aromatics >EC21-EC35 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Aromatics >EC16-EC35 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Total Aromatics >EC12-EC35 (diss.filt)          | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
| Total Aliphatics & Aromatics >C5-35 (diss.filt) | <10<br>µg/l                                                                                                                                                      | TM174  | 0.00 - 0.00          | Ground Water (GW) | 18/09/2019   | 18/09/2019   | 190920-25 | 20760836          |
|                                                 |                                                                                                                                                                  |        |                      |                   |              |              |           |                   |
|                                                 |                                                                                                                                                                  |        |                      |                   |              |              |           |                   |
|                                                 |                                                                                                                                                                  |        |                      |                   |              |              |           |                   |
|                                                 |                                                                                                                                                                  |        |                      |                   |              |              |           |                   |



## CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25  
Location: Port Talbot HarboursideClient Reference: 62253048-GI2  
Order Number: 62253048-GI2Report Number: 523853  
Superseded Report: 523696

## TPH CWG (W)

| Results Legend                                  |                                                                                                                                                                  |        | Customer Sample Ref.                                                                                                       | BHH03             | BHH05             | BHH02(D)          | BHH07(D)          | BHH07(D) Dup      | BHH02(S)          |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| #                                               | ISO17025 accredited.                                                                                                                                             |        | Depth (m)<br>Sample Type<br>Date Sampled<br>Sampled Time<br>Date Received<br>SDG Ref<br>Lab Sample No.(s)<br>AGS Reference | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       |
| M                                               | mCERTS accredited.                                                                                                                                               |        |                                                                                                                            | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) |
| aq                                              | Aqueous / settled sample.                                                                                                                                        |        |                                                                                                                            | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        |
| diss.filt                                       | Dissolved / filtered sample.                                                                                                                                     |        |                                                                                                                            |                   |                   |                   |                   |                   |                   |
| tot.unfilt                                      | Total / unfiltered sample.                                                                                                                                       |        |                                                                                                                            |                   |                   |                   |                   |                   |                   |
| *                                               | Subcontracted - refer to subcontractor report for accreditation status.                                                                                          |        |                                                                                                                            |                   |                   |                   |                   |                   |                   |
| **                                              | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |        |                                                                                                                            | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        |
| (F)                                             | Trigger breach confirmed                                                                                                                                         |        |                                                                                                                            | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         |
| 1-3+5@                                          | Sample deviation (see appendix)                                                                                                                                  |        |                                                                                                                            | 20760887          | 20760703          | 20760874          | 20760736          | 20760770          | 20760860          |
|                                                 |                                                                                                                                                                  |        |                                                                                                                            | EW                | EW                | EW                | EW                | EW                | EW                |
| Component                                       | LOD/Units                                                                                                                                                        | Method |                                                                                                                            |                   |                   |                   |                   |                   |                   |
| GRO Surrogate % recovery**                      | %                                                                                                                                                                | TM245  |                                                                                                                            | 108               | 109               | 110               | 114               | 104               | 105               |
| GRO >C5-C12                                     | <50<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <50<br>#          | <50<br>#          | <50<br>#          | <50<br>#          | <50<br>#          | <50<br>#          |
| Methyl tertiary butyl ether (MTBE)              | <3<br>µg/l                                                                                                                                                       | TM245  |                                                                                                                            | <3                | <3                | <3                | <3                | <3                | <3                |
| Benzene                                         | <7<br>µg/l                                                                                                                                                       | TM245  |                                                                                                                            | <7                | <7                | <7                | <7                | <7                | <7                |
| Toluene                                         | <4<br>µg/l                                                                                                                                                       | TM245  |                                                                                                                            | <4                | <4                | <4                | <4                | <4                | <4                |
| Ethylbenzene                                    | <5<br>µg/l                                                                                                                                                       | TM245  |                                                                                                                            | <5                | <5                | <5                | <5                | <5                | <5                |
| m,p-Xylene                                      | <8<br>µg/l                                                                                                                                                       | TM245  |                                                                                                                            | <8                | <8                | <8                | <8                | <8                | <8                |
| o-Xylene                                        | <3<br>µg/l                                                                                                                                                       | TM245  |                                                                                                                            | <3                | <3                | <3                | <3                | <3                | <3                |
| Sum of detected Xylenes                         | <11<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <11               | <11               | <11               | <11               | <11               | <11               |
| Sum of detected BTEX                            | <28<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <28               | <28               | <28               | <28               | <28               | <28               |
| Aliphatics >C5-C6                               | <10<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aliphatics >C6-C8                               | <10<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aliphatics >C8-C10                              | <10<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aliphatics >C10-C12                             | <10<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aliphatics >C12-C16 (diss.filt)                 | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aliphatics >C16-C21 (diss.filt)                 | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aliphatics >C21-C35 (diss.filt)                 | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Total Aliphatics >C12-C35 (diss.filt)           | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aromatics >EC5-EC7                              | <10<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aromatics >EC7-EC8                              | <10<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aromatics >EC8-EC10                             | <10<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aromatics >EC10-EC12                            | <10<br>µg/l                                                                                                                                                      | TM245  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aromatics >EC12-EC16 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aromatics >EC16-EC21 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aromatics >EC21-EC35 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Aromatics >EC16-EC35 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Total Aromatics >EC12-EC35 (diss.filt)          | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
| Total Aliphatics & Aromatics >C5-35 (diss.filt) | <10<br>µg/l                                                                                                                                                      | TM174  |                                                                                                                            | <10               | <10               | <10               | <10               | <10               | <10               |
|                                                 |                                                                                                                                                                  |        |                                                                                                                            |                   |                   |                   |                   |                   |                   |
|                                                 |                                                                                                                                                                  |        |                                                                                                                            |                   |                   |                   |                   |                   |                   |
|                                                 |                                                                                                                                                                  |        |                                                                                                                            |                   |                   |                   |                   |                   |                   |
|                                                 |                                                                                                                                                                  |        |                                                                                                                            |                   |                   |                   |                   |                   |                   |



## CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25  
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2  
Order Number: 62253048-GI2

Report Number: 523853  
Superseded Report: 523696

## TPH CWG (W)

| Results Legend                                  |                                                                                                                                                                  | Customer Sample Ref.                                                                                                       | BHH07(S)          | MW1               |  |  |  |  |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--|--|--|--|
| #                                               | ISO17025 accredited.                                                                                                                                             | Depth (m)<br>Sample Type<br>Date Sampled<br>Sampled Time<br>Date Received<br>SDG Ref<br>Lab Sample No.(s)<br>AGS Reference |                   |                   |  |  |  |  |
| M                                               | mCERTS accredited.                                                                                                                                               |                                                                                                                            |                   |                   |  |  |  |  |
| aq                                              | Aqueous / settled sample.                                                                                                                                        |                                                                                                                            | 0.00 - 0.00       | 0.00 - 0.00       |  |  |  |  |
| diss.filt                                       | Dissolved / filtered sample.                                                                                                                                     |                                                                                                                            | Ground Water (GW) | Ground Water (GW) |  |  |  |  |
| tot.unfilt                                      | Total / unfiltered sample.                                                                                                                                       |                                                                                                                            | 18/09/2019        | 18/09/2019        |  |  |  |  |
| *                                               | Subcontracted - refer to subcontractor report for accreditation status.                                                                                          |                                                                                                                            |                   |                   |  |  |  |  |
| **                                              | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |                                                                                                                            | 20/09/2019        | 20/09/2019        |  |  |  |  |
| (F)                                             | Trigger breach confirmed                                                                                                                                         |                                                                                                                            | 190920-25         | 190920-25         |  |  |  |  |
| 1-3+5@                                          | Sample deviation (see appendix)                                                                                                                                  |                                                                                                                            | 20760717          | 20760746          |  |  |  |  |
|                                                 |                                                                                                                                                                  |                                                                                                                            | EW                | EW                |  |  |  |  |
| Component                                       | LOD/Units                                                                                                                                                        | Method                                                                                                                     |                   |                   |  |  |  |  |
| GRO Surrogate % recovery**                      | %                                                                                                                                                                | TM245                                                                                                                      | 110               | 113               |  |  |  |  |
| GRO >C5-C12                                     | <50<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <50<br>#          | <50<br>#          |  |  |  |  |
| Methyl tertiary butyl ether (MTBE)              | <3<br>µg/l                                                                                                                                                       | TM245                                                                                                                      | <3                | <3                |  |  |  |  |
| Benzene                                         | <7<br>µg/l                                                                                                                                                       | TM245                                                                                                                      | <7                | <7                |  |  |  |  |
| Toluene                                         | <4<br>µg/l                                                                                                                                                       | TM245                                                                                                                      | <4                | <4                |  |  |  |  |
| Ethylbenzene                                    | <5<br>µg/l                                                                                                                                                       | TM245                                                                                                                      | <5                | <5                |  |  |  |  |
| m,p-Xylene                                      | <8<br>µg/l                                                                                                                                                       | TM245                                                                                                                      | <8                | <8                |  |  |  |  |
| o-Xylene                                        | <3<br>µg/l                                                                                                                                                       | TM245                                                                                                                      | <3                | <3                |  |  |  |  |
| Sum of detected Xylenes                         | <11<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <11               | <11               |  |  |  |  |
| Sum of detected BTEX                            | <28<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <28               | <28               |  |  |  |  |
| Aliphatics >C5-C6                               | <10<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <10               | <10               |  |  |  |  |
| Aliphatics >C6-C8                               | <10<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <10               | <10               |  |  |  |  |
| Aliphatics >C8-C10                              | <10<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <10               | <10               |  |  |  |  |
| Aliphatics >C10-C12                             | <10<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <10               | <10               |  |  |  |  |
| Aliphatics >C12-C16 (diss.filt)                 | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
| Aliphatics >C16-C21 (diss.filt)                 | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
| Aliphatics >C21-C35 (diss.filt)                 | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
| Total Aliphatics >C12-C35 (diss.filt)           | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
| Aromatics >EC5-EC7                              | <10<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <10               | <10               |  |  |  |  |
| Aromatics >EC7-EC8                              | <10<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <10               | <10               |  |  |  |  |
| Aromatics >EC8-EC10                             | <10<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <10               | <10               |  |  |  |  |
| Aromatics >EC10-EC12                            | <10<br>µg/l                                                                                                                                                      | TM245                                                                                                                      | <10               | <10               |  |  |  |  |
| Aromatics >EC12-EC16 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
| Aromatics >EC16-EC21 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
| Aromatics >EC21-EC35 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
| Aromatics >EC16-EC35 (diss.filt)                | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
| Total Aromatics >EC12-EC35 (diss.filt)          | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
| Total Aliphatics & Aromatics >C5-35 (diss.filt) | <10<br>µg/l                                                                                                                                                      | TM174                                                                                                                      | <10               | <10               |  |  |  |  |
|                                                 |                                                                                                                                                                  |                                                                                                                            |                   |                   |  |  |  |  |
|                                                 |                                                                                                                                                                  |                                                                                                                            |                   |                   |  |  |  |  |
|                                                 |                                                                                                                                                                  |                                                                                                                            |                   |                   |  |  |  |  |
|                                                 |                                                                                                                                                                  |                                                                                                                            |                   |                   |  |  |  |  |



# CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25  
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2  
Order Number: 62253048-GI2

Report Number: 523853  
Superseded Report: 523696

## VOC MS (W)

| Results Legend                            |                                                                                                                                                                  |                                                                                                                            | Customer Sample Ref. | BH101             | BH102             | BH103             | BH106             | BH107             | BH105A            |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| #                                         | ISO17025 accredited.                                                                                                                                             | Depth (m)<br>Sample Type<br>Date Sampled<br>Sampled Time<br>Date Received<br>SDG Ref<br>Lab Sample No.(s)<br>AGS Reference |                      | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       |
| M                                         | mCERIS accredited.                                                                                                                                               |                                                                                                                            |                      | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) |
| aq                                        | Aqueous / settled sample.                                                                                                                                        |                                                                                                                            |                      | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        |
| diss.filt                                 | Dissolved / filtered sample.                                                                                                                                     |                                                                                                                            |                      | -                 | -                 | -                 | -                 | -                 | -                 |
| tot.unfilt                                | Total / unfiltered sample.                                                                                                                                       |                                                                                                                            |                      | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        |
| *                                         | Subcontracted - refer to subcontractor report for accreditation status.                                                                                          |                                                                                                                            |                      | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         |
| **                                        | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |                                                                                                                            |                      | 20760684          | 20760803          | 20760820          | 20760844          | 20760852          | 20760836          |
| (F)                                       | Trigger breach confirmed                                                                                                                                         |                                                                                                                            | EW                   | EW                | EW                | EW                | EW                | EW                |                   |
| 1-3+5@<br>Sample deviation (see appendix) |                                                                                                                                                                  |                                                                                                                            |                      |                   |                   |                   |                   |                   |                   |
| Component                                 | LOD/Units                                                                                                                                                        | Method                                                                                                                     |                      |                   |                   |                   |                   |                   |                   |
| Dibromofluoromethane**                    | %                                                                                                                                                                | TM208                                                                                                                      | 109                  | 124               | 110               | 112               | 109               | 110               |                   |
| Toluene-d8**                              | %                                                                                                                                                                | TM208                                                                                                                      | 99.1                 | 97.2              | 97.5              | 98.6              | 98.9              | 93.1              |                   |
| 4-Bromofluorobenzene**                    | %                                                                                                                                                                | TM208                                                                                                                      | 95.9                 | 98.8              | 97.3              | 97.8              | 97.3              | 101               |                   |
| Dichlorodifluoromethane                   | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Chloromethane                             | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Vinyl chloride                            | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Bromomethane                              | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Chloroethane                              | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Trichlorofluoromethane                    | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| 1,1-Dichloroethene                        | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Carbon disulphide                         | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Dichloromethane                           | <3<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <3                   | <3                | <3                | <3                | <3                | <3                |                   |
| Methyl tertiary butyl ether (MTBE)        | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| trans-1,2-Dichloroethene                  | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| 1,1-Dichloroethane                        | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| cis-1,2-Dichloroethene                    | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| 2,2-Dichloropropane                       | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Bromochloromethane                        | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Chloroform                                | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| 1,1,1-Trichloroethane                     | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| 1,1-Dichloropropene                       | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Carbontetrachloride                       | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| 1,2-Dichloroethane                        | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Benzene                                   | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | 24600             |                   |
| Trichloroethene                           | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| 1,2-Dichloropropane                       | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Dibromomethane                            | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Bromodichloromethane                      | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| cis-1,3-Dichloropropene                   | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| Toluene                                   | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | 1000              |                   |
| trans-1,3-Dichloropropene                 | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |
| 1,1,2-Trichloroethane                     | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                   | <1                | <1                | <1                | <1                | <1                |                   |



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 190920-25  
**Location:** Port Talbot Harbourside

**Client Reference:** 62253048-GI2  
**Order Number:** 62253048-GI2

**Report Number:** 523853  
**Superseded Report:** 523696

## VOC MS (W)

| Results Legend                |                                                                                                                                                                  |        | Customer Sample Ref.                                                                                                       |   | BH101             | BH102             | BH103             | BH106             | BH107             | BH105A            |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| #                             | ISO17025 accredited.                                                                                                                                             |        | Depth (m)<br>Sample Type<br>Date Sampled<br>Sampled Time<br>Date Received<br>SDG Ref<br>Lab Sample No.(s)<br>AGS Reference |   | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       |
| M                             | mCERTS accredited.                                                                                                                                               |        |                                                                                                                            |   | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) |
| aq                            | Aqueous / settled sample.                                                                                                                                        |        |                                                                                                                            |   | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        |
| diss.filt                     | Dissolved / filtered sample.                                                                                                                                     |        |                                                                                                                            |   | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        |
| tot.unfilt                    | Total / unfiltered sample.                                                                                                                                       |        |                                                                                                                            |   | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         |
| +                             | Subcontracted - refer to subcontractor report for accreditation status.                                                                                          |        |                                                                                                                            |   | 20760684          | 20760803          | 20760820          | 20760844          | 20760852          | 20760836          |
| **                            | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |        |                                                                                                                            |   | EW                | EW                | EW                | EW                | EW                | EW                |
| (F)                           | Trigger breach confirmed                                                                                                                                         |        |                                                                                                                            |   |                   |                   |                   |                   |                   |                   |
| 1-3+5@                        | Sample deviation (see appendix)                                                                                                                                  |        |                                                                                                                            |   |                   |                   |                   |                   |                   |                   |
| Component                     | LOD/Units                                                                                                                                                        | Method |                                                                                                                            |   |                   |                   |                   |                   |                   |                   |
| 1,3-Dichloropropane           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Tetrachloroethene             | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Dibromochloromethane          | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,2-Dibromoethane             | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Chlorobenzene                 | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,1,1,2-Tetrachloroethane     | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Ethylbenzene                  | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | 170               |
| m,p-Xylene                    | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | 463               |
| o-Xylene                      | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | 136               |
| Styrene                       | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| Bromoform                     | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| Isopropylbenzene              | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | 8.61              |
| 1,1,2,2-Tetrachloroethane     | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| 1,2,3-Trichloropropane        | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| Bromobenzene                  | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| Propylbenzene                 | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| 2-Chlorotoluene               | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| 1,3,5-Trimethylbenzene        | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | 16.9              |
| 4-Chlorotoluene               | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| tert-Butylbenzene             | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| 1,2,4-Trimethylbenzene        | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | 44.9              |
| sec-Butylbenzene              | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| 4-iso-Propyltoluene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | 1.56              |
| 1,3-Dichlorobenzene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| 1,4-Dichlorobenzene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| n-Butylbenzene                | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| 1,2-Dichlorobenzene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| 1,2-Dibromo-3-chloropropane   | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| 1,2,4-Trichlorobenzene        | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| Hexachlorobutadiene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| tert-Amyl methyl ether (TAME) | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | <1                |
| Naphthalene                   | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | 270               |





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 190920-25  
**Location:** Port Talbot Harbourside

**Client Reference:** 62253048-GI2  
**Order Number:** 62253048-GI2

**Report Number:** 523853  
**Superseded Report:** 523696

## VOC MS (W)

| Results Legend                     |                                                                                                                                                                  |        | Customer Sample Ref.                                                                                                                                                               | BHH03             | BHH05             | BHH02(D)          | BHH07(D)          | BHH07(D) Dup      | BHH02(S)          |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| #                                  | ISO17025 accredited.                                                                                                                                             |        | <b>Depth (m)</b><br><b>Sample Type</b><br><b>Date Sampled</b><br><b>Sampled Time</b><br><b>Date Received</b><br><b>SDG Ref</b><br><b>Lab Sample No.(s)</b><br><b>AGS Reference</b> | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       |
| M                                  | mCERES accredited.                                                                                                                                               |        |                                                                                                                                                                                    | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) |
| aq                                 | Aqueous / settled sample.                                                                                                                                        |        |                                                                                                                                                                                    | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        |
| diss.filt                          | Dissolved / filtered sample.                                                                                                                                     |        |                                                                                                                                                                                    |                   |                   |                   |                   |                   |                   |
| tot.unfilt                         | Total / unfiltered sample.                                                                                                                                       |        |                                                                                                                                                                                    | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        |
| *                                  | Subcontracted - refer to subcontractor report for accreditation status.                                                                                          |        |                                                                                                                                                                                    | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         |
| **                                 | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |        |                                                                                                                                                                                    | 20760887          | 20760703          | 20760874          | 20760736          | 20760770          | 20760860          |
| (F)                                | Trigger breach confirmed                                                                                                                                         |        |                                                                                                                                                                                    | EW                | EW                | EW                | EW                | EW                | EW                |
| 1-3+5@                             | Sample deviation (see appendix)                                                                                                                                  |        |                                                                                                                                                                                    |                   |                   |                   |                   |                   |                   |
| Component                          | LOD/Units                                                                                                                                                        | Method |                                                                                                                                                                                    |                   |                   |                   |                   |                   |                   |
| Dibromofluoromethane**             | %                                                                                                                                                                | TM208  |                                                                                                                                                                                    | 108               | 43.9              | 108               | 105               | 109               | 107               |
| Toluene-d8**                       | %                                                                                                                                                                | TM208  |                                                                                                                                                                                    | 99                | 98.7              | 98.2              | 98.4              | 97.7              | 97.8              |
| 4-Bromofluorobenzene**             | %                                                                                                                                                                | TM208  |                                                                                                                                                                                    | 97.2              | 95.5              | 97                | 96.8              | 96.5              | 95.3              |
| Dichlorodifluoromethane            | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Chloromethane                      | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Vinyl chloride                     | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Bromomethane                       | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Chloroethane                       | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Trichlorofluoromethane             | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| 1,1-Dichloroethene                 | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Carbon disulphide                  | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Dichloromethane                    | <3<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <3                | <3                | <3                | <3                | <3                | <3                |
| Methyl tertiary butyl ether (MTBE) | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| trans-1,2-Dichloroethene           | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| 1,1-Dichloroethane                 | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| cis-1,2-Dichloroethene             | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| 2,2-Dichloropropane                | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Bromochloromethane                 | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Chloroform                         | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| 1,1,1-Trichloroethane              | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| 1,1-Dichloropropene                | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Carbontetrachloride                | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| 1,2-Dichloroethane                 | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Benzene                            | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Trichloroethene                    | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| 1,2-Dichloropropane                | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Dibromomethane                     | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Bromodichloromethane               | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| cis-1,3-Dichloropropene            | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| Toluene                            | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| trans-1,3-Dichloropropene          | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |
| 1,1,2-Trichloroethane              | <1<br>µg/l                                                                                                                                                       | TM208  |                                                                                                                                                                                    | <1                | <1                | <1                | <1                | <1                | <1                |



# CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25  
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2  
Order Number: 62253048-GI2

Report Number: 523853  
Superseded Report: 523696

## VOC MS (W)

| Results Legend                |                                                                                                                                                                  |        | Customer Sample Ref.                                                                                                       |   | BHH03             | BHH05             | BHH02(D)          | BHH07(D)          | BHH07(D) Dup      | BHH02(S)          |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| #                             | ISO17025 accredited.                                                                                                                                             |        | Depth (m)<br>Sample Type<br>Date Sampled<br>Sampled Time<br>Date Received<br>SDG Ref<br>Lab Sample No.(s)<br>AGS Reference |   | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       | 0.00 - 0.00       |
| M                             | mCERTS accredited.                                                                                                                                               |        |                                                                                                                            |   | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) | Ground Water (GW) |
| aq                            | Aqueous / settled sample.                                                                                                                                        |        |                                                                                                                            |   | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        | 18/09/2019        |
| diss.filt                     | Dissolved / filtered sample.                                                                                                                                     |        |                                                                                                                            |   |                   |                   |                   |                   |                   |                   |
| tot.unfilt                    | Total / unfiltered sample.                                                                                                                                       |        |                                                                                                                            |   |                   |                   |                   |                   |                   |                   |
| +                             | Subcontracted - refer to subcontractor report for accreditation status.                                                                                          |        |                                                                                                                            |   | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        | 20/09/2019        |
| **                            | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |        |                                                                                                                            |   | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         | 190920-25         |
| (F)                           | Trigger breach confirmed                                                                                                                                         |        |                                                                                                                            |   | 20760887          | 20760703          | 20760874          | 20760736          | 20760770          | 20760860          |
| 1-3+5@                        | Sample deviation (see appendix)                                                                                                                                  |        |                                                                                                                            |   | EW                | EW                | EW                | EW                | EW                | EW                |
| Component                     | LOD/Units                                                                                                                                                        | Method |                                                                                                                            |   |                   |                   |                   |                   |                   |                   |
| 1,3-Dichloropropane           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Tetrachloroethene             | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Dibromochloromethane          | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,2-Dibromoethane             | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Chlorobenzene                 | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,1,1,2-Tetrachloroethane     | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Ethylbenzene                  | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| m,p-Xylene                    | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| o-Xylene                      | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Styrene                       | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Bromoform                     | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Isopropylbenzene              | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,1,2,2-Tetrachloroethane     | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,2,3-Trichloropropane        | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Bromobenzene                  | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Propylbenzene                 | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 2-Chlorotoluene               | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,3,5-Trimethylbenzene        | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 4-Chlorotoluene               | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| tert-Butylbenzene             | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,2,4-Trimethylbenzene        | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| sec-Butylbenzene              | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 4-iso-Propyltoluene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,3-Dichlorobenzene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,4-Dichlorobenzene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| n-Butylbenzene                | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,2-Dichlorobenzene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,2-Dibromo-3-chloropropane   | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| 1,2,4-Trichlorobenzene        | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Hexachlorobutadiene           | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| tert-Amyl methyl ether (TAME) | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |
| Naphthalene                   | <1<br>µg/l                                                                                                                                                       | TM208  | <1                                                                                                                         | # | <1                | #                 | <1                | #                 | <1                | #                 |





# CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25  
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2  
Order Number: 62253048-GI2

Report Number: 523853  
Superseded Report: 523696

## VOC MS (W)

| Results Legend                     |                                                                                                                                                                  | Customer Sample Ref.                                                                                                       | BHH07(S)          | MW1               |   |   |  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|---|---|--|
| #                                  | ISO17025 accredited.                                                                                                                                             | Depth (m)<br>Sample Type<br>Date Sampled<br>Sampled Time<br>Date Received<br>SDG Ref<br>Lab Sample No.(s)<br>AGS Reference | 0.00 - 0.00       | 0.00 - 0.00       |   |   |  |
| M                                  | mCERTS accredited.                                                                                                                                               |                                                                                                                            | Ground Water (GW) | Ground Water (GW) |   |   |  |
| aq                                 | Aqueous / settled sample.                                                                                                                                        |                                                                                                                            | 18/09/2019        | 18/09/2019        |   |   |  |
| diss.filt                          | Dissolved / filtered sample.                                                                                                                                     |                                                                                                                            |                   |                   |   |   |  |
| tot.unfilt                         | Total / unfiltered sample.                                                                                                                                       |                                                                                                                            |                   |                   |   |   |  |
| *                                  | Subcontracted - refer to subcontractor report for accreditation status.                                                                                          |                                                                                                                            |                   |                   |   |   |  |
| **                                 | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |                                                                                                                            | 20/09/2019        | 20/09/2019        |   |   |  |
| (F)                                | Trigger breach confirmed                                                                                                                                         |                                                                                                                            | 190920-25         | 190920-25         |   |   |  |
| 1.3+5@                             | Sample deviation (see appendix)                                                                                                                                  |                                                                                                                            | 20760717          | 20760746          |   |   |  |
|                                    |                                                                                                                                                                  |                                                                                                                            | EW                | EW                |   |   |  |
| Component                          | LOD/Units                                                                                                                                                        | Method                                                                                                                     |                   |                   |   |   |  |
| Dibromofluoromethane**             | %                                                                                                                                                                | TM208                                                                                                                      | 106               | 109               |   |   |  |
| Toluene-d8**                       | %                                                                                                                                                                | TM208                                                                                                                      | 98.5              | 98.5              |   |   |  |
| 4-Bromofluorobenzene**             | %                                                                                                                                                                | TM208                                                                                                                      | 96                | 96.5              |   |   |  |
| Dichlorodifluoromethane            | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                |   |   |  |
| Chloromethane                      | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Vinyl chloride                     | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Bromomethane                       | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Chloroethane                       | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Trichlorofluoromethane             | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| 1,1-Dichloroethene                 | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Carbon disulphide                  | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Dichloromethane                    | <3<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <3                | <3                | # | # |  |
| Methyl tertiary butyl ether (MTBE) | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| trans-1,2-Dichloroethene           | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| 1,1-Dichloroethane                 | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| cis-1,2-Dichloroethene             | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| 2,2-Dichloropropane                | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                |   |   |  |
| Bromochloromethane                 | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Chloroform                         | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| 1,1,1-Trichloroethane              | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| 1,1-Dichloropropene                | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Carbontetrachloride                | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| 1,2-Dichloroethane                 | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | 1.01              | # | # |  |
| Benzene                            | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Trichloroethene                    | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| 1,2-Dichloropropane                | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Dibromomethane                     | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Bromodichloromethane               | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| cis-1,3-Dichloropropene            | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| Toluene                            | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| trans-1,3-Dichloropropene          | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |
| 1,1,2-Trichloroethane              | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                | # | # |  |



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 190920-25  
**Location:** Port Talbot Harbourside

**Client Reference:** 62253048-GI2  
**Order Number:** 62253048-GI2

**Report Number:** 523853  
**Superseded Report:** 523696

## VOC MS (W)

| Results Legend                |                                                                                                                                                                  | Customer Sample Ref.                                                                                                       | BHH07(S)          | MW1               |  |  |  |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--|--|--|
| #                             | ISO17025 accredited.                                                                                                                                             | Depth (m)<br>Sample Type<br>Date Sampled<br>Sampled Time<br>Date Received<br>SDG Ref<br>Lab Sample No.(s)<br>AGS Reference | 0.00 - 0.00       | 0.00 - 0.00       |  |  |  |
| M                             | mCERTS accredited.                                                                                                                                               |                                                                                                                            | Ground Water (GW) | Ground Water (GW) |  |  |  |
| aq                            | Aqueous / settled sample.                                                                                                                                        |                                                                                                                            | 18/09/2019        | 18/09/2019        |  |  |  |
| diss.filt                     | Dissolved / filtered sample.                                                                                                                                     |                                                                                                                            |                   |                   |  |  |  |
| tot.unfilt                    | Total / unfiltered sample.                                                                                                                                       |                                                                                                                            | 20/09/2019        | 20/09/2019        |  |  |  |
| *                             | Subcontracted - refer to subcontractor report for accreditation status.                                                                                          |                                                                                                                            | 190920-25         | 190920-25         |  |  |  |
| **                            | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |                                                                                                                            | 20760717          | 20760746          |  |  |  |
| (F)                           | Trigger breach confirmed                                                                                                                                         |                                                                                                                            | EW                | EW                |  |  |  |
| 1-3+5@                        | Sample deviation (see appendix)                                                                                                                                  |                                                                                                                            |                   |                   |  |  |  |
| Component                     | LOD/Units                                                                                                                                                        | Method                                                                                                                     |                   |                   |  |  |  |
| 1,3-Dichloropropane           | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Tetrachloroethene             | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Dibromochloromethane          | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,2-Dibromoethane             | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Chlorobenzene                 | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,1,1,2-Tetrachloroethane     | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Ethylbenzene                  | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| m,p-Xylene                    | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| o-Xylene                      | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Styrene                       | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Bromoform                     | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Isopropylbenzene              | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,1,2,2-Tetrachloroethane     | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,2,3-Trichloropropane        | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Bromobenzene                  | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Propylbenzene                 | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 2-Chlorotoluene               | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,3,5-Trimethylbenzene        | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 4-Chlorotoluene               | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| tert-Butylbenzene             | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,2,4-Trimethylbenzene        | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| sec-Butylbenzene              | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 4-iso-Propyltoluene           | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,3-Dichlorobenzene           | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,4-Dichlorobenzene           | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| n-Butylbenzene                | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,2-Dichlorobenzene           | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| 1,2-Dibromo-3-chloropropane   | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1                | <1                |  |  |  |
| 1,2,4-Trichlorobenzene        | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Hexachlorobutadiene           | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| tert-Amyl methyl ether (TAME) | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |
| Naphthalene                   | <1<br>µg/l                                                                                                                                                       | TM208                                                                                                                      | <1<br>#           | <1<br>#           |  |  |  |





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 190920-25 **Client Reference:** 62253048-GI2 **Report Number:** 523853  
**Location:** Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:** 523696

## Table of Results - Appendix

| Method No | Reference                                                                                        | Description                                                                                                      |
|-----------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| SUB       |                                                                                                  | Subcontracted Test                                                                                               |
| TM059     | In - house Method                                                                                | Determination of whole oil by gas chromatography (C4-C40)                                                        |
| TM152     | Method 3125B, AWWA/APHA, 20th Ed., 1999                                                          | Analysis of Aqueous Samples by ICP-MS                                                                            |
| TM174     | Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria | Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID                                |
| TM178     | Modified: US EPA Method 8100                                                                     | Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters                                      |
| TM183     | BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3                                         | Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry |
| TM208     | Modified: US EPA Method 8260b & 624                                                              | Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters                                       |
| TM226     | In-House Method                                                                                  | Determination of Anions in Waters using Ion Chromatography                                                       |
| TM245     | By GC-FID                                                                                        | Determination of GRO by Headspace in waters                                                                      |
| TM259     | by HPLC                                                                                          | Determination of Phenols in Waters and Leachates by HPLC                                                         |
| TM331     |                                                                                                  | Low Level Hexavalent Chromium                                                                                    |

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



## CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25  
Location: Port Talbot HarboursideClient Reference: 62253048-GI2  
Order Number: 62253048-GI2Report Number: 523853  
Superseded Report: 523696

## Test Completion Dates

| Lab Sample No(s)                    | 20760684     | 20760803     | 20760820     | 20760790    | 20760844     | 20760852     | 20760836     | 20760887     | 20760703     | 20760874     |
|-------------------------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Customer Sample Ref.                | BH101        | BH102        | BH103        | BH104       | BH106        | BH107        | BH105A       | BHH03        | BHH05        | BHH02(D)     |
| AGS Ref.                            | EW           | EW           | EW           | EW          | EW           | EW           | EW           | EW           | EW           | EW           |
| Depth                               | 0.00 - 0.00  | 0.00 - 0.00  | 0.00 - 0.00  | 0.00 - 0.00 | 0.00 - 0.00  | 0.00 - 0.00  | 0.00 - 0.00  | 0.00 - 0.00  | 0.00 - 0.00  | 0.00 - 0.00  |
| Type                                | Ground Water | Ground Water | Ground Water | Product (P) | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water |
| Anions by ion Chromatography        | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  |             | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  |
| Character of hydrocarbon samples    |              |              |              | 25-Sep-2019 |              |              |              |              |              |              |
| Density in Product*                 |              |              |              | 01-Oct-2019 |              |              |              |              |              |              |
| Dissolved Metals by ICP-MS          | 28-Sep-2019  | 01-Oct-2019  | 28-Sep-2019  |             | 28-Sep-2019  | 28-Sep-2019  | 28-Sep-2019  | 28-Sep-2019  | 28-Sep-2019  | 28-Sep-2019  |
| EPH CWG (Aliphatic) Filtered GC (W) | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  |             | 01-Oct-2019  | 01-Oct-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  |
| EPH CWG (Aromatic) Filtered GC (W)  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  |             | 01-Oct-2019  | 01-Oct-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  |
| GRO by GC-FID (W)                   | 26-Sep-2019  | 27-Sep-2019  | 26-Sep-2019  |             | 26-Sep-2019  | 26-Sep-2019  | 30-Sep-2019  | 26-Sep-2019  | 27-Sep-2019  | 26-Sep-2019  |
| Kinematic viscosity at 40°C*        |              |              |              | 25-Sep-2019 |              |              |              |              |              |              |
| Low Level Hexavalent Chromium (w)   | 24-Sep-2019  | 24-Sep-2019  | 24-Sep-2019  |             | 24-Sep-2019  | 24-Sep-2019  | 24-Sep-2019  | 24-Sep-2019  | 24-Sep-2019  | 24-Sep-2019  |
| Mercury Dissolved                   | 29-Sep-2019  | 29-Sep-2019  | 29-Sep-2019  |             | 29-Sep-2019  | 29-Sep-2019  | 29-Sep-2019  | 29-Sep-2019  | 29-Sep-2019  | 29-Sep-2019  |
| PAH Spec MS - Aqueous (W)           | 30-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  |             | 02-Oct-2019  | 02-Oct-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 27-Sep-2019  |
| Phenols by HPLC (W)                 | 27-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  |             | 27-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  |
| TPH CWG Filtered (W)                | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  |             | 01-Oct-2019  | 01-Oct-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  |
| VOC MS (W)                          | 26-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  |             | 26-Sep-2019  | 26-Sep-2019  | 30-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  |

| Lab Sample No(s)                    | 20760736     | 20760770     | 20760860     | 20760717     | 20760746     |
|-------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Customer Sample Ref.                | BHH07(D)     | BHH07(D) Dup | BHH02(S)     | BHH07(S)     | MW1          |
| AGS Ref.                            | EW           | EW           | EW           | EW           | EW           |
| Depth                               | 0.00 - 0.00  | 0.00 - 0.00  | 0.00 - 0.00  | 0.00 - 0.00  | 0.00 - 0.00  |
| Type                                | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water |
| Anions by ion Chromatography        | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  |
| Dissolved Metals by ICP-MS          | 28-Sep-2019  | 28-Sep-2019  | 28-Sep-2019  | 28-Sep-2019  | 28-Sep-2019  |
| EPH CWG (Aliphatic) Filtered GC (W) | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  |
| EPH CWG (Aromatic) Filtered GC (W)  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  |
| GRO by GC-FID (W)                   | 27-Sep-2019  | 27-Sep-2019  | 26-Sep-2019  | 27-Sep-2019  | 26-Sep-2019  |
| Low Level Hexavalent Chromium (w)   | 24-Sep-2019  | 24-Sep-2019  | 24-Sep-2019  | 24-Sep-2019  | 24-Sep-2019  |
| Mercury Dissolved                   | 29-Sep-2019  | 29-Sep-2019  | 29-Sep-2019  | 29-Sep-2019  | 29-Sep-2019  |
| PAH Spec MS - Aqueous (W)           | 30-Sep-2019  | 30-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  | 30-Sep-2019  |
| Phenols by HPLC (W)                 | 27-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  | 27-Sep-2019  |
| TPH CWG Filtered (W)                | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  | 30-Sep-2019  |
| VOC MS (W)                          | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  | 26-Sep-2019  |



# CERTIFICATE OF ANALYSIS

Validated

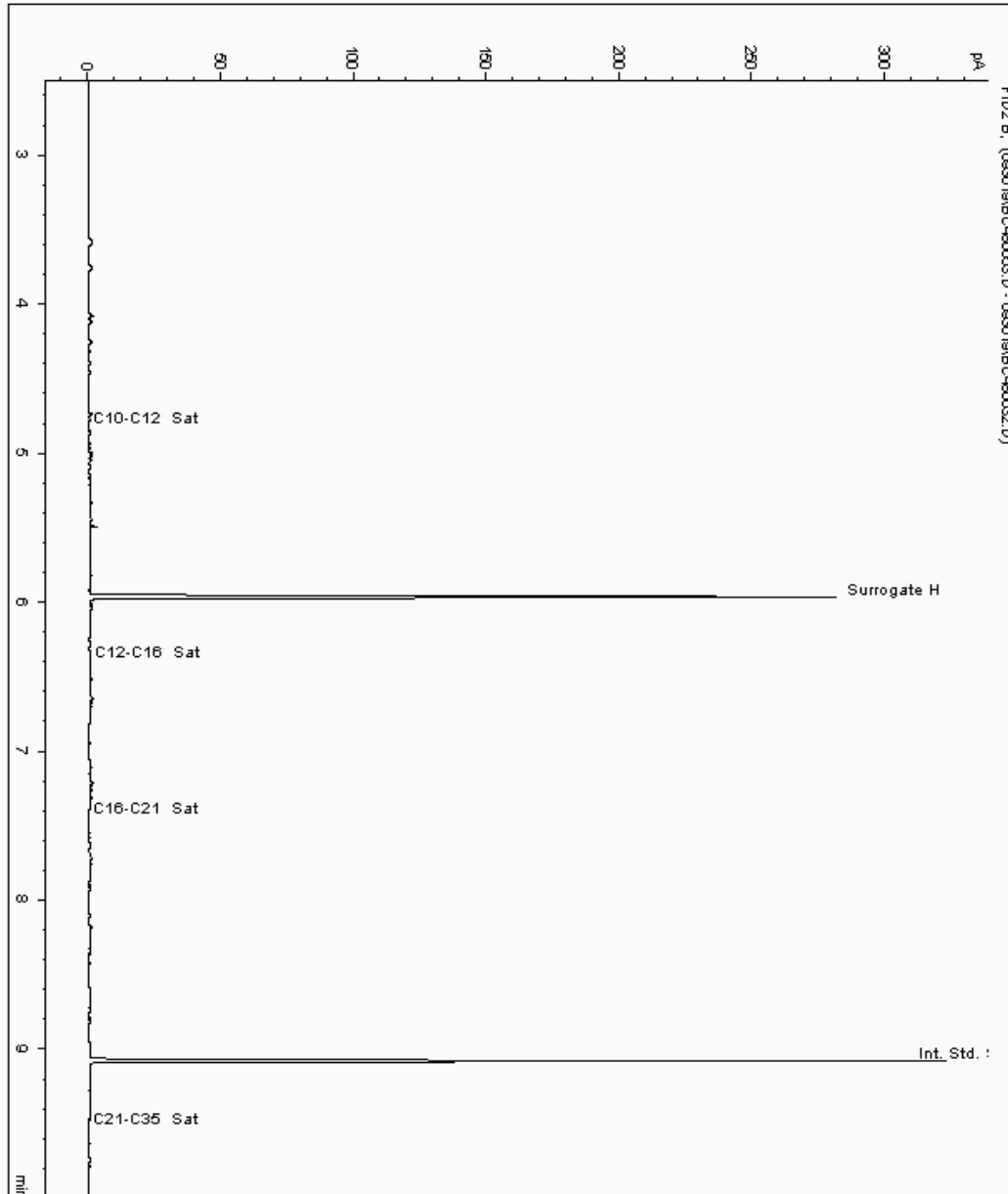
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| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

|           |                                     |             |          |         |             |
|-----------|-------------------------------------|-------------|----------|---------|-------------|
| Analysis: | EPH CWG (Aliphatic) Filtered GC (W) | Sample No : | 20776828 | Depth : | 0.00 - 0.00 |
|           |                                     | Sample ID : | BH107    |         |             |

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507601-  
Date Acquired : 01/10/2019 10:03:06 PM  
Units : ppb  
Dilution : SE BH107[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

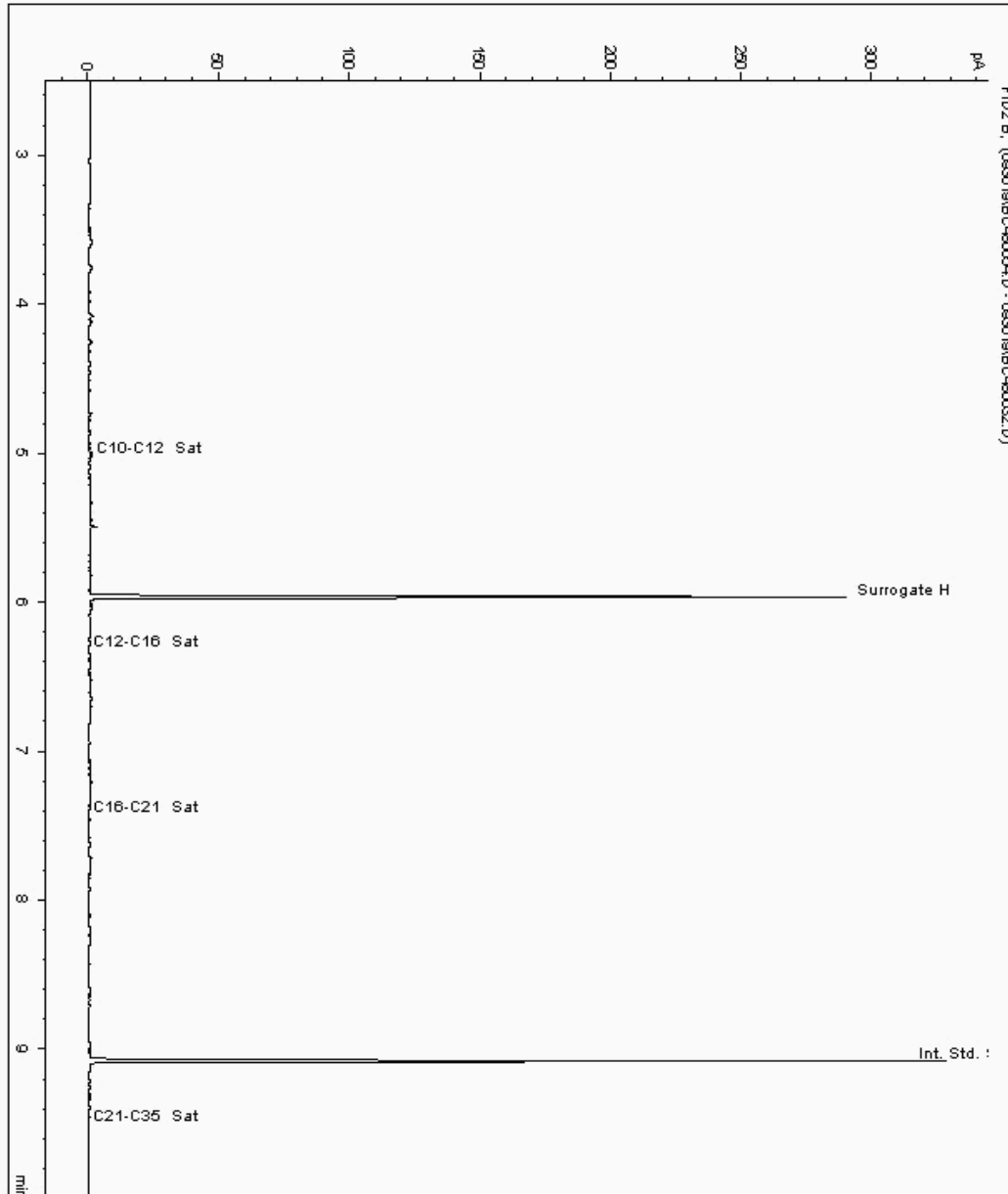
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| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W)      Sample No : 20776832      Depth : 0.00 - 0.00  
Sample ID : BH106

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507588-  
Date Acquired : 01/10/2019 10:24:10 PM  
Units : ppb  
Dilution : SE BH106[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

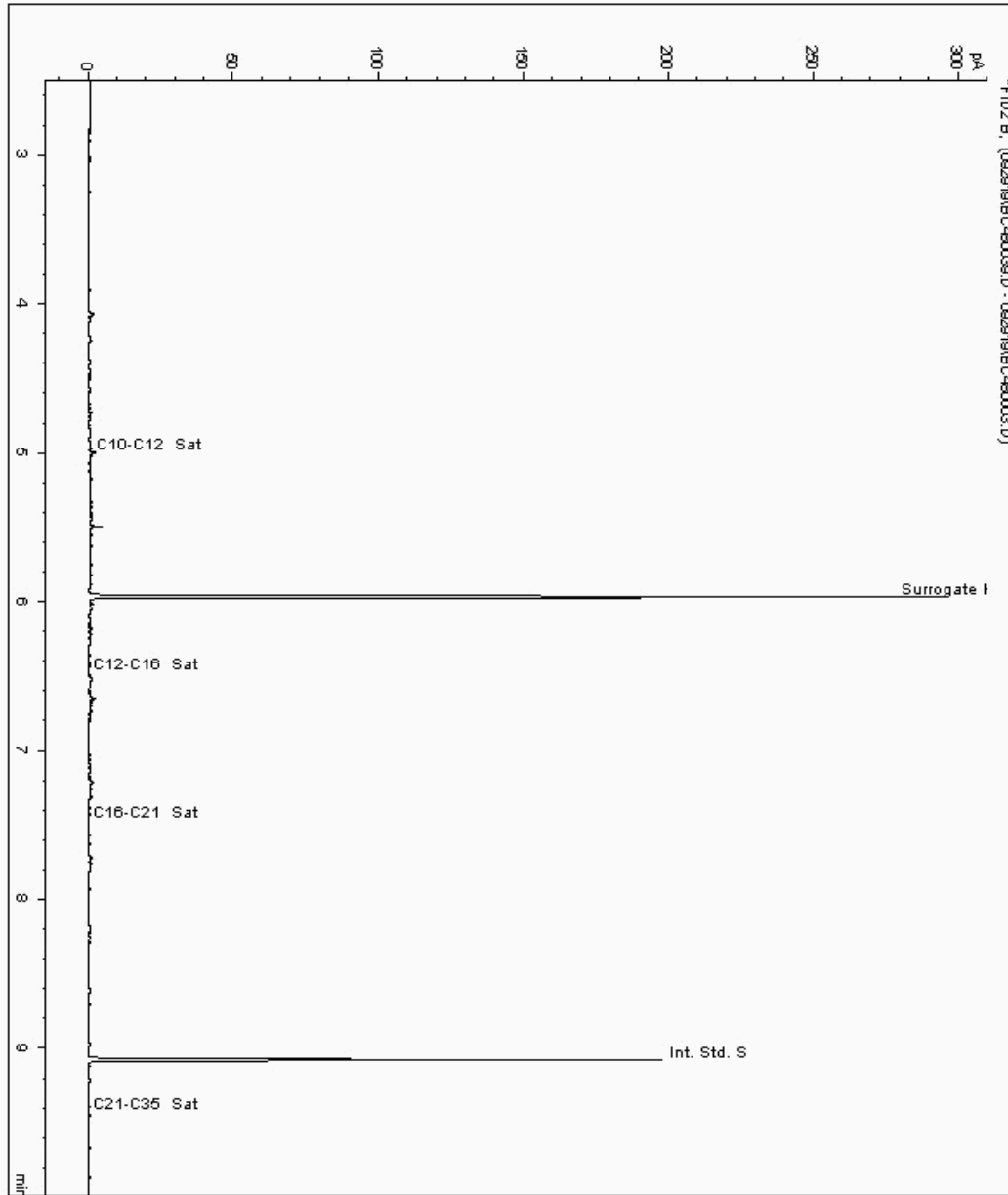
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| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W)      Sample No : 20778040      Depth : 0.00 - 0.00  
Sample ID : BH102

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507549-  
Date Acquired : 30/09/2019 02:43:07 PM  
Units : ppb  
Dilution : SE BH102[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

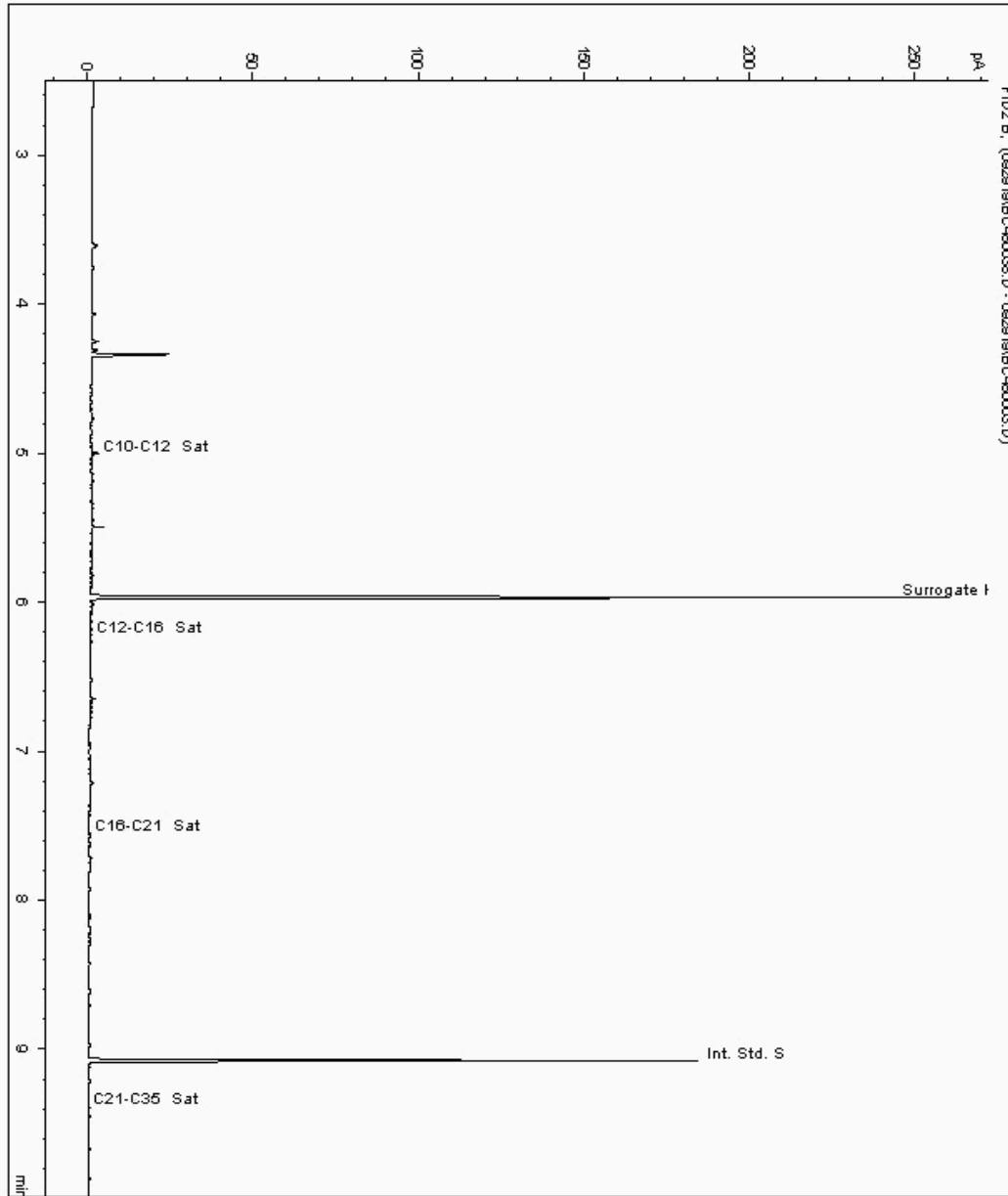
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| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W)      Sample No : 20778046      Depth : 0.00 - 0.00  
Sample ID : BH105A

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507575-  
Date Acquired : 30/09/2019 02:20:00 PM  
Units : ppb  
Dilution : SE BH105A[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

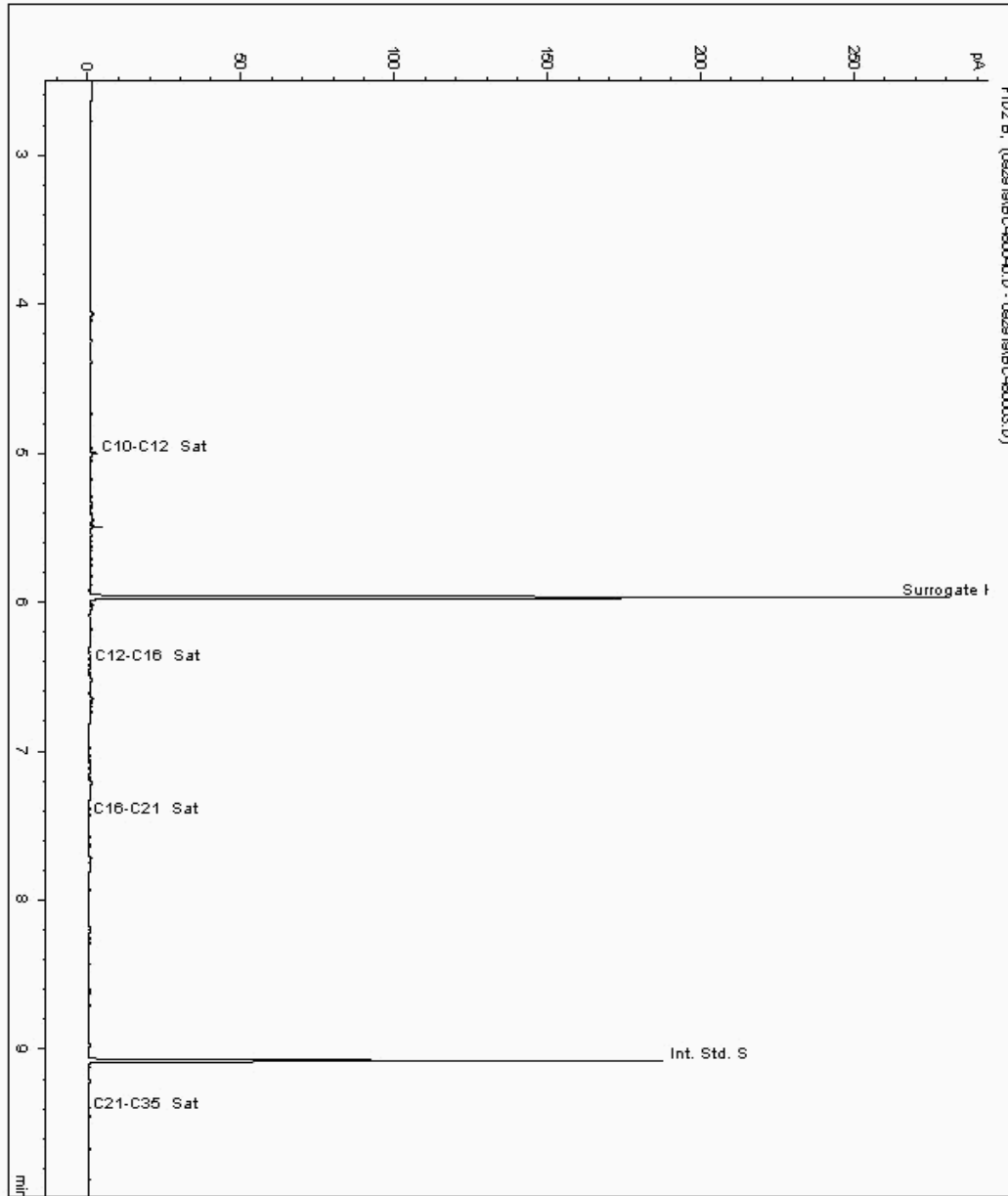
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| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

|           |                                     |             |          |         |             |
|-----------|-------------------------------------|-------------|----------|---------|-------------|
| Analysis: | EPH CWG (Aliphatic) Filtered GC (W) | Sample No : | 20778054 | Depth : | 0.00 - 0.00 |
|           |                                     | Sample ID : | BHH07(S) |         |             |

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507482-  
Date Acquired : 30/09/2019 03:05:59 PM  
Units : ppb  
Dilution : SE BHH07(S)[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

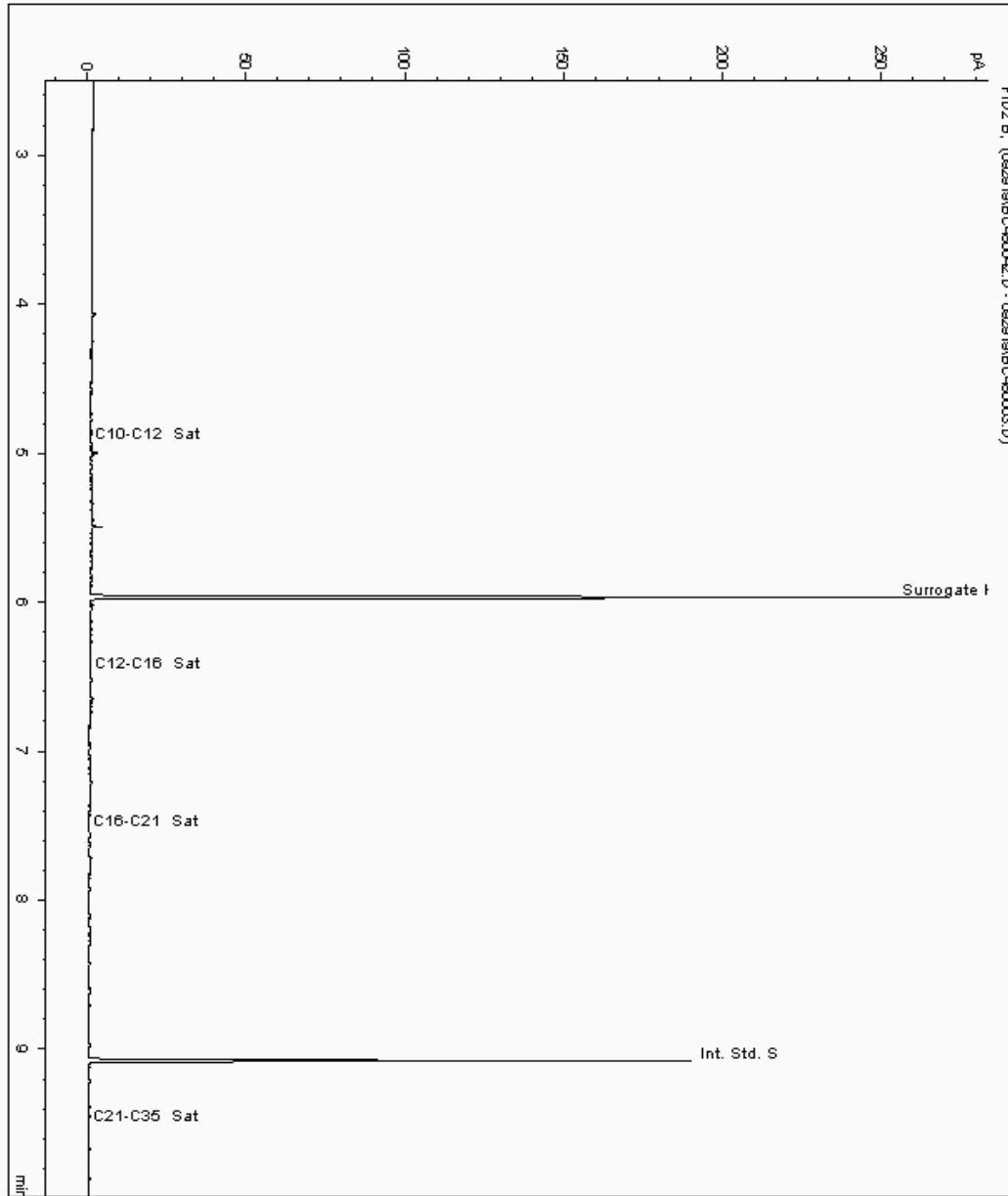
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|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

|           |                                     |             |          |         |             |
|-----------|-------------------------------------|-------------|----------|---------|-------------|
| Analysis: | EPH CWG (Aliphatic) Filtered GC (W) | Sample No : | 20778058 | Depth : | 0.00 - 0.00 |
|           |                                     | Sample ID : | MW1      |         |             |

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507508-  
Date Acquired : 30/09/2019 03:51:54 PM  
Units : ppb  
Dilution : SE MW1[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

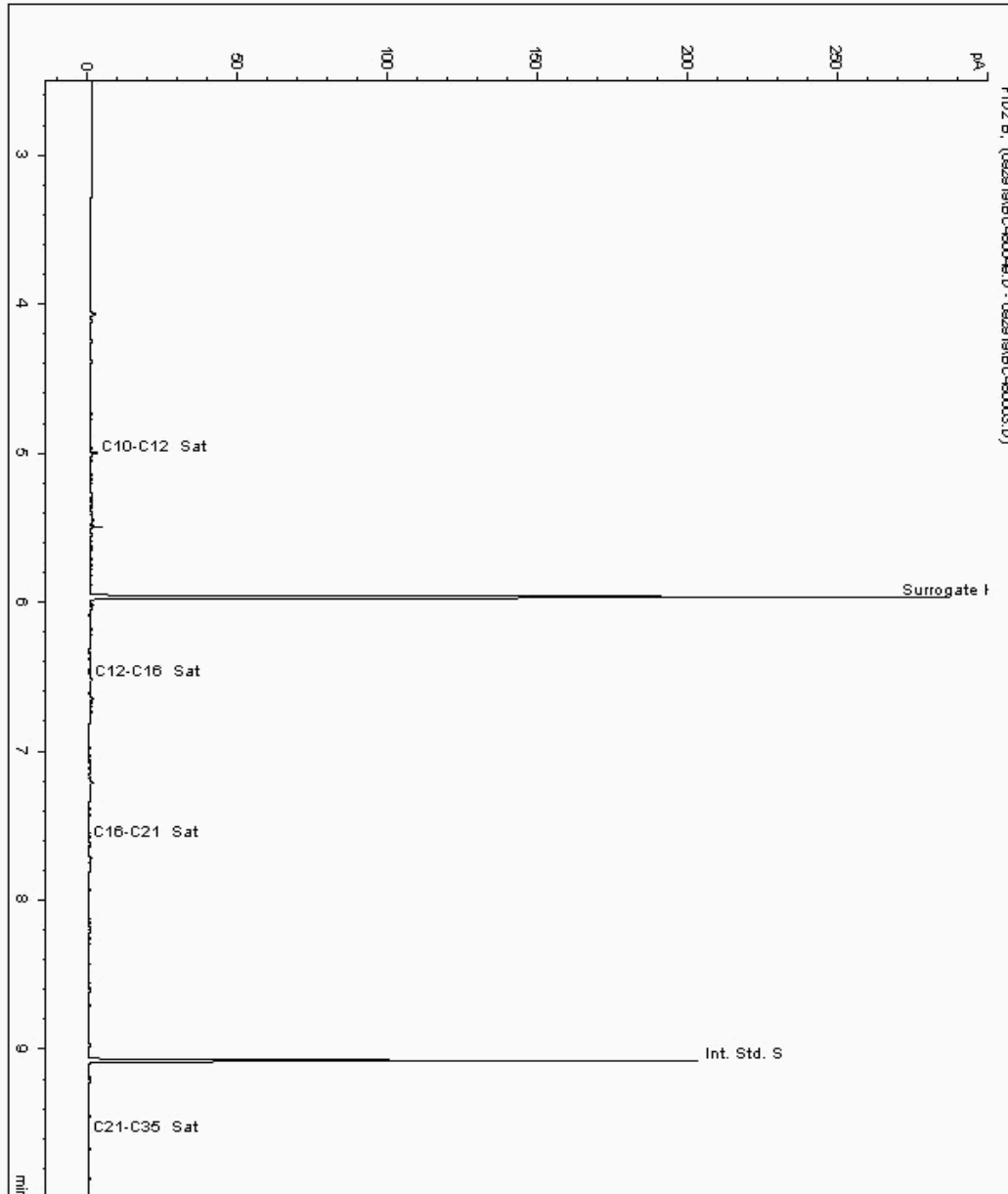
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|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

|           |                                     |             |          |         |             |
|-----------|-------------------------------------|-------------|----------|---------|-------------|
| Analysis: | EPH CWG (Aliphatic) Filtered GC (W) | Sample No : | 20778063 | Depth : | 0.00 - 0.00 |
|           |                                     | Sample ID : | BHH05    |         |             |

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507469-  
Date Acquired : 30/09/2019 06:31:07 PM  
Units : ppb  
Dilution : SE BHH05[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

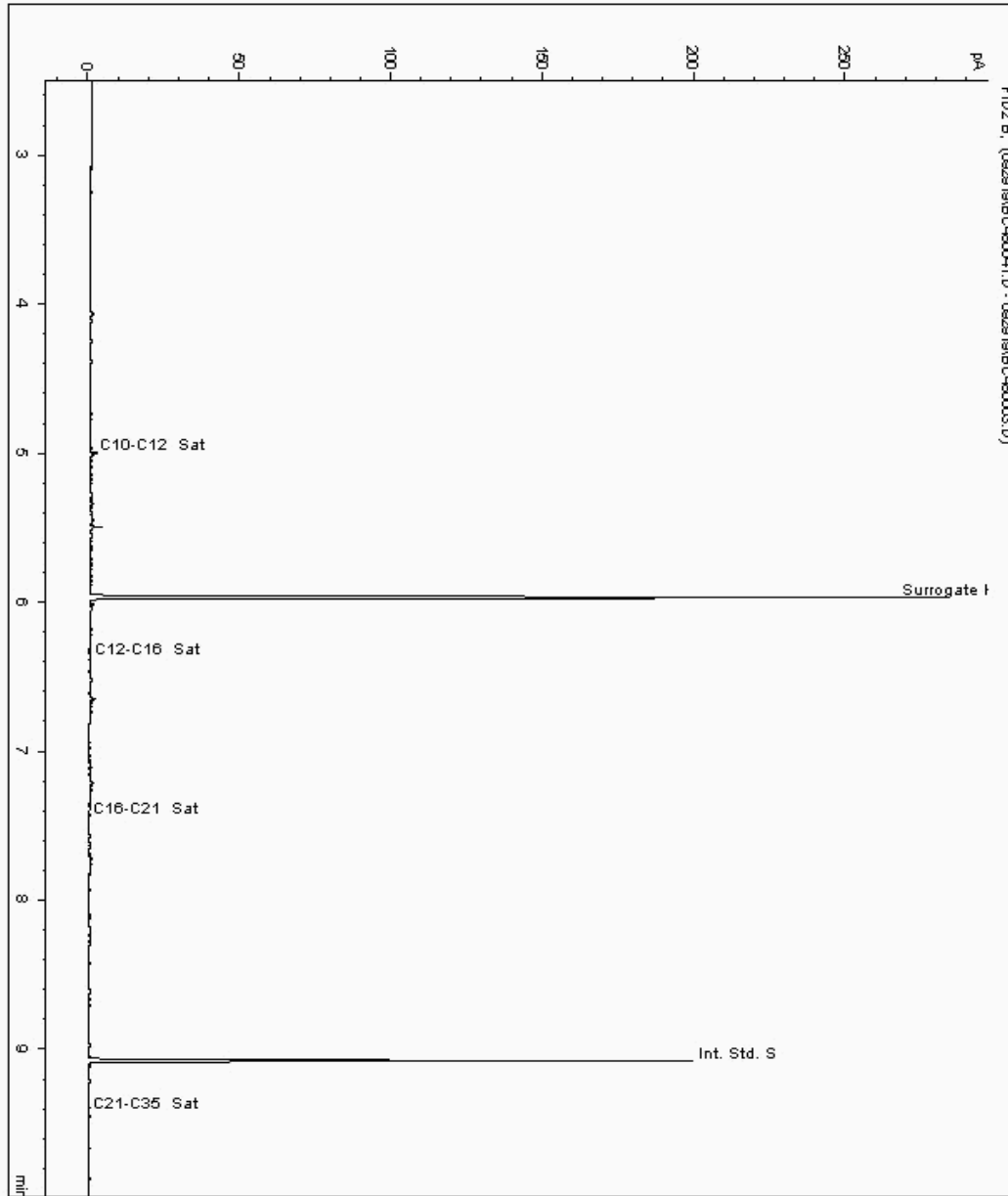
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| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W)      Sample No : 20778069      Depth : 0.00 - 0.00  
Sample ID : BHH07(D) Dup

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507534-  
Date Acquired : 30/09/2019 03:28:50 PM  
Units : ppb  
Dilution : SE BHH07(D) DUP[0.00 - 0.0->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

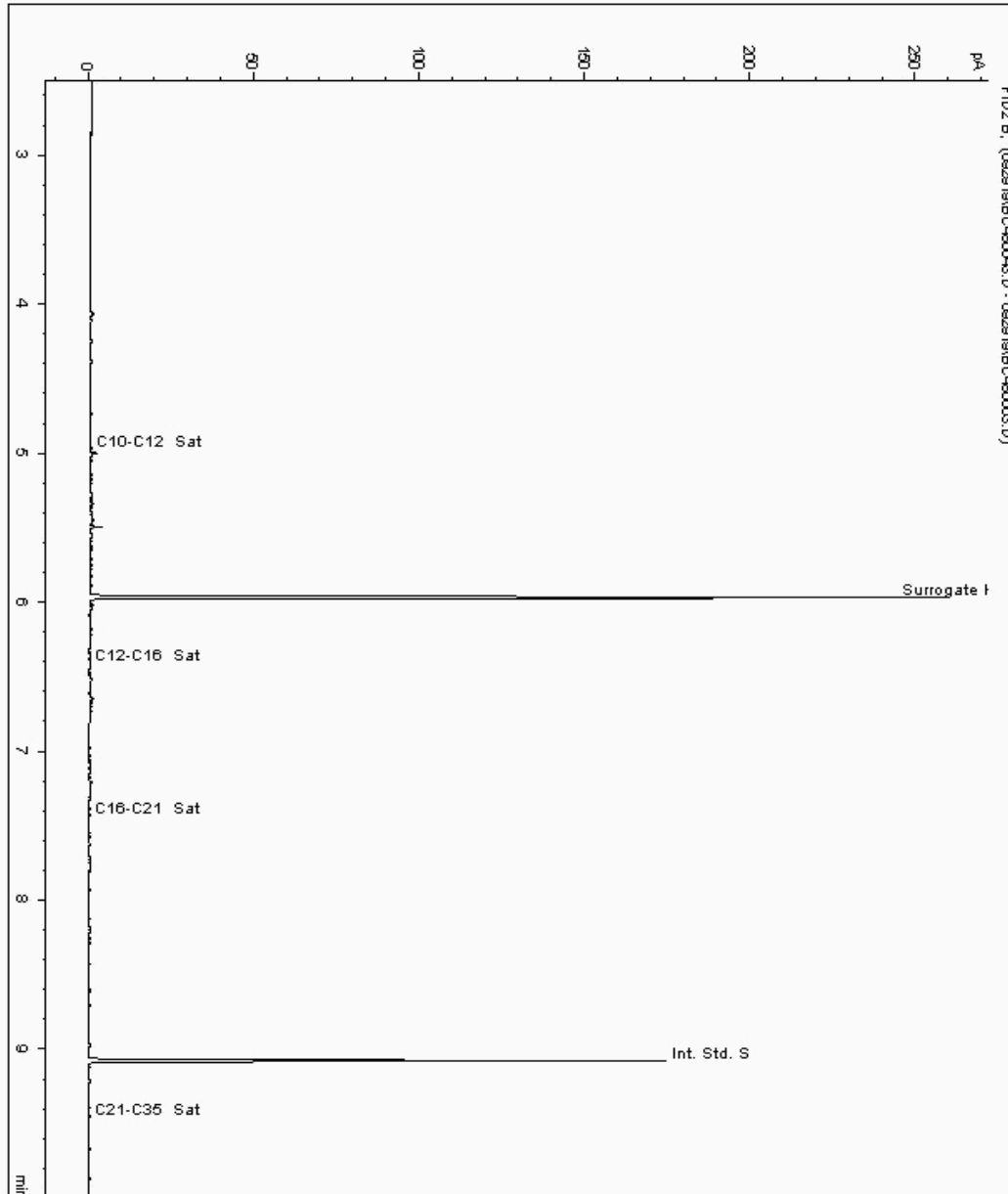
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| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W)      Sample No : 20778074      Depth : 0.00 - 0.00  
Sample ID : BHH07(D)

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507495-  
Date Acquired : 30/09/2019 04:14:44 PM  
Units : ppb  
Dilution : SE BHH07(D)[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

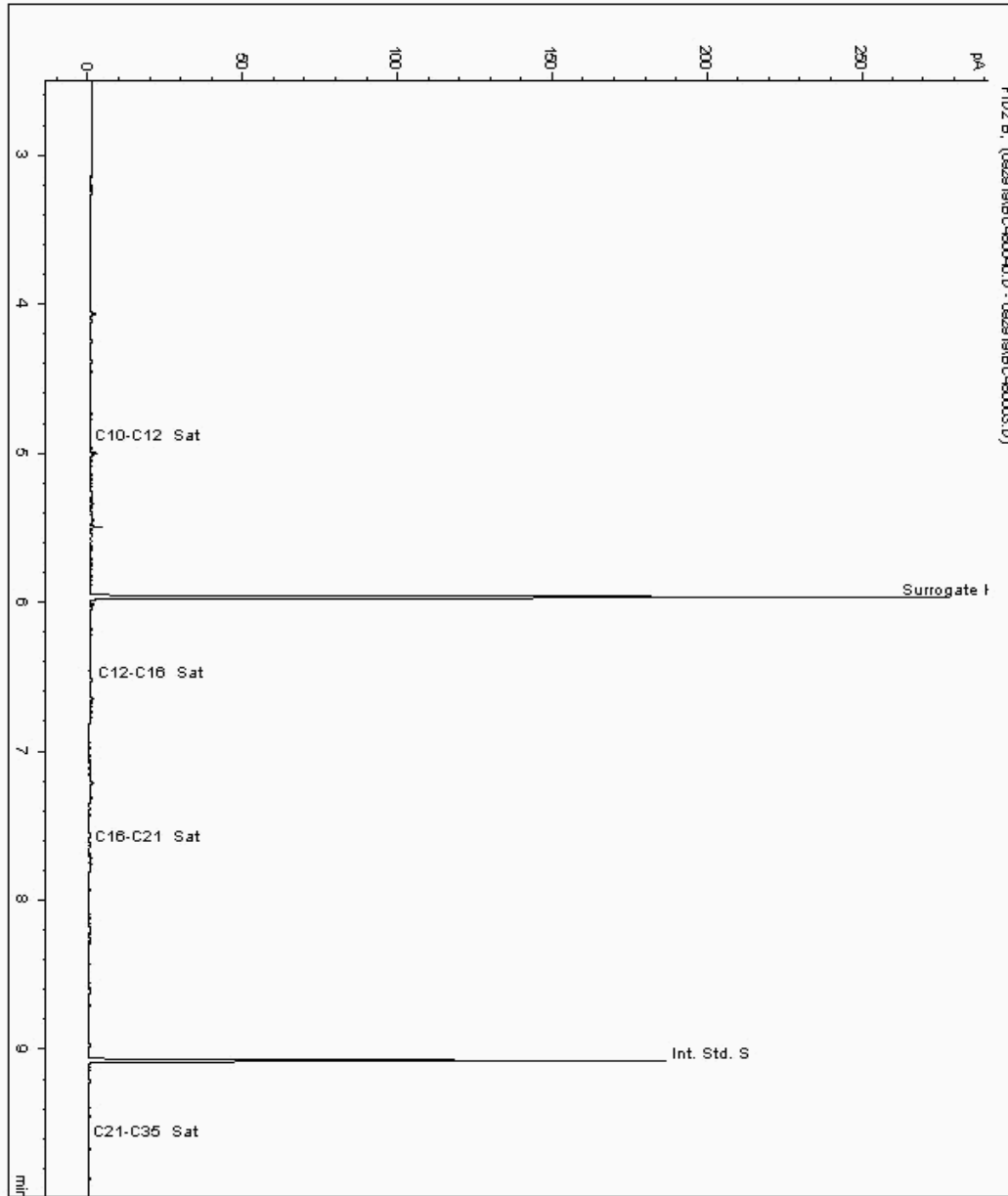
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| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W)      Sample No : 20778112      Depth : 0.00 - 0.00  
Sample ID : BHH03

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507640-  
Date Acquired : 30/09/2019 05:00:35 PM  
Units : ppb  
Dilution : SE BHH03[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

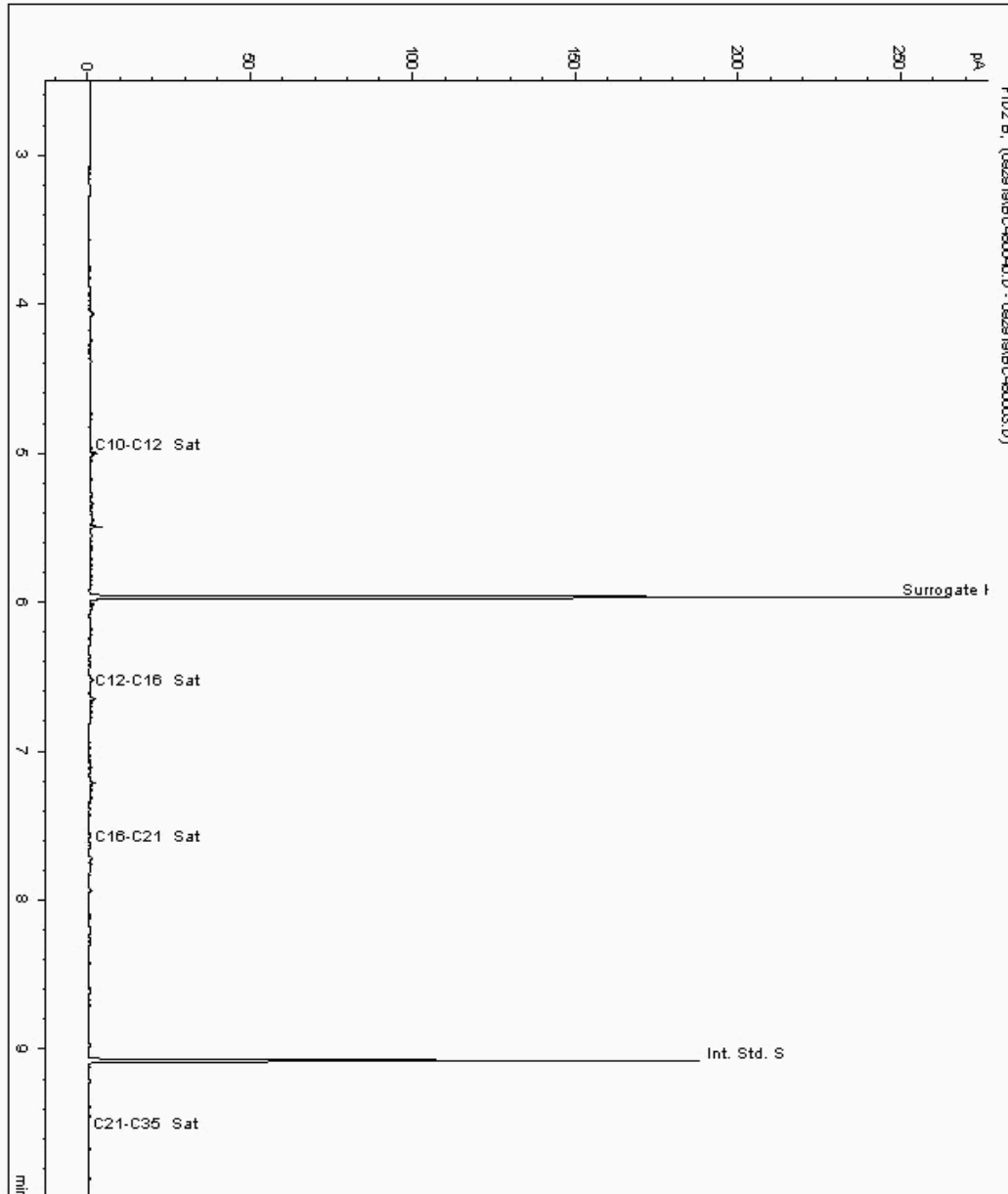
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W)      Sample No : 20778126      Depth : 0.00 - 0.00  
Sample ID : BHH02(D)

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507627-  
Date Acquired : 30/09/2019 05:23:08 PM  
Units : ppb  
Dilution : SE BHH02(D)[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

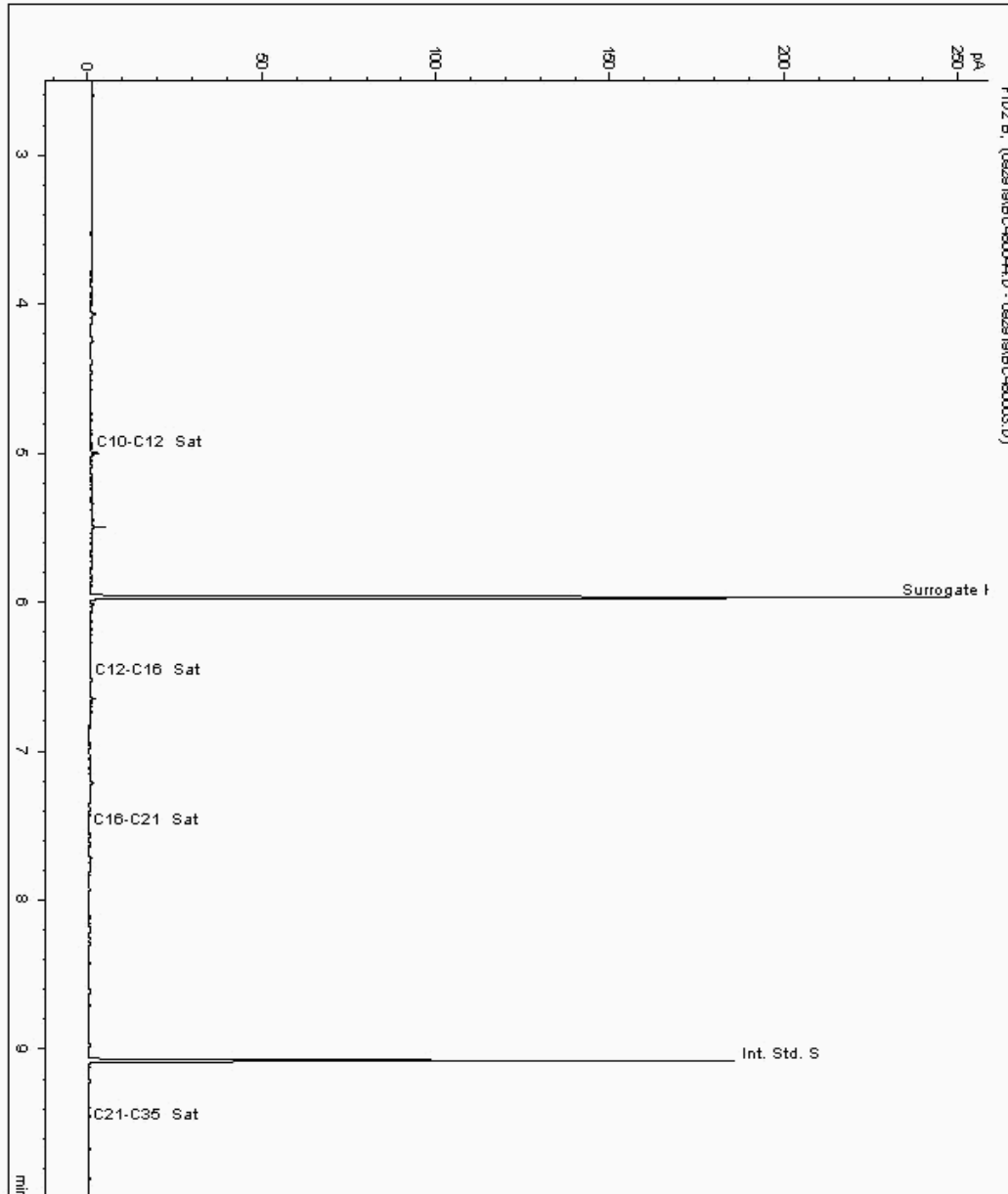
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W)      Sample No : 20778136      Depth : 0.00 - 0.00  
Sample ID : BH103

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507562-  
Date Acquired : 30/09/2019 04:37:34 PM  
Units : ppb  
Dilution : SE BH103[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

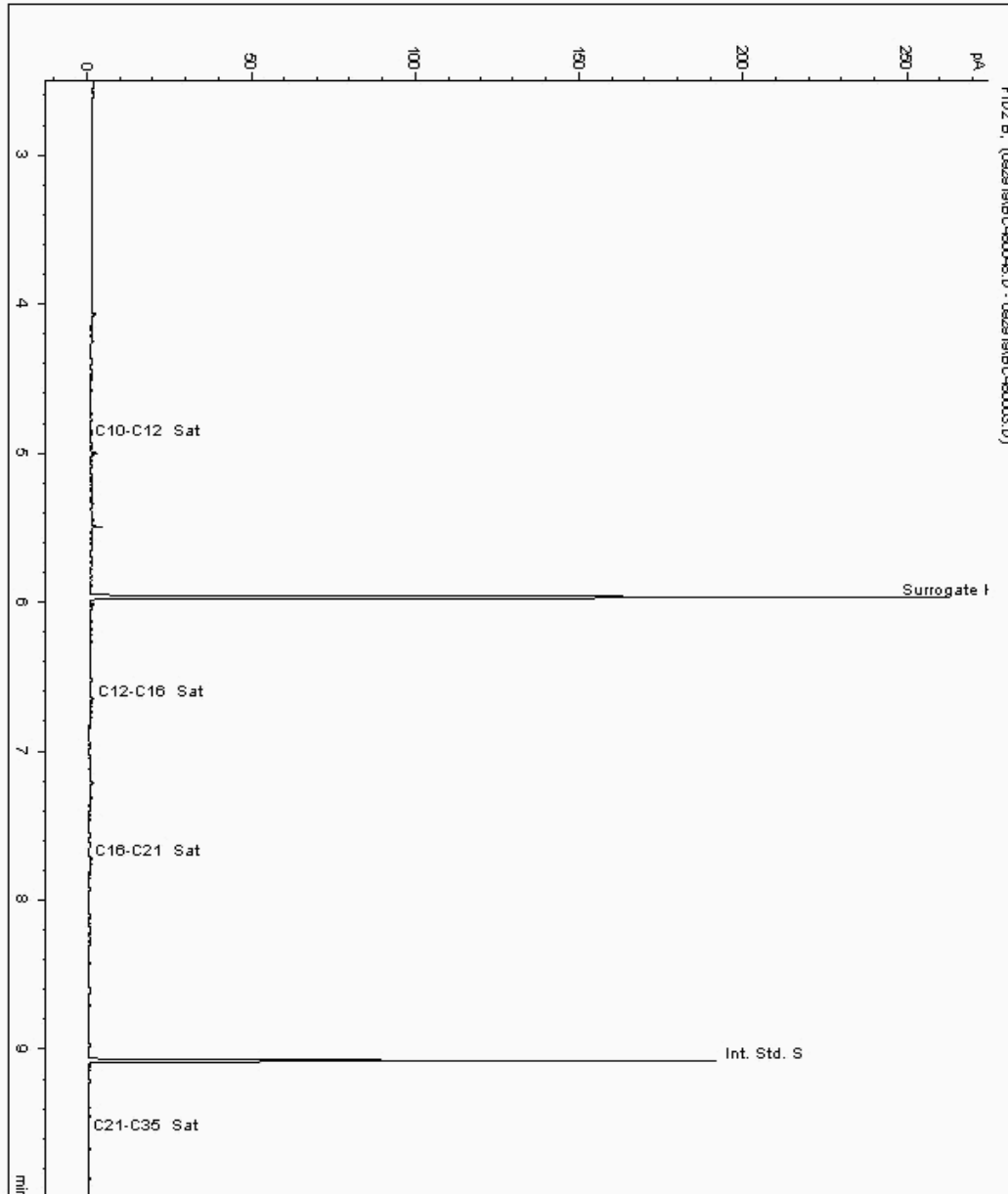
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

|           |                                     |             |          |         |             |
|-----------|-------------------------------------|-------------|----------|---------|-------------|
| Analysis: | EPH CWG (Aliphatic) Filtered GC (W) | Sample No : | 20778142 | Depth : | 0.00 - 0.00 |
|           |                                     | Sample ID : | BHH02(S) |         |             |

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507614-  
Date Acquired : 30/09/2019 06:08:37 PM  
Units : ppb  
Dilution : SE BHH02(S)[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

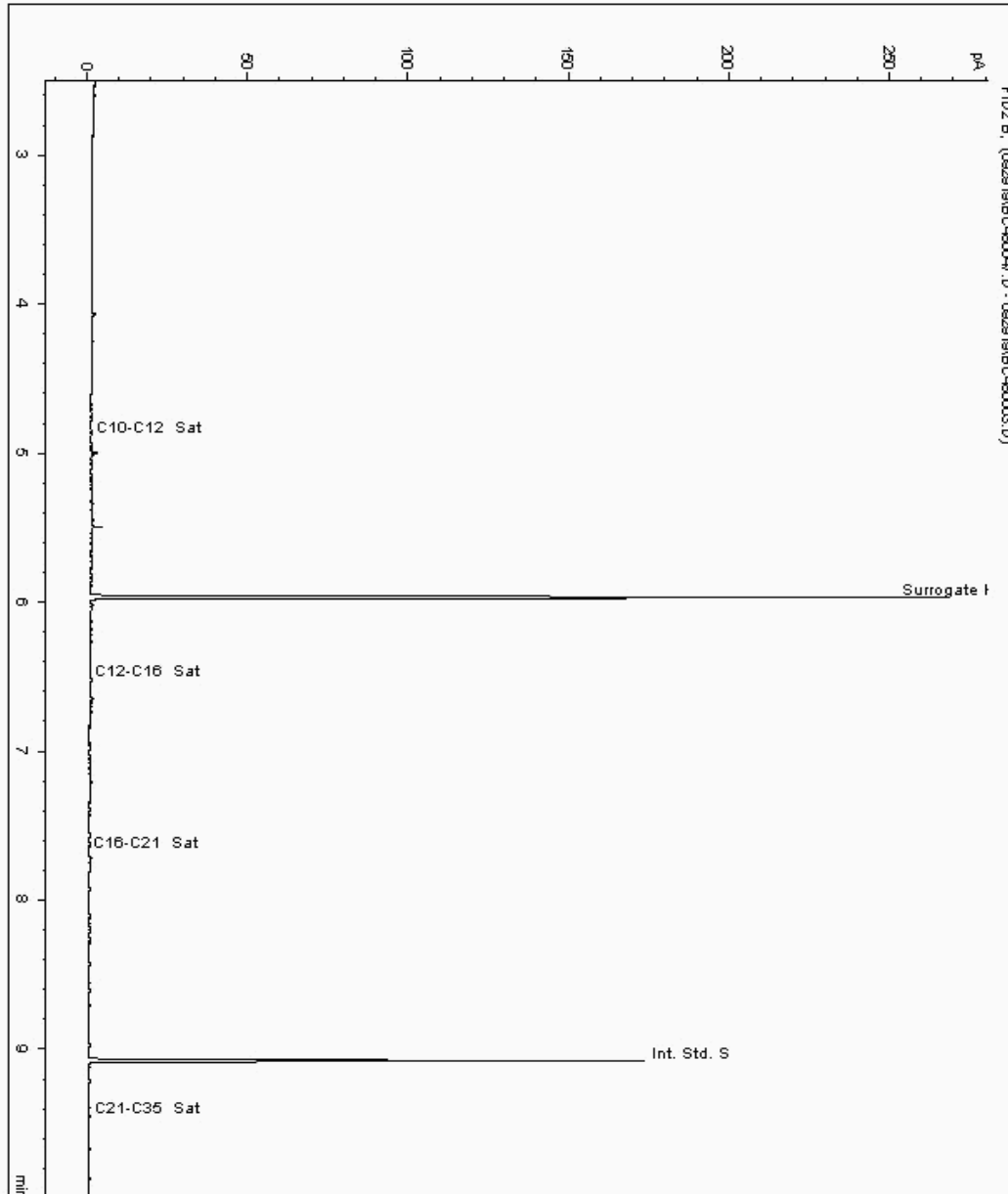
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W)      Sample No : 20778148      Depth : 0.00 - 0.00  
Sample ID : BH101

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 19507456-  
Date Acquired : 30/09/2019 05:45:44 PM  
Units : ppb  
Dilution : SE BH101[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

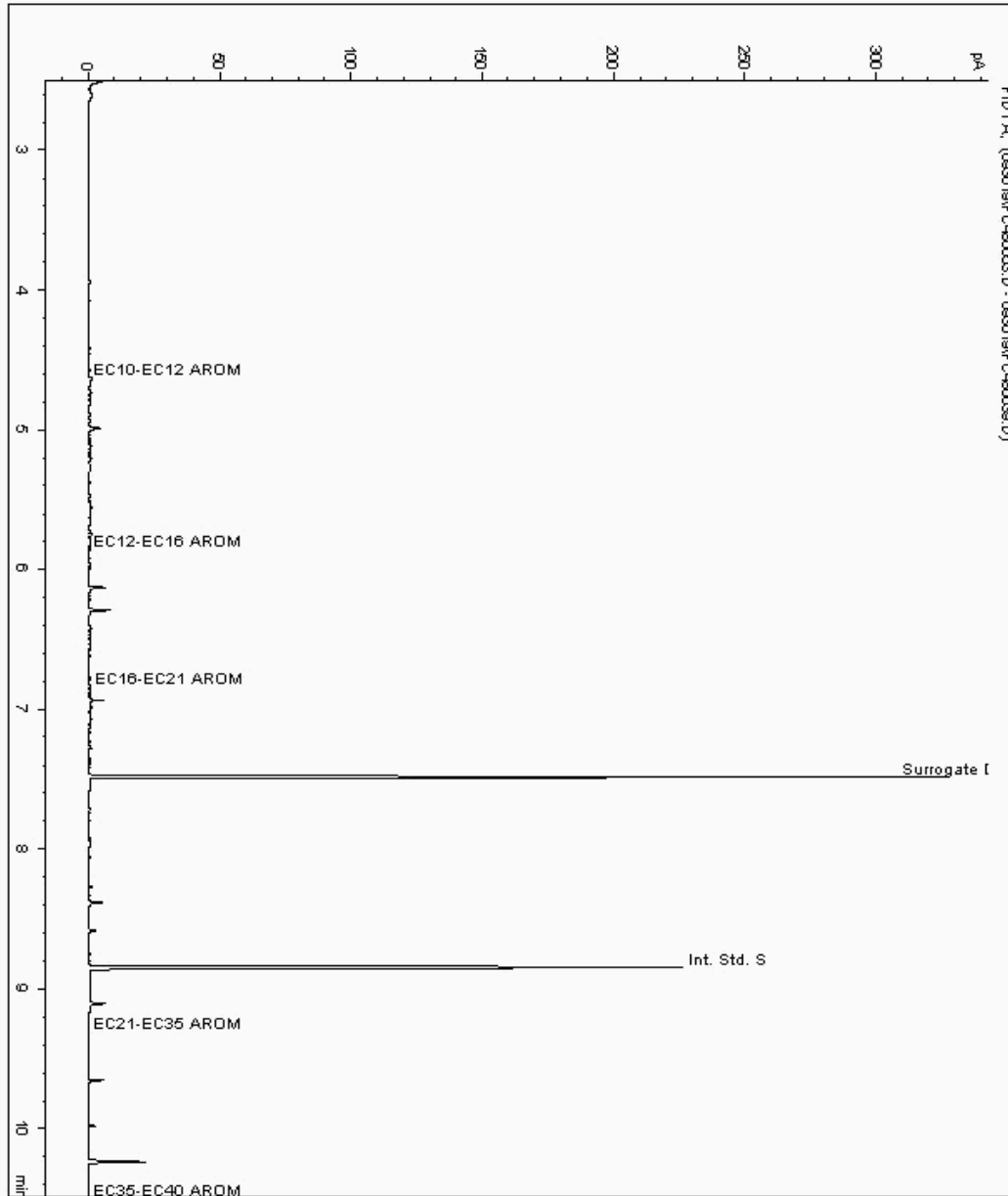
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20776828  
Sample ID : BH107

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507602-  
Date Acquired : 01/10/2019 10:03:06 PM  
Units : ppb  
Dilution : SE BH107[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

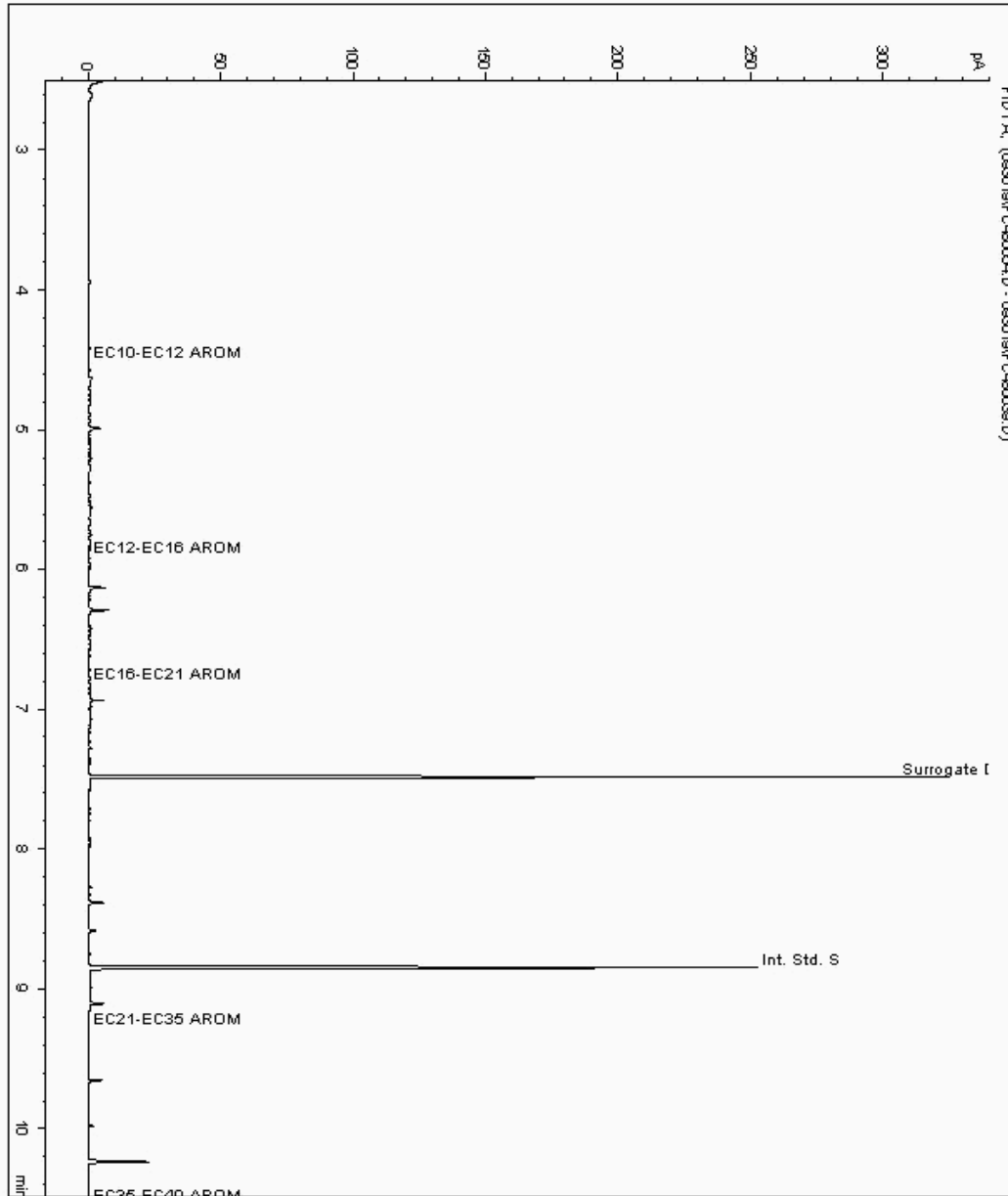
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20776832  
Sample ID : BH106

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507589-  
Date Acquired : 01/10/2019 10:24:09 PM  
Units : ppb  
Dilution : SE BH106[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

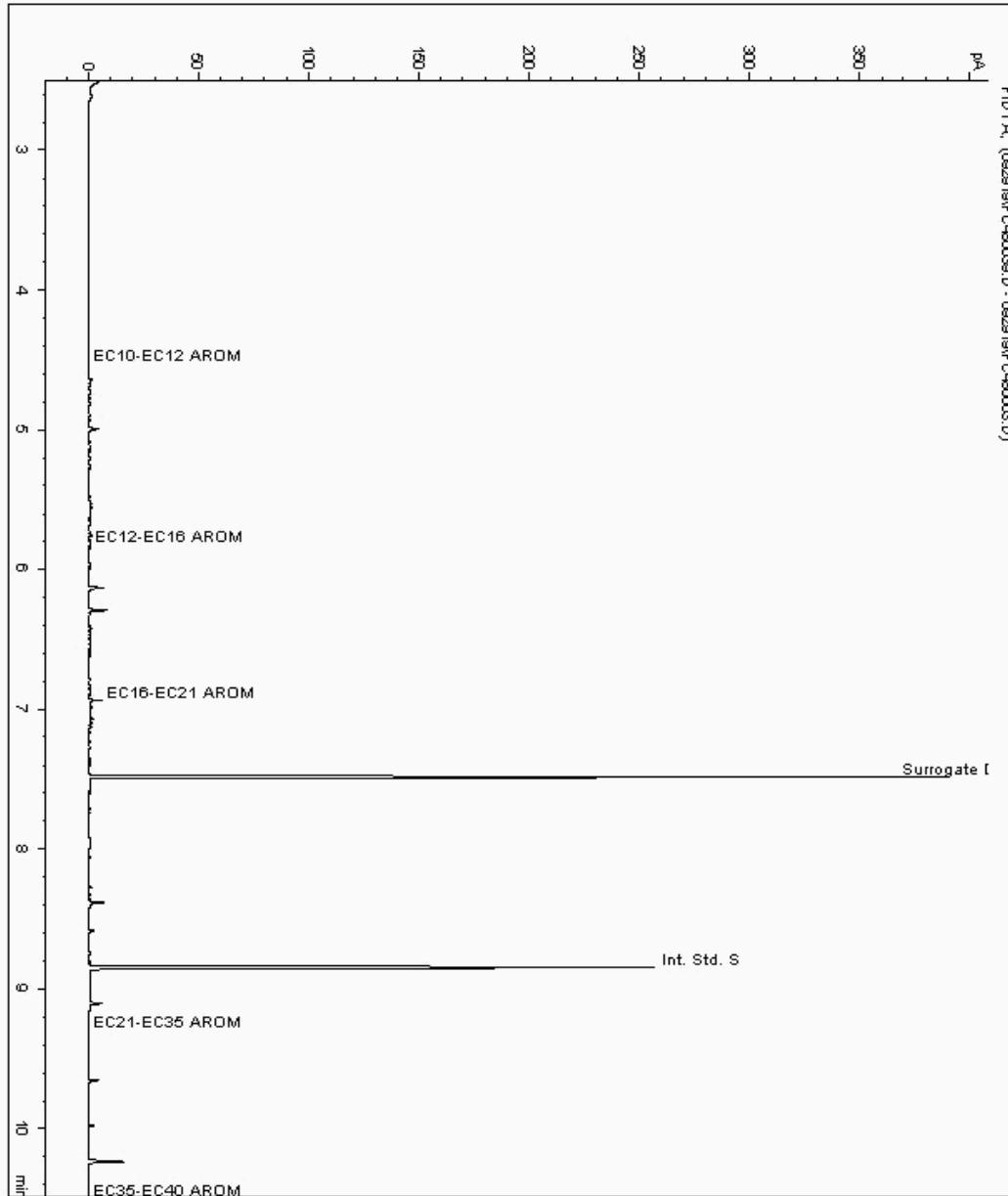
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aromatic) Filtered GC (W)      Sample No : 20778040      Depth : 0.00 - 0.00  
Sample ID : BH102

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507550-  
Date Acquired : 30/09/2019 02:43:07 PM  
Units : ppb  
Dilution : SE BH102[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

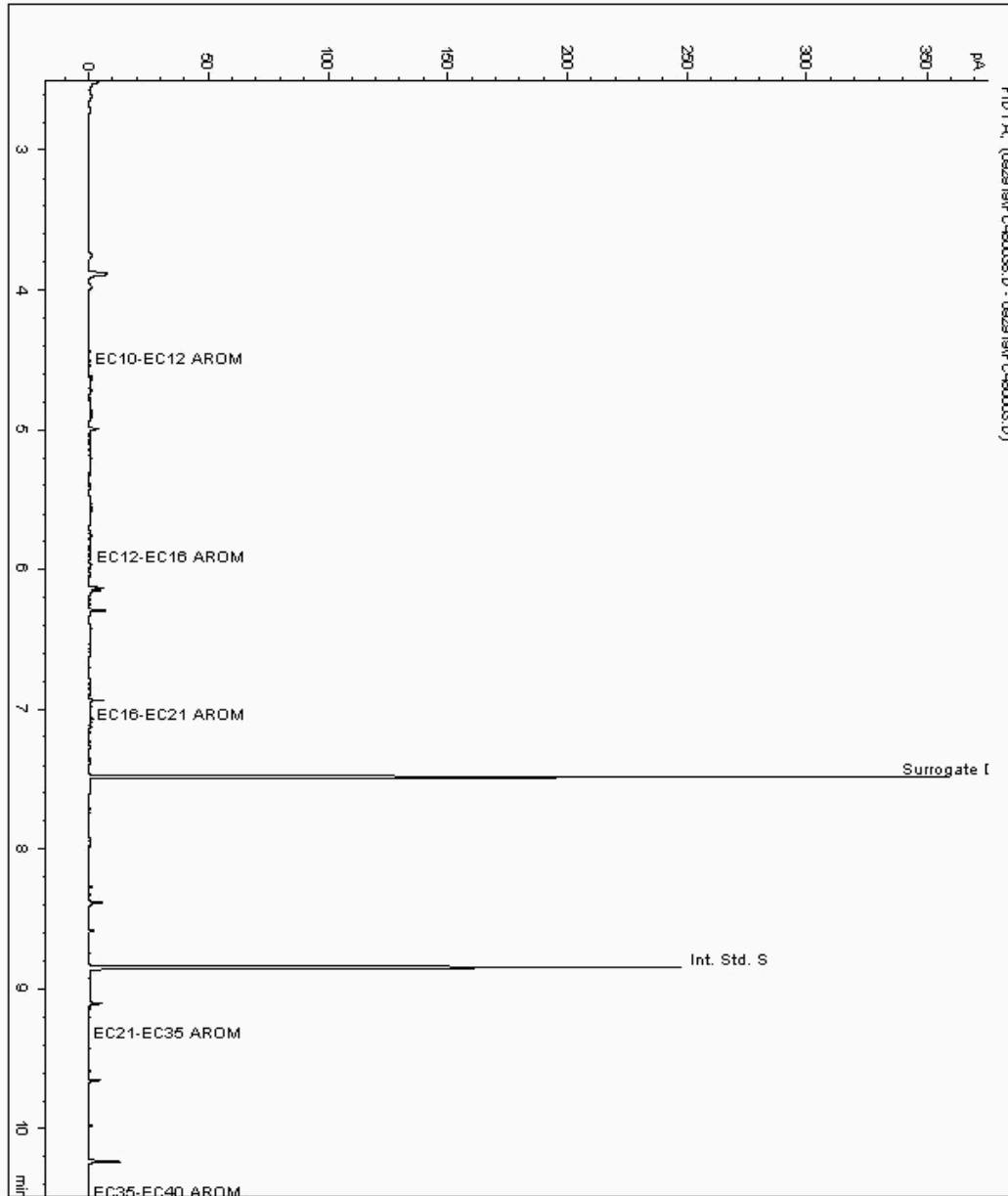
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20778046  
Sample ID : BH105A

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507576-  
Date Acquired : 30/09/2019 02:20:00 PM  
Units : ppb  
Dilution : SE BH105A[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

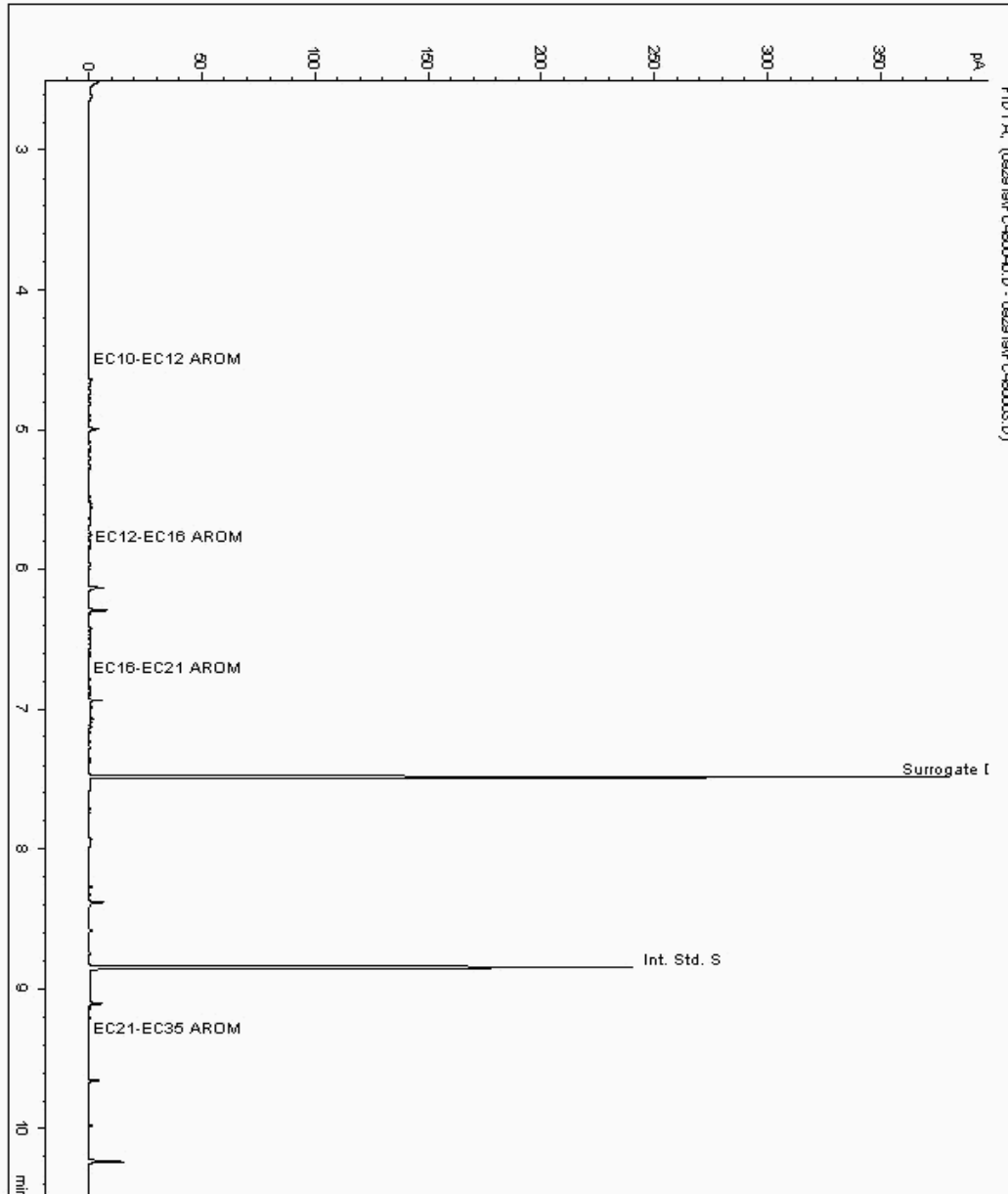
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aromatic) Filtered GC (W)      Sample No : 20778054      Depth : 0.00 - 0.00  
Sample ID : BHH07(S)

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507483-  
Date Acquired : 30/09/2019 03:05:59 PM  
Units : ppb  
Dilution : SE BHH07(S)[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

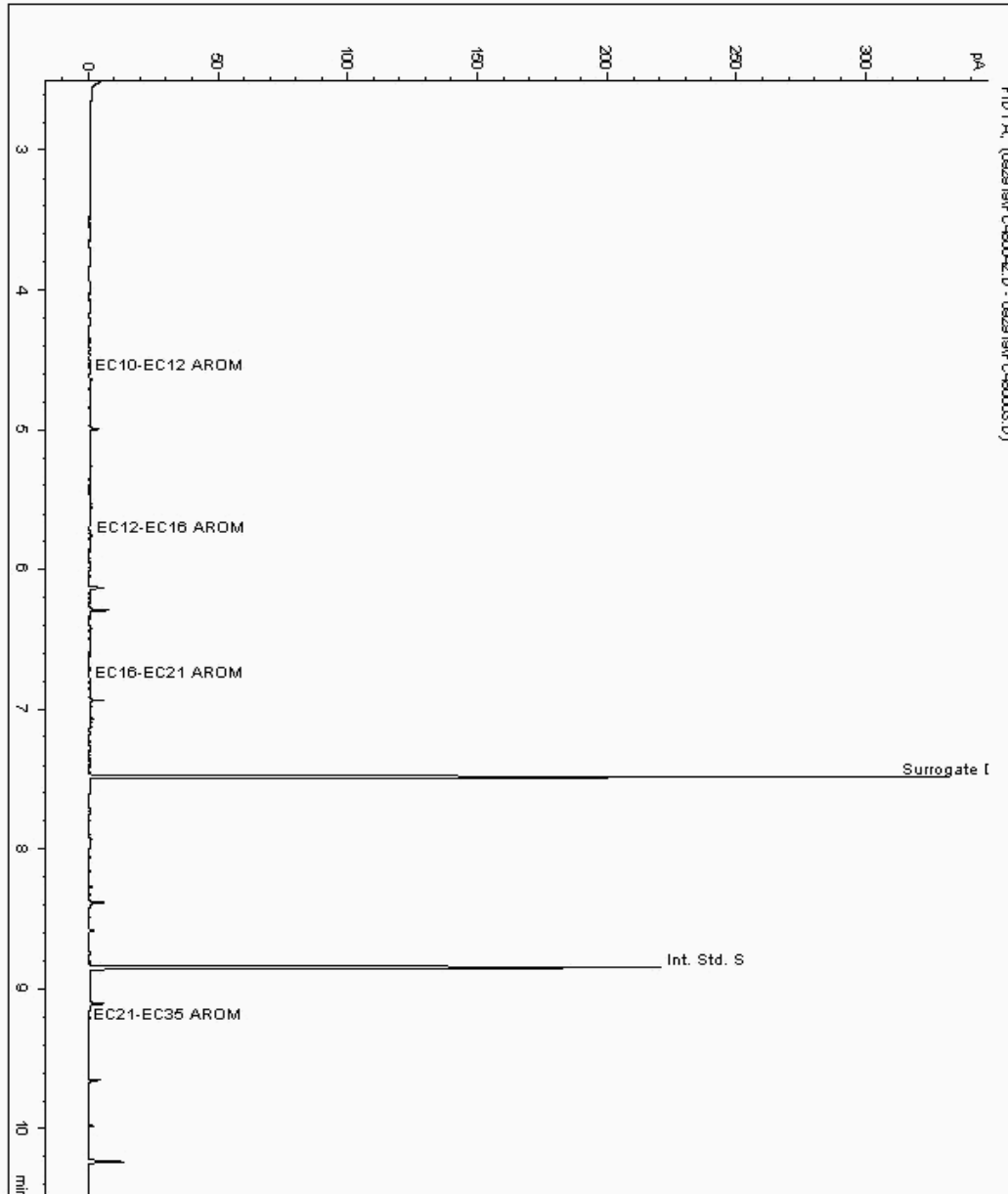
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20778058  
Sample ID : MW1

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507509-  
Date Acquired : 30/09/2019 03:51:54 PM  
Units : ppb  
Dilution : SE MW1[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25  
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2  
Order Number: 62253048-GI2

Report Number: 523853  
Superseded Report: 523696

## Chromatogram

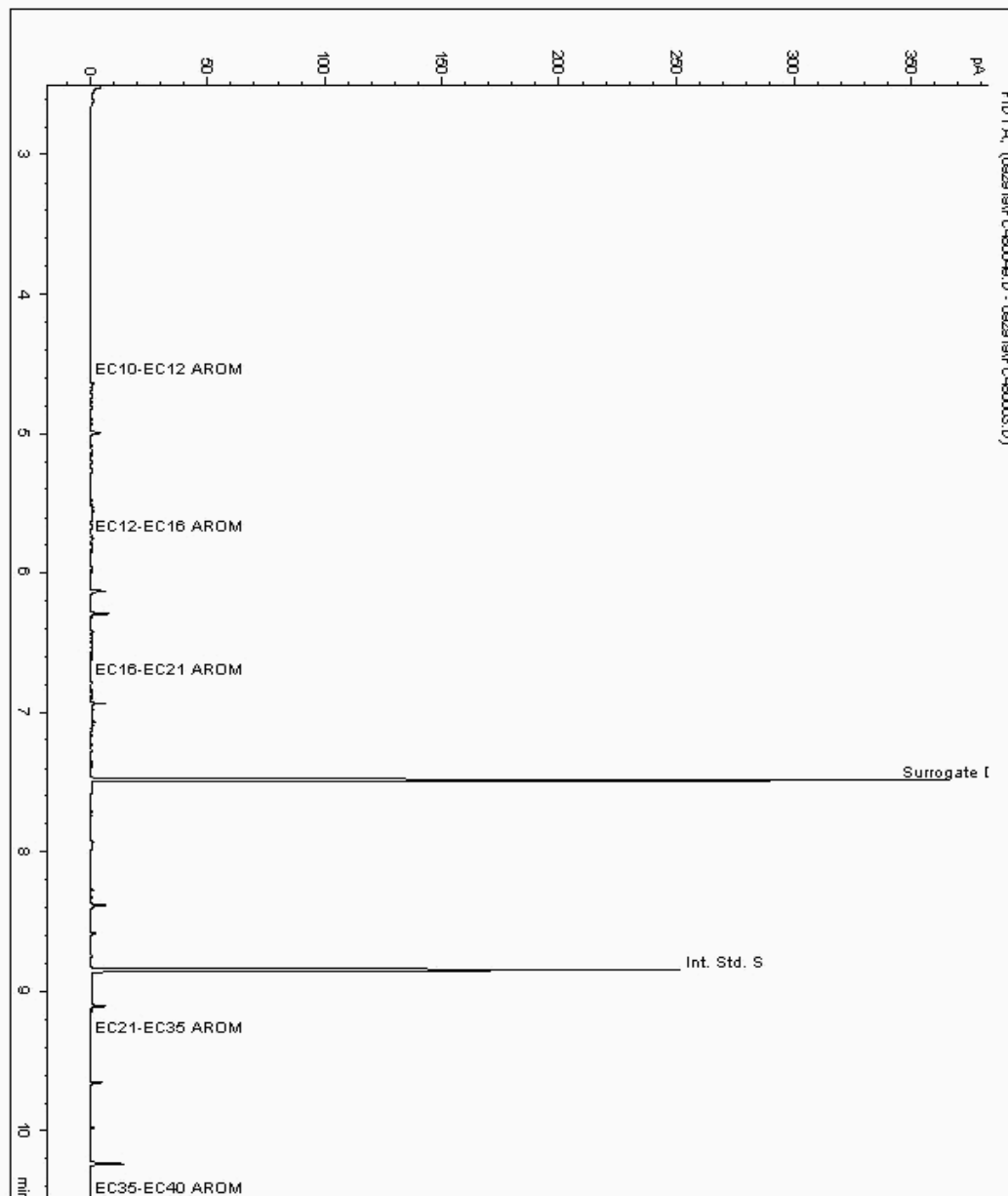
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20778063  
Sample ID : BHH05

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507470-  
Date Acquired : 30/09/2019 06:31:07 PM  
Units : ppb  
Dilution : SE BHH05[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

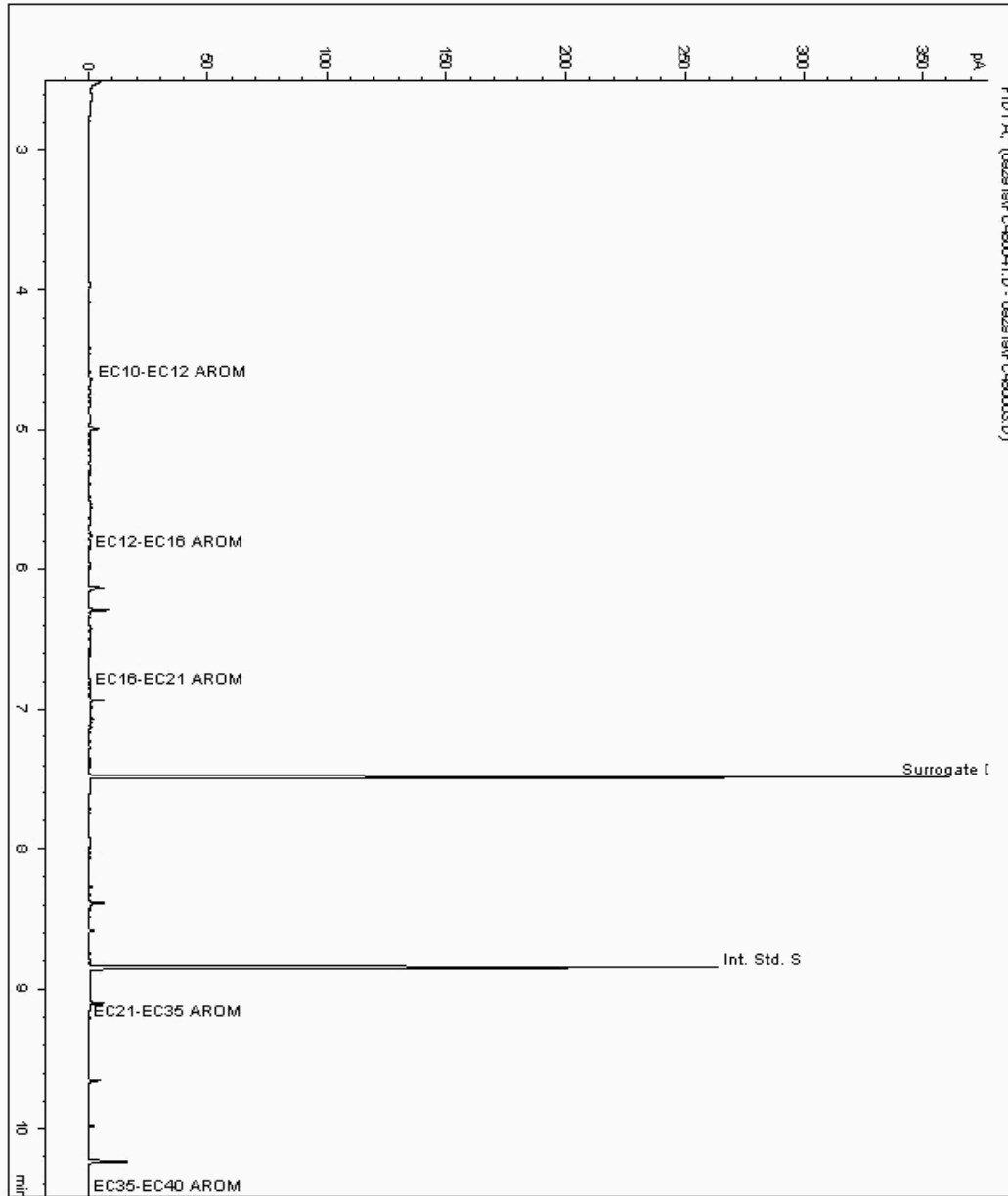
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aromatic) Filtered GC (W) Sample No : 20778069 Depth : 0.00 - 0.00  
Sample ID : BHH07(D) Dup

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507535-  
Date Acquired : 30/09/2019 03:28:50 PM  
Units : ppb  
Dilution : SE BHH07(D) DUP[0.00 - 0.0->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

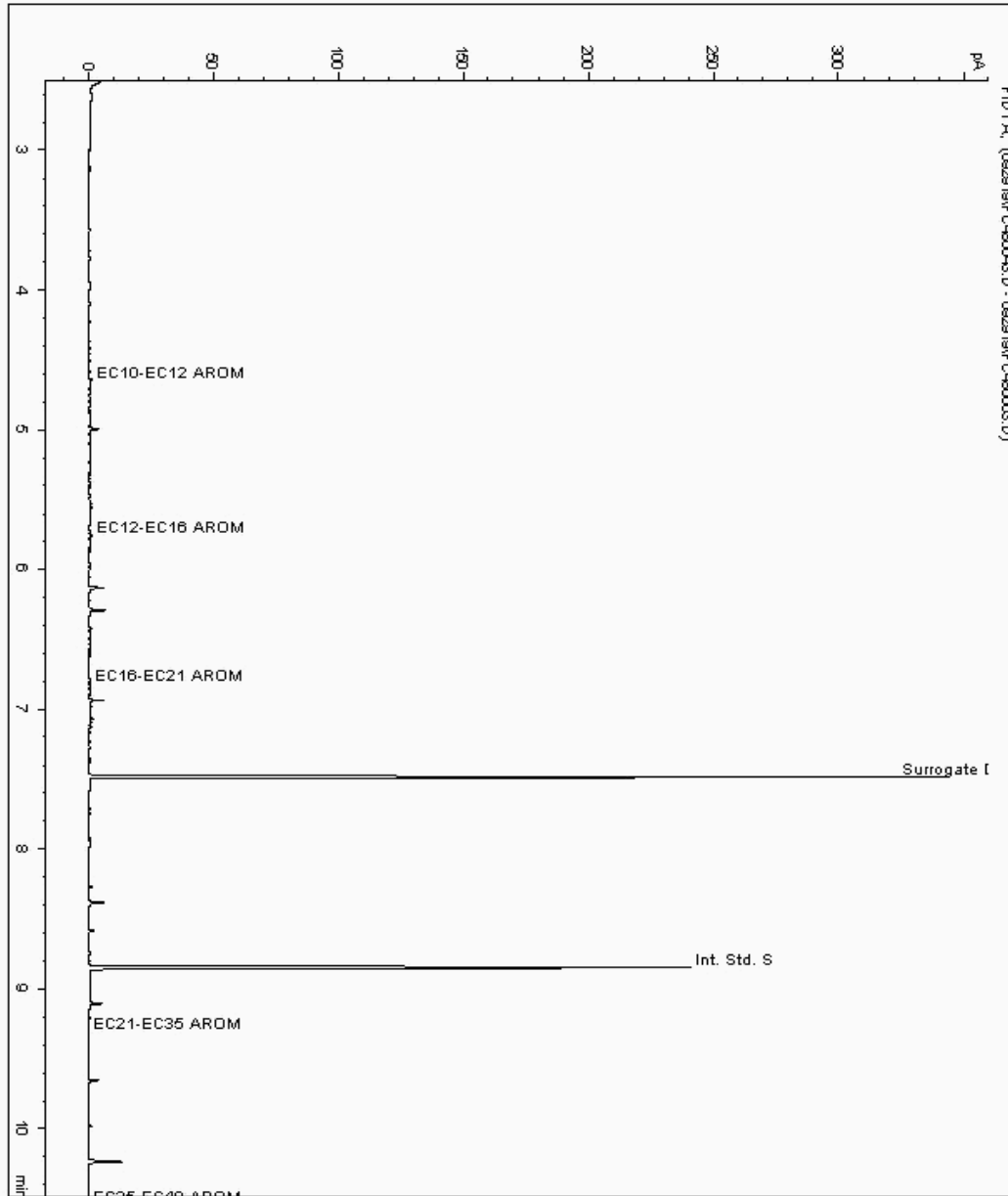
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20778074  
Sample ID : BHH07(D)

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507496-  
Date Acquired : 30/09/2019 04:14:44 PM  
Units : ppb  
Dilution : SE BHH07(D)[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

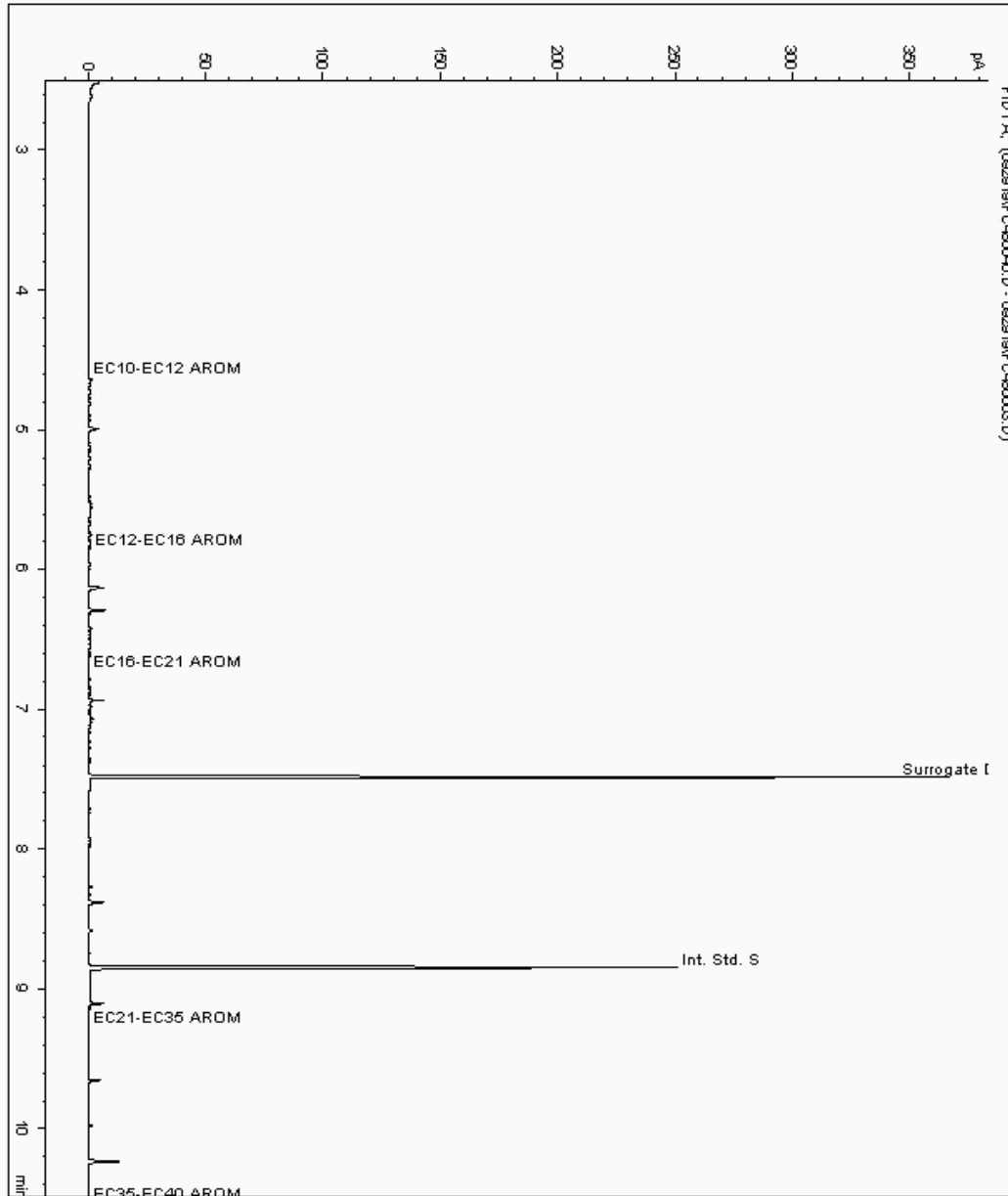
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20778112  
Sample ID : BHH03

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507641-  
Date Acquired : 30/09/2019 05:00:35 PM  
Units : ppb  
Dilution : SE BHH03[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

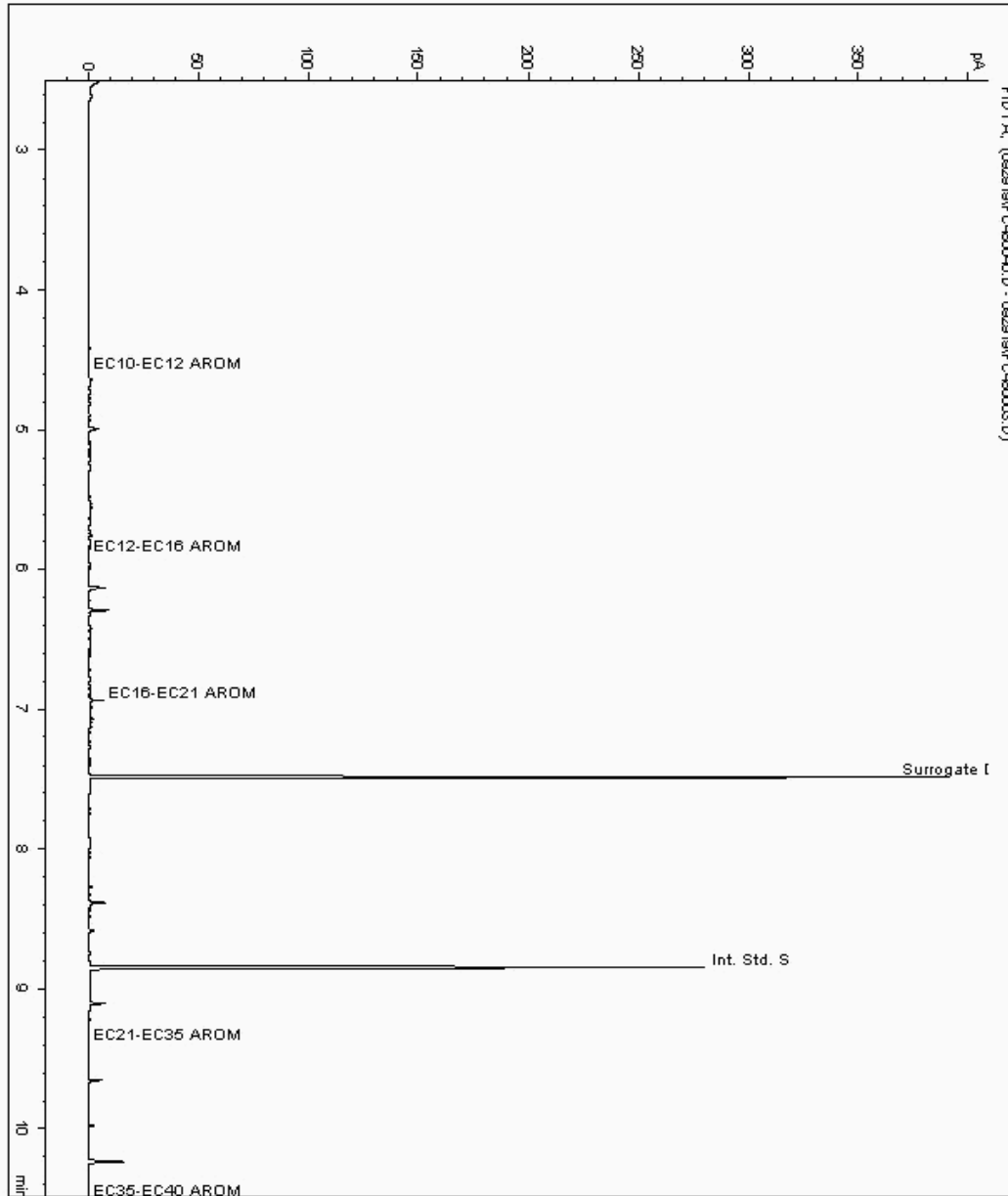
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20778126  
Sample ID : BHH02(D)

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507628-  
Date Acquired : 30/09/2019 05:23:08 PM  
Units : ppb  
Dilution : SE BHH02(D)[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

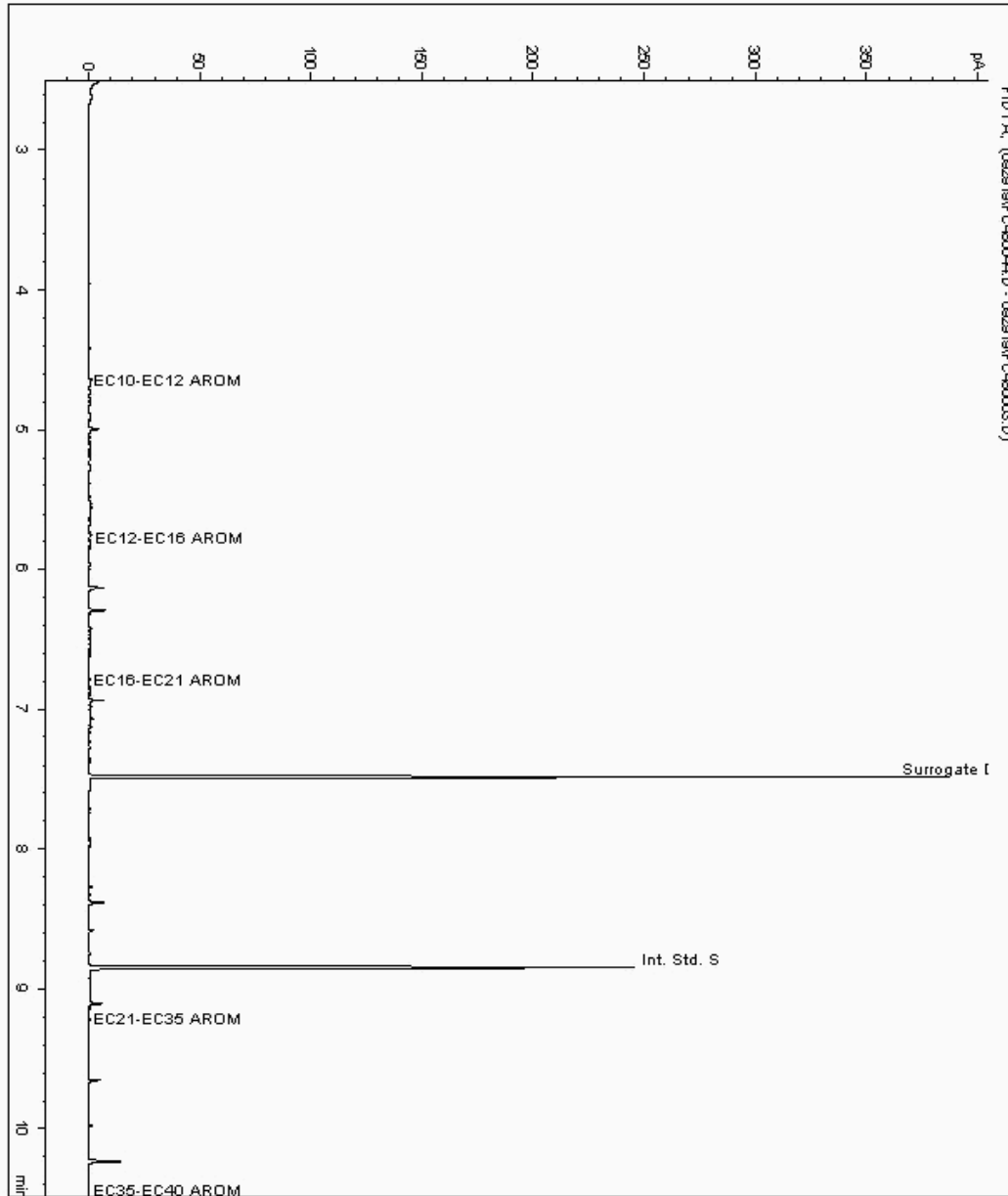
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20778136  
Sample ID : BH103

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507563-  
Date Acquired : 30/09/2019 04:37:34 PM  
Units : ppb  
Dilution : SE BH103[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

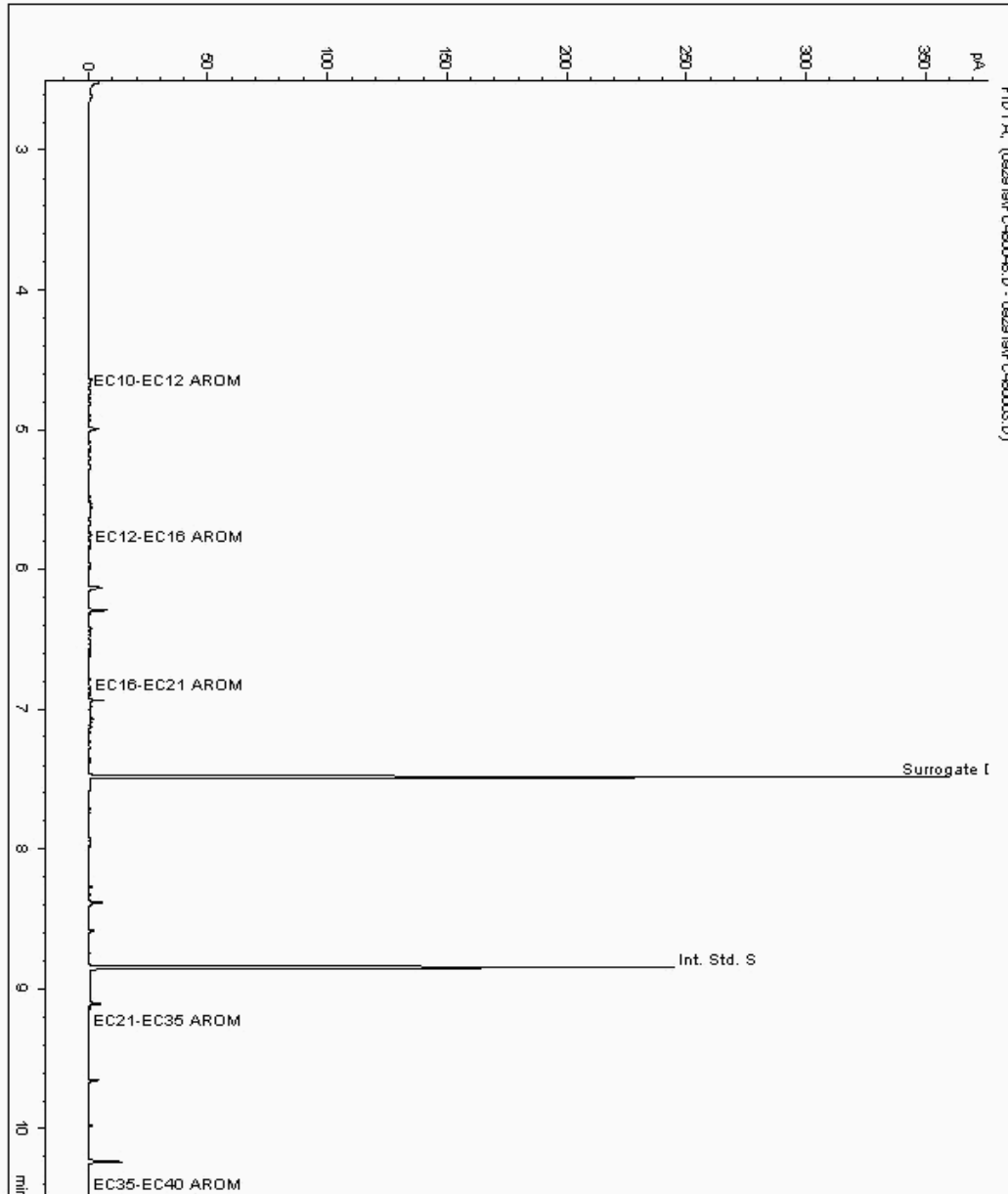
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: EPH CWG (Aromatic) Filtered GC (W)      Sample No : 20778142      Depth : 0.00 - 0.00  
Sample ID : BHH02(S)

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507615-  
Date Acquired : 30/09/2019 06:08:37 PM  
Units : ppb  
Dilution : SE BHH02(S)[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

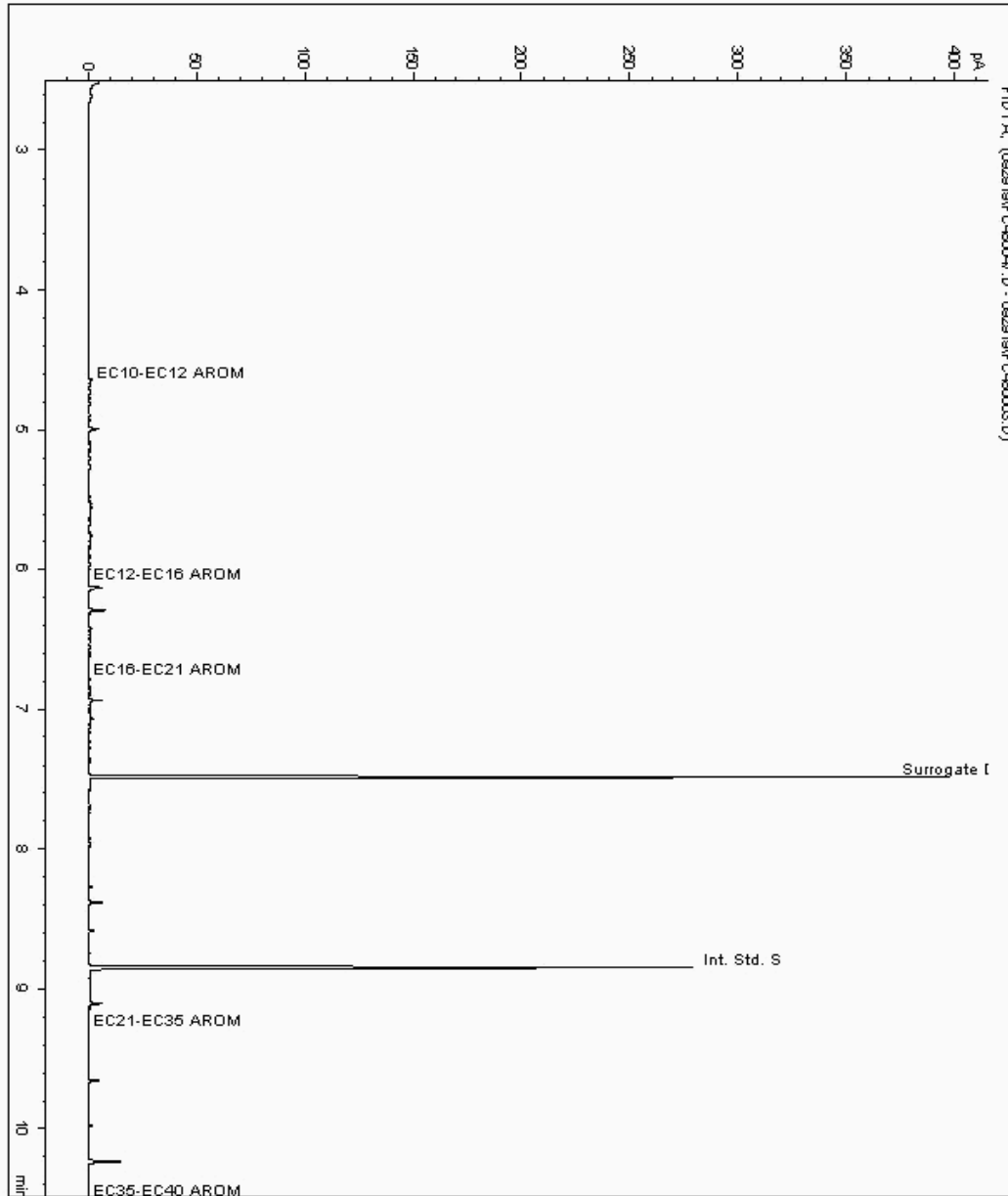
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20778148  
Sample ID : BH101

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 19507457-  
Date Acquired : 30/09/2019 05:45:44 PM  
Units : ppb  
Dilution : SE BH101[0.00 - 0.00] ->  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

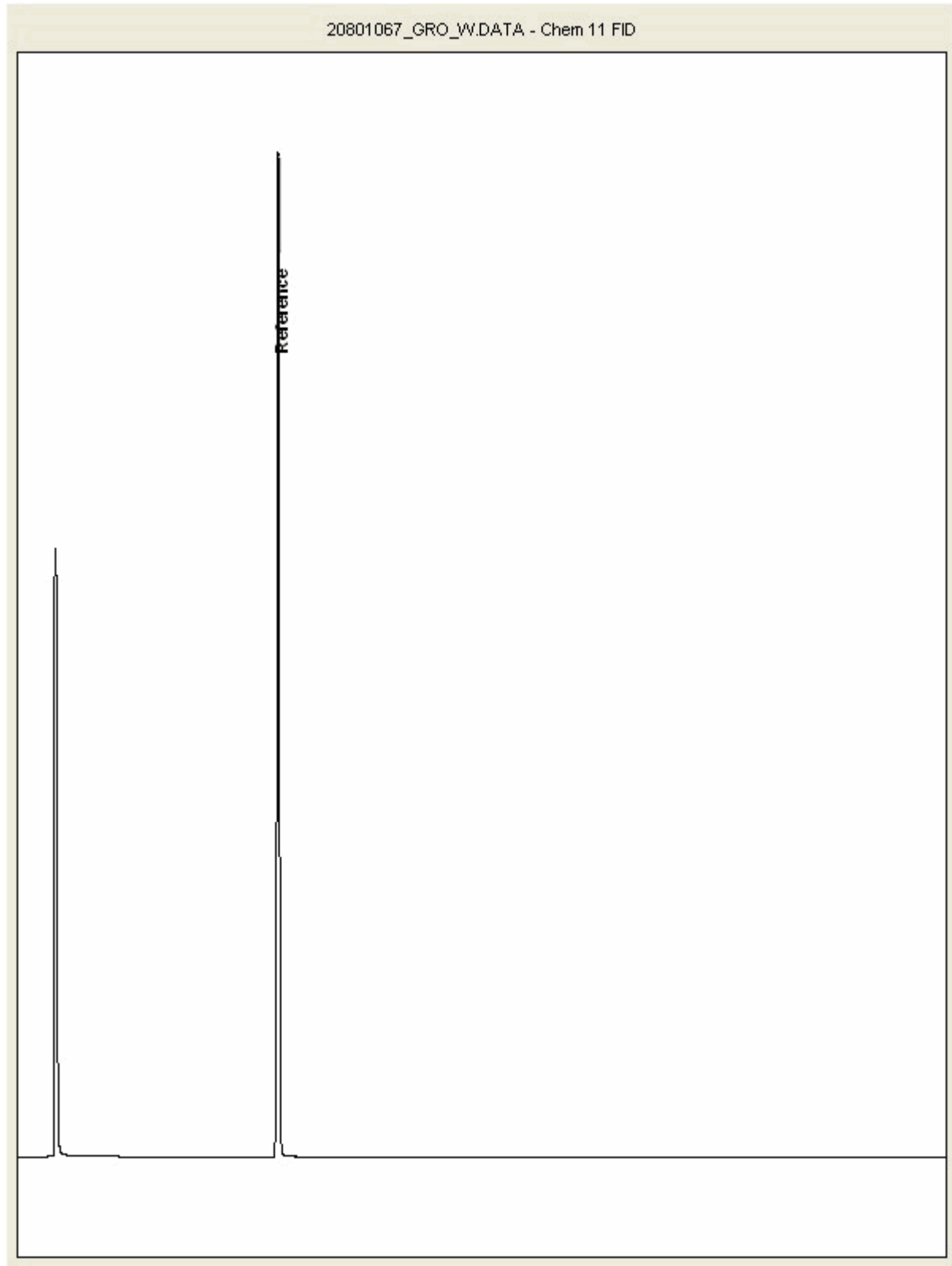
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801067  
Sample ID : BH106

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

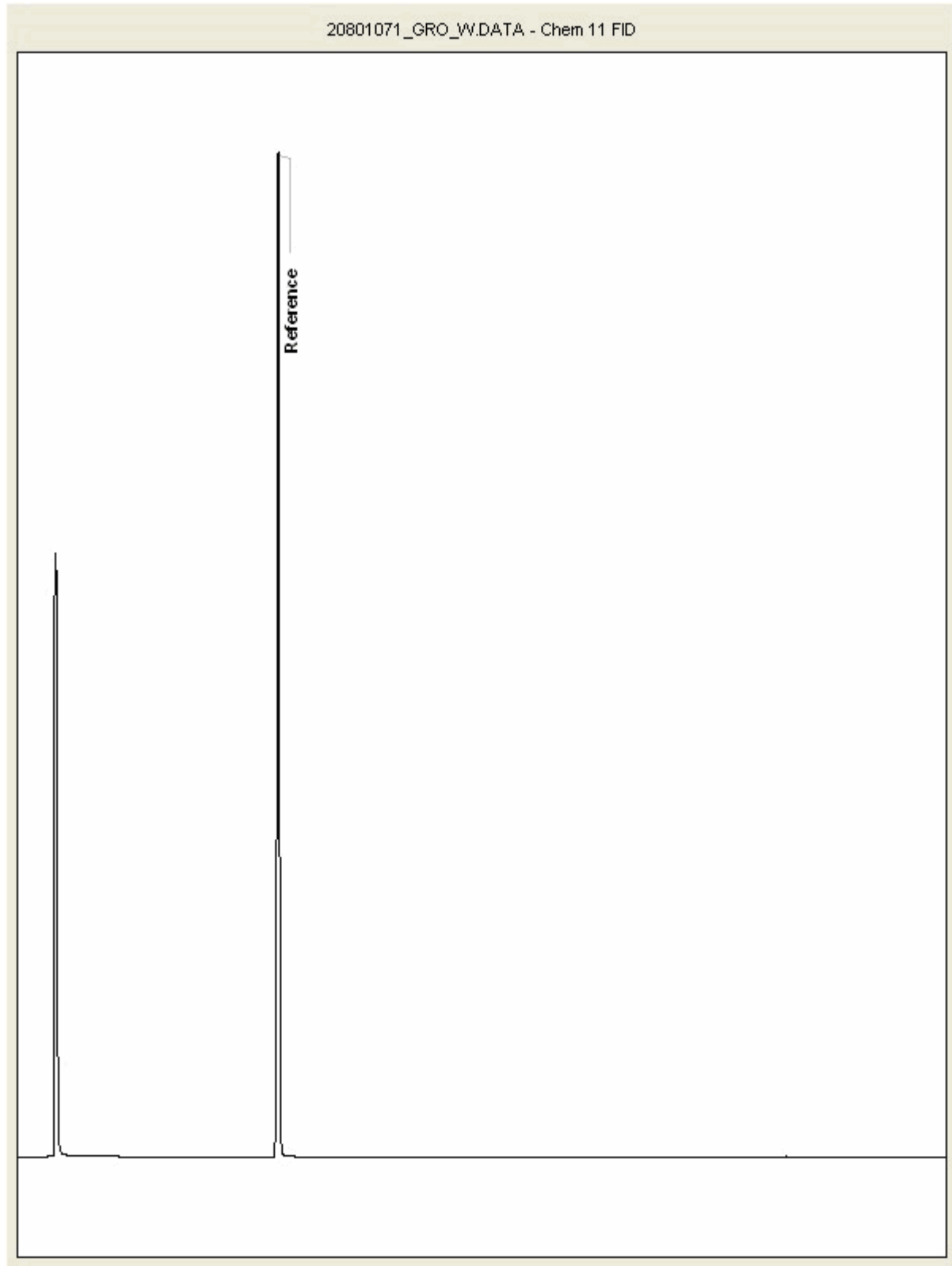
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801071  
Sample ID : BHH03

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

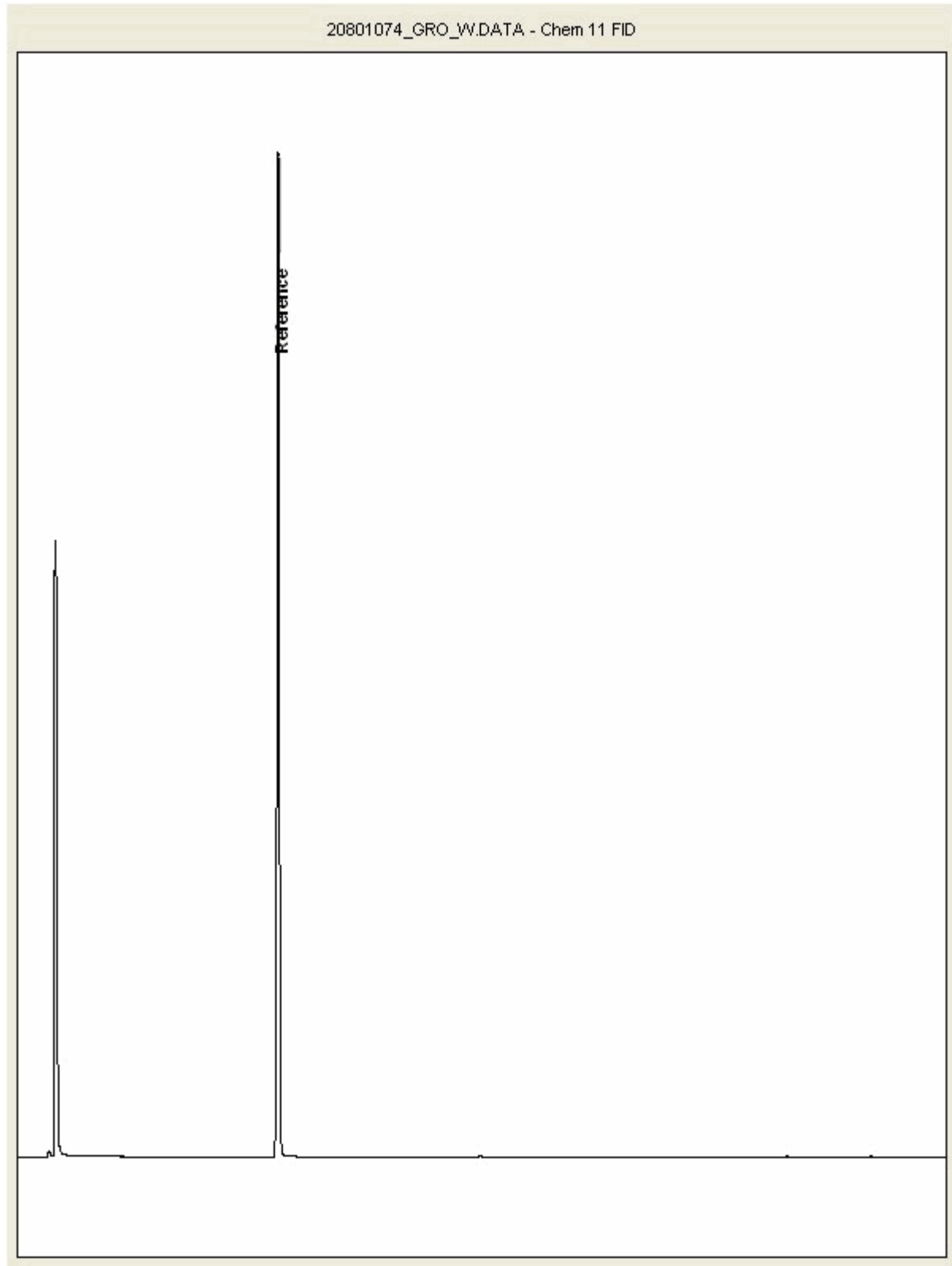
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801074  
Sample ID : BH107

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

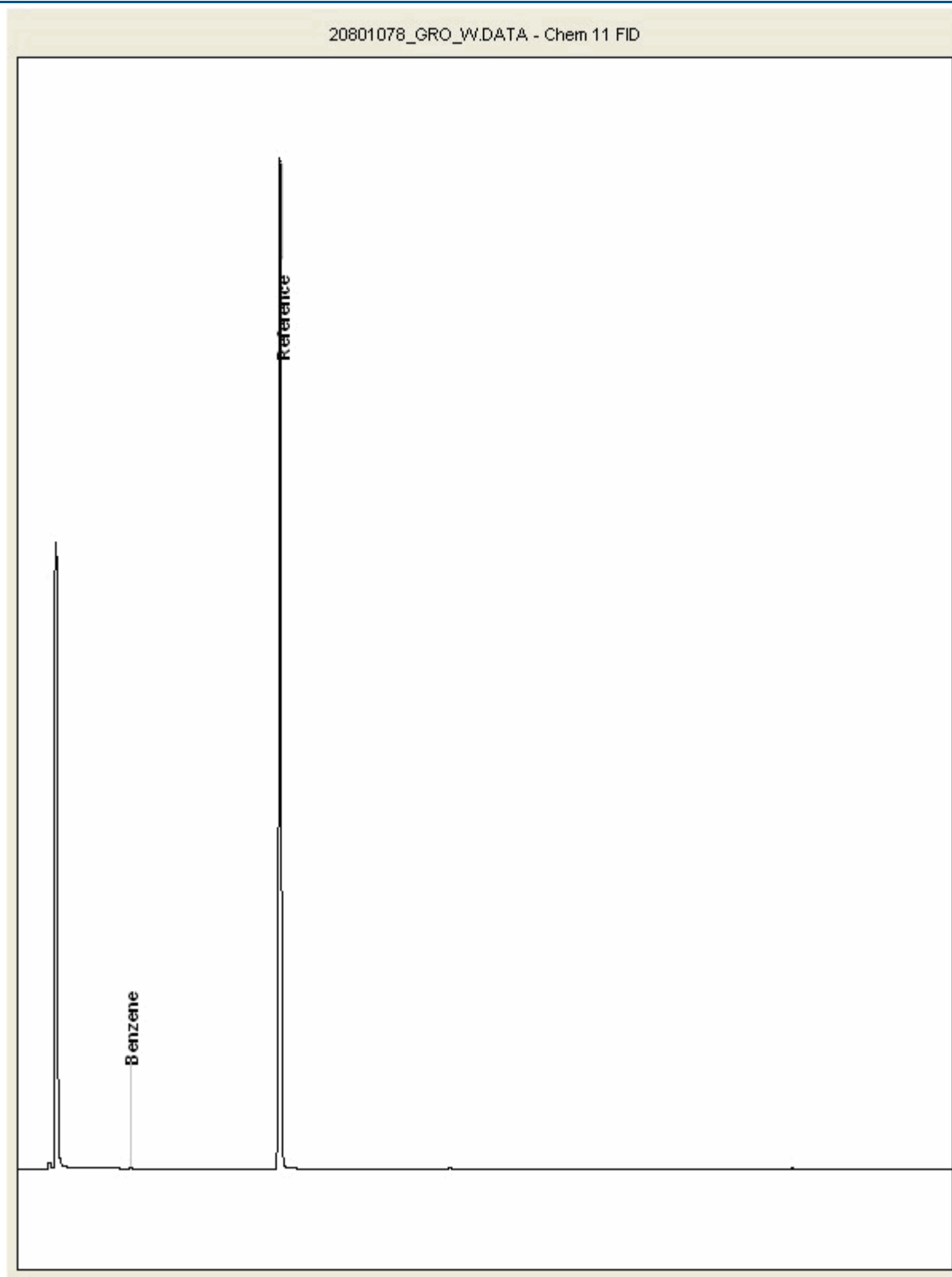
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801078  
Sample ID : BH103

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

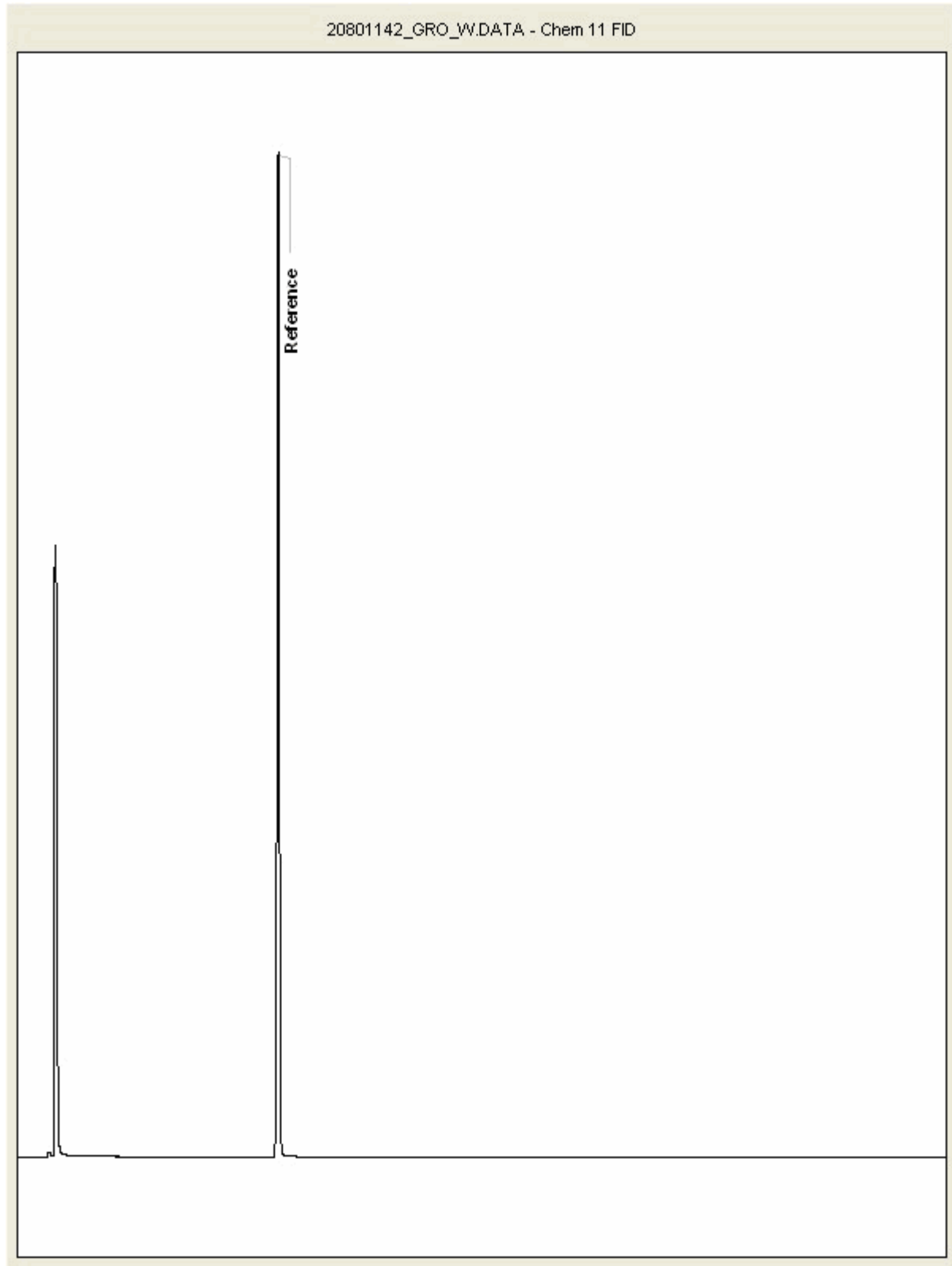
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801142  
Sample ID : BH101

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

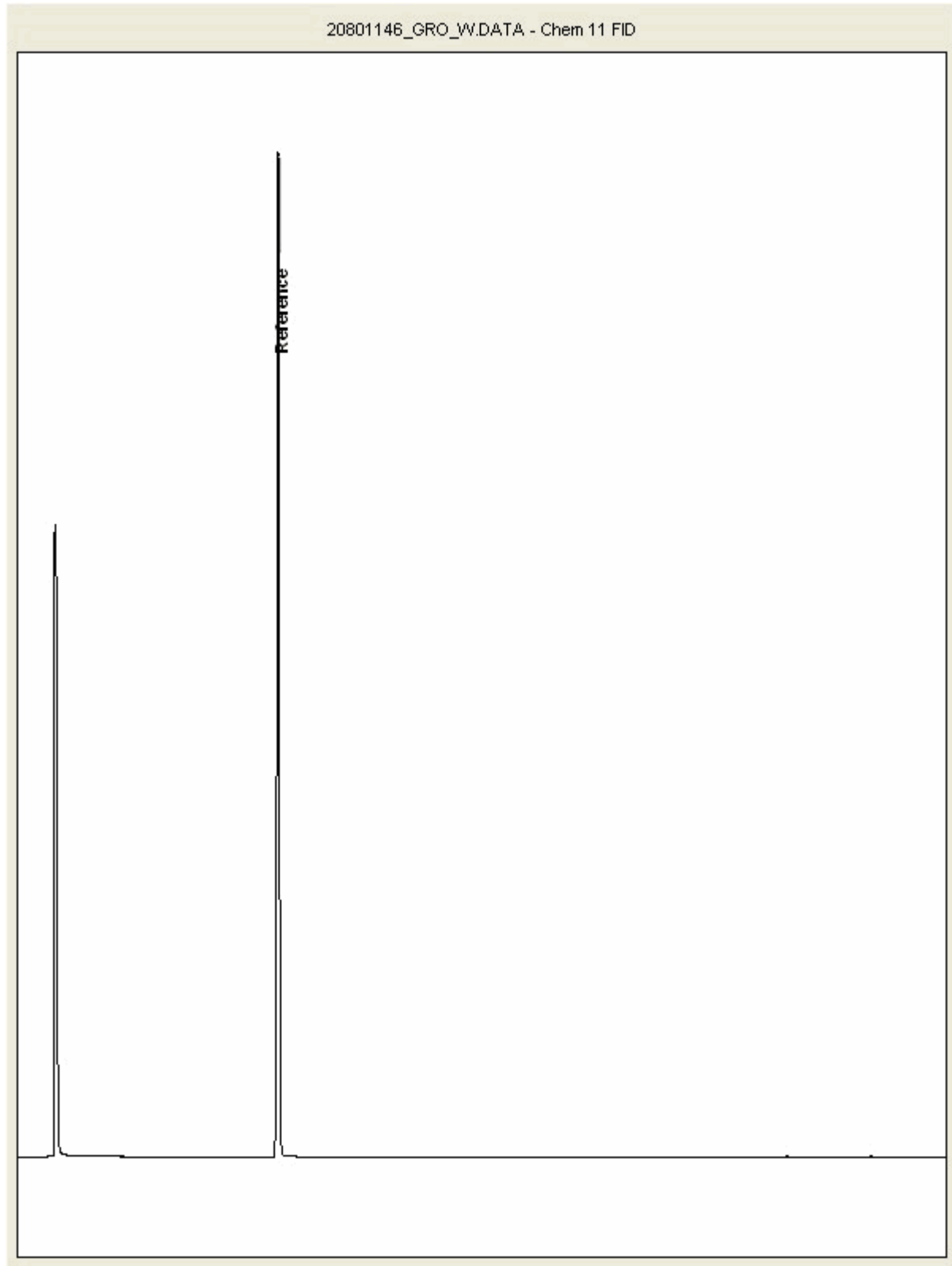
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801146  
Sample ID : BHH02(S)

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

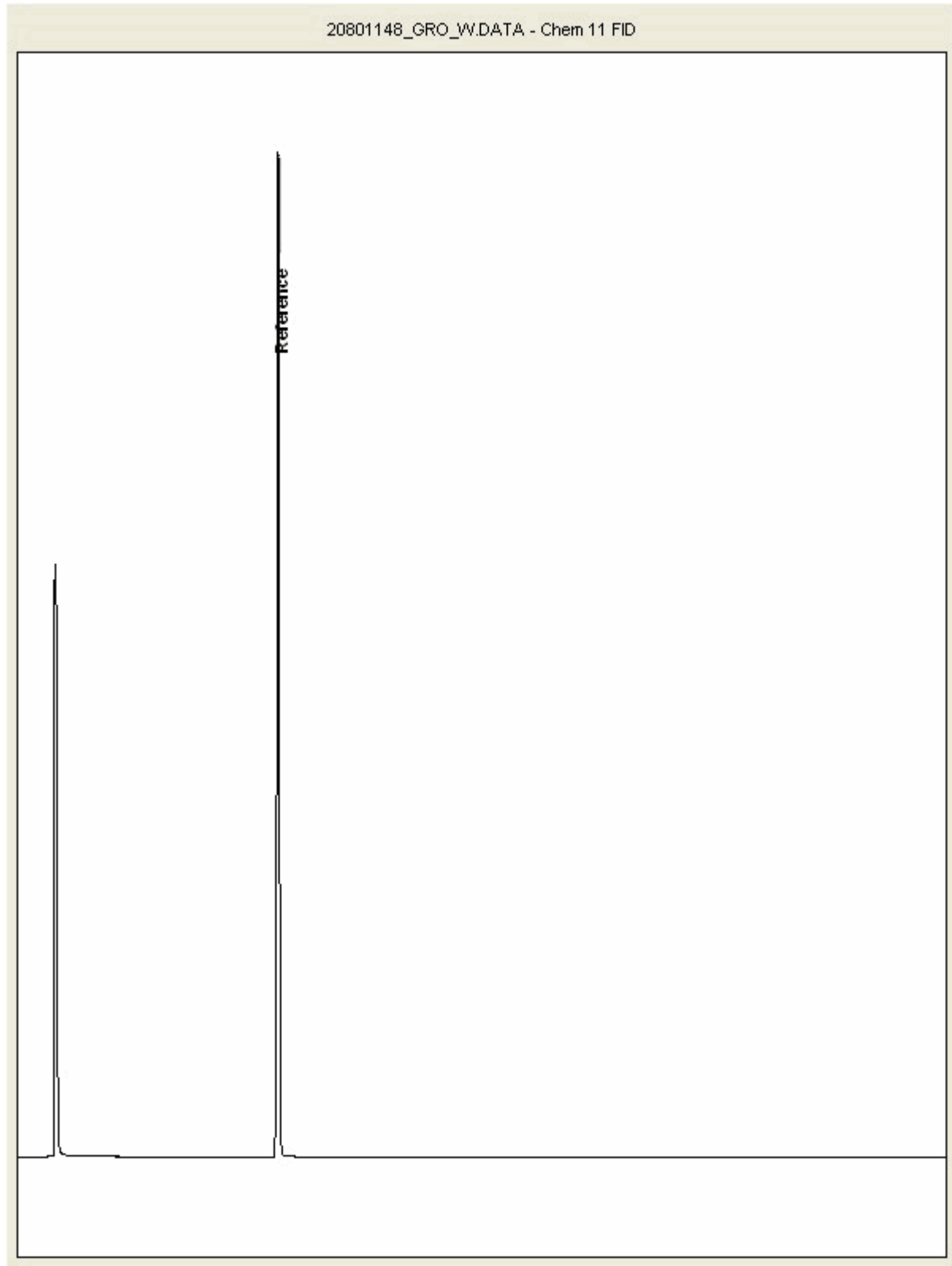
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801148  
Sample ID : BHH02(D)

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

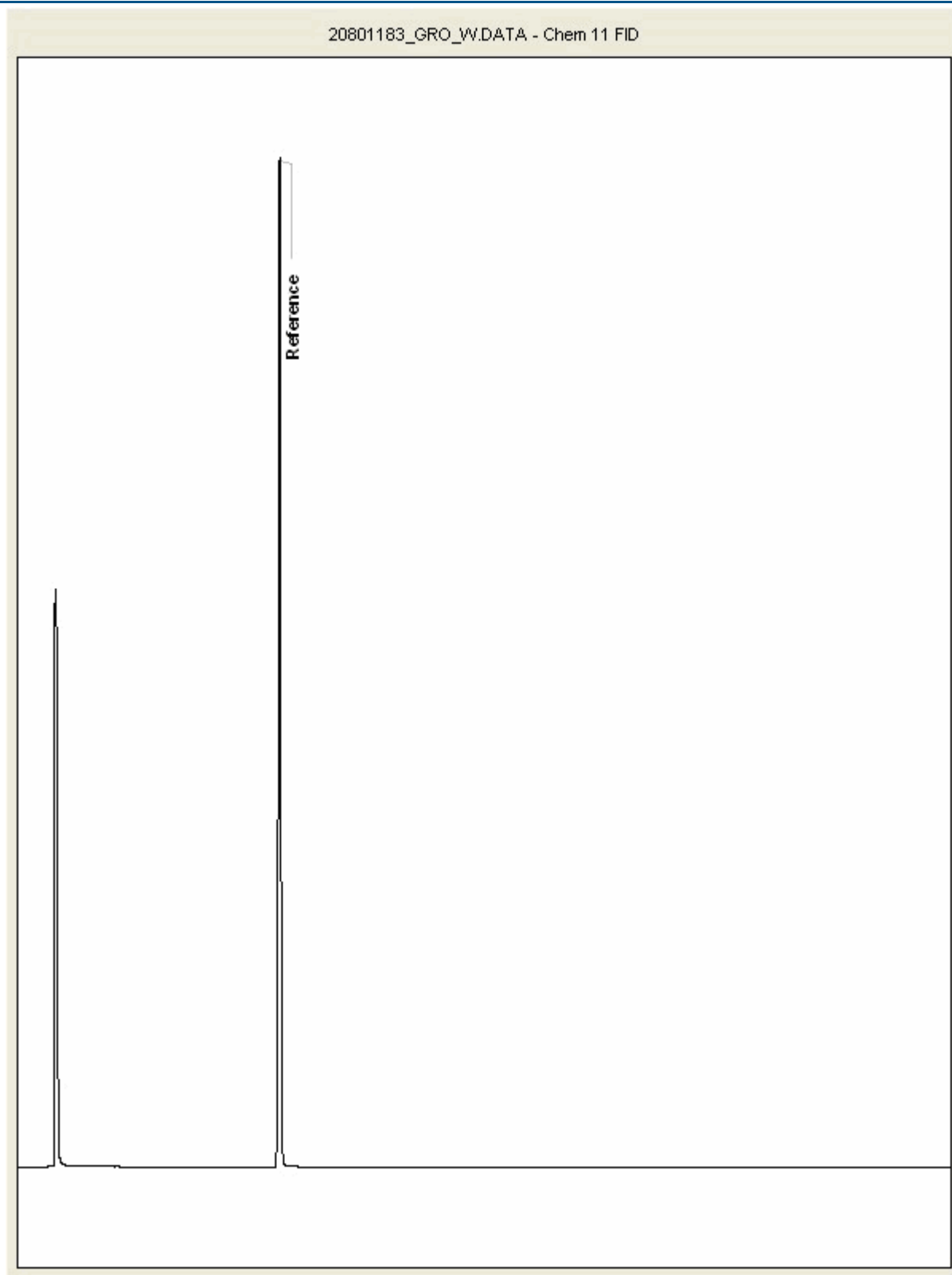
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801183  
Sample ID : MW1

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

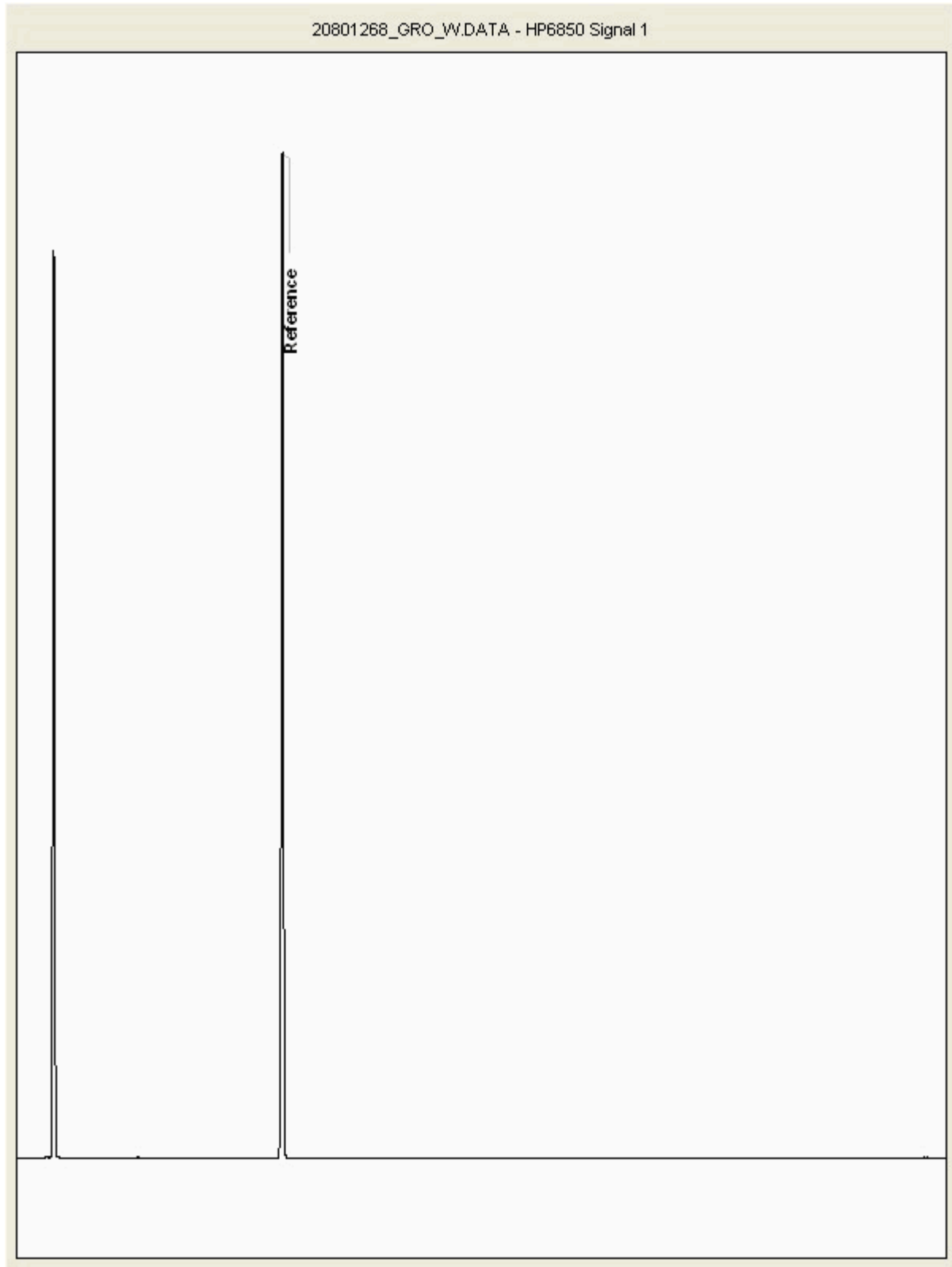
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801268  
Sample ID : BHH07(D) Dup

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

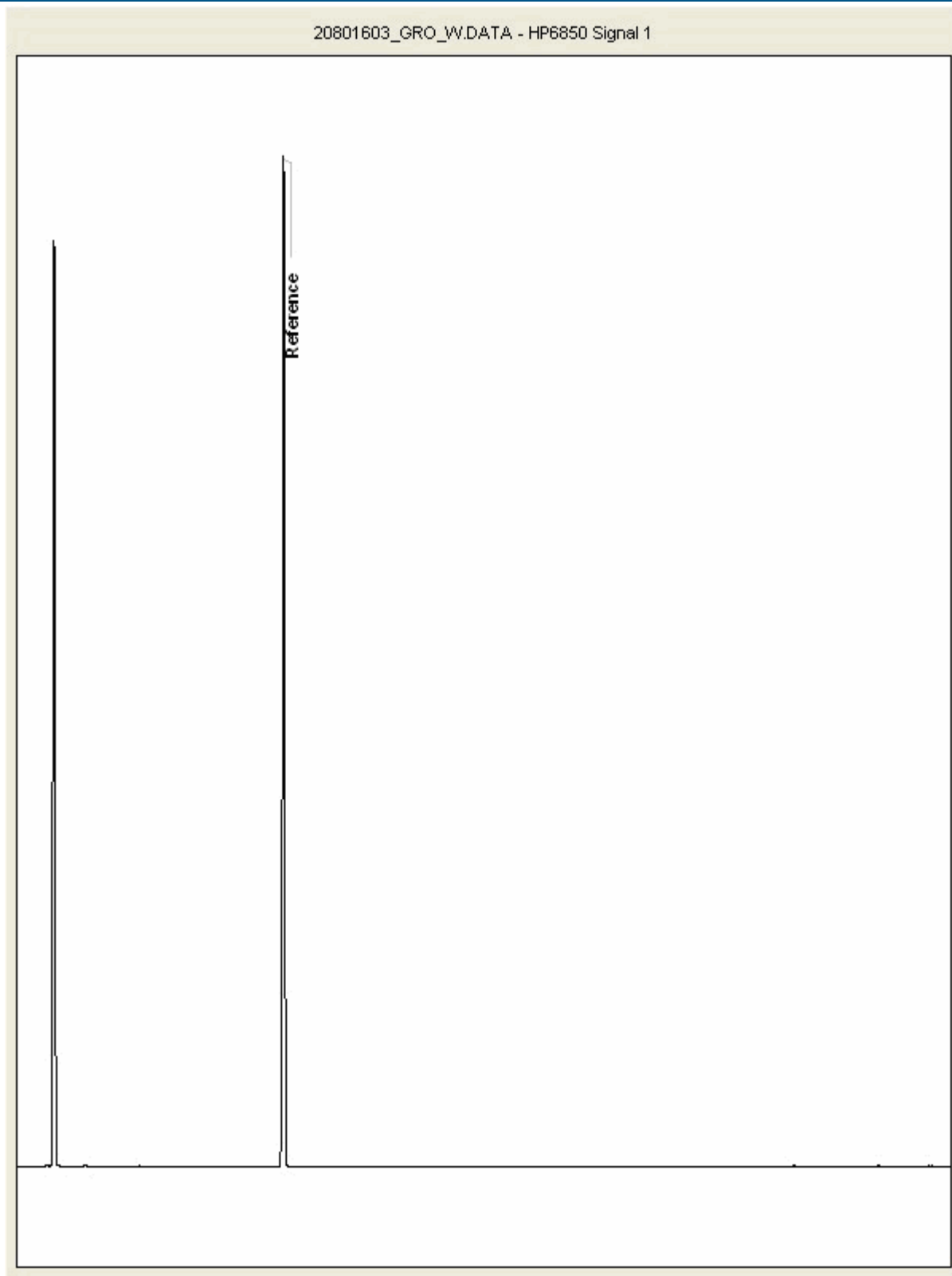
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801603  
Sample ID : BHH07(S)

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

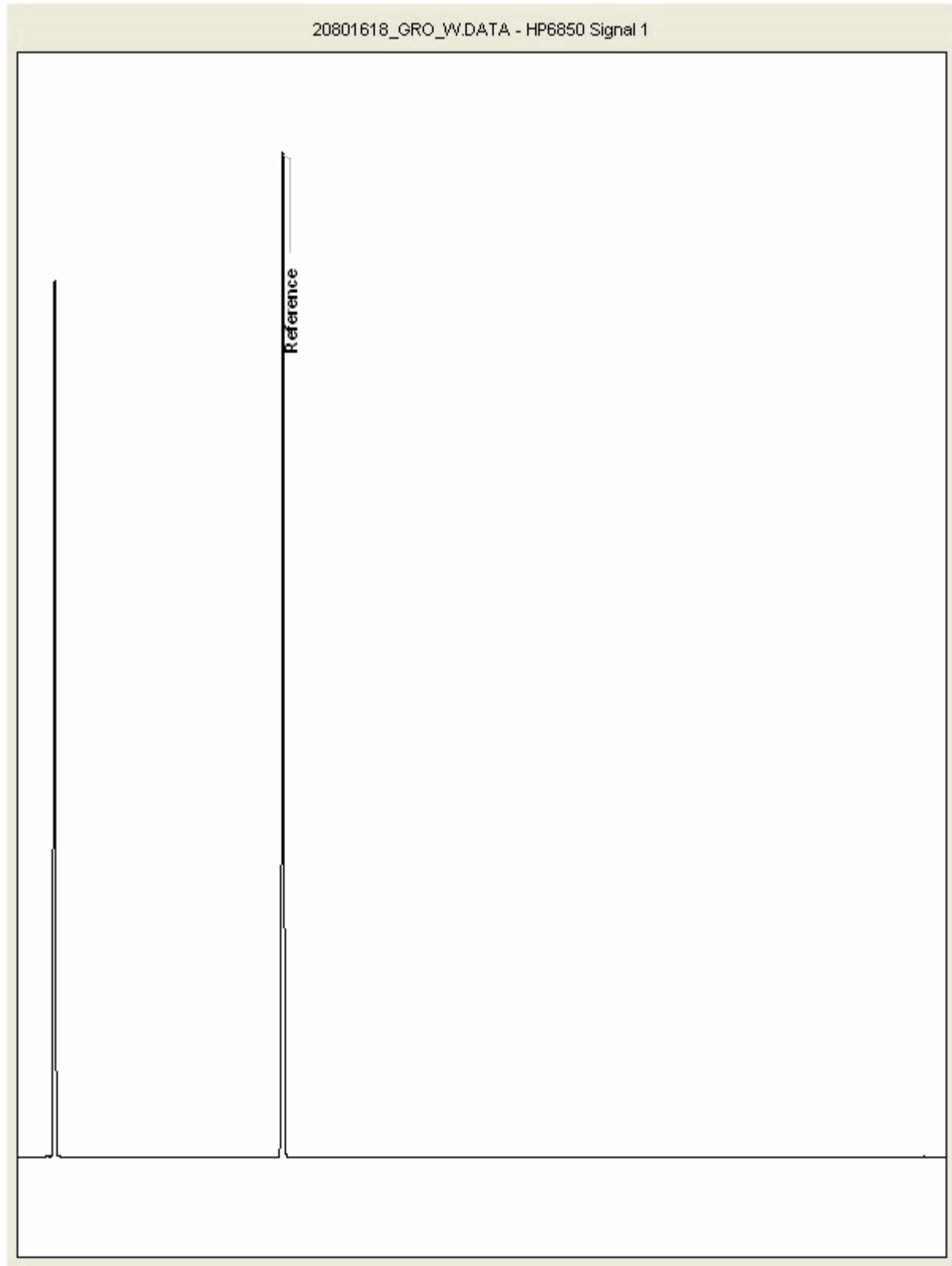
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801618  
Sample ID : BHH07(D)

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

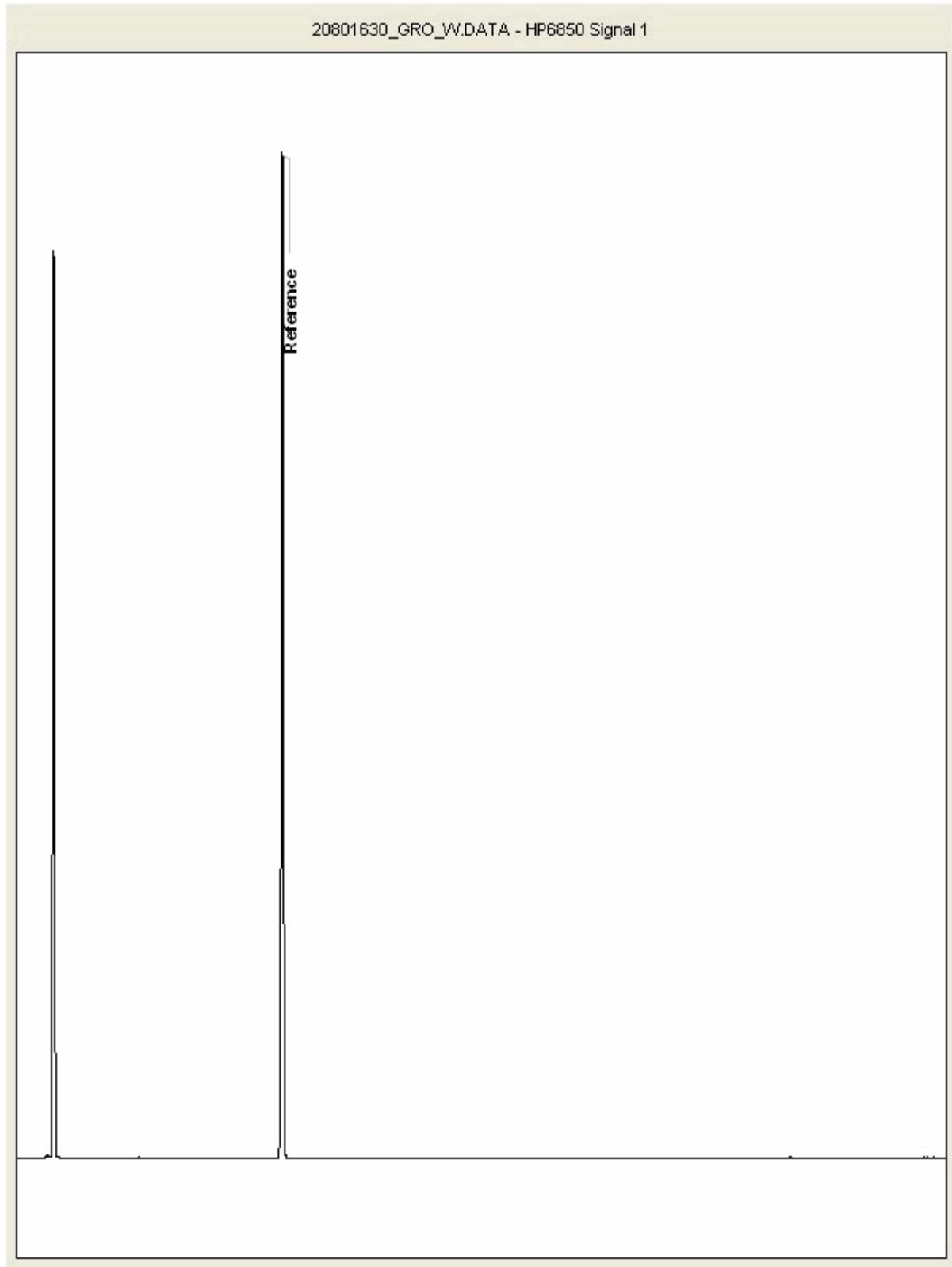
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20801630  
Sample ID : BHH05

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

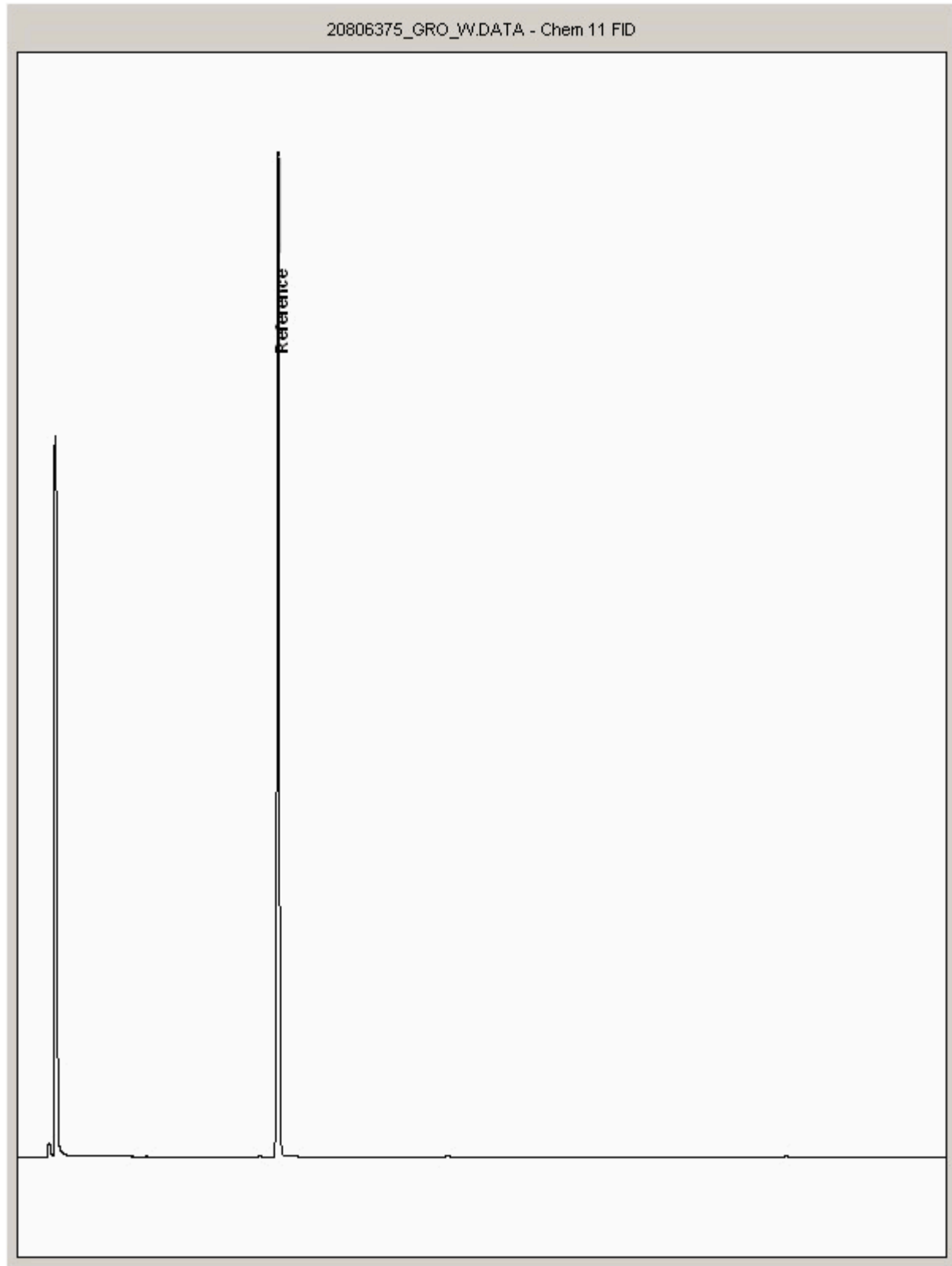
|           |                         |                   |              |                    |        |
|-----------|-------------------------|-------------------|--------------|--------------------|--------|
| SDG:      | 190920-25               | Client Reference: | 62253048-GI2 | Report Number:     | 523853 |
| Location: | Port Talbot Harbourside | Order Number:     | 62253048-GI2 | Superseded Report: | 523696 |

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20806375  
Sample ID : BH102

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

SDG: 190920-25  
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2  
Order Number: 62253048-GI2

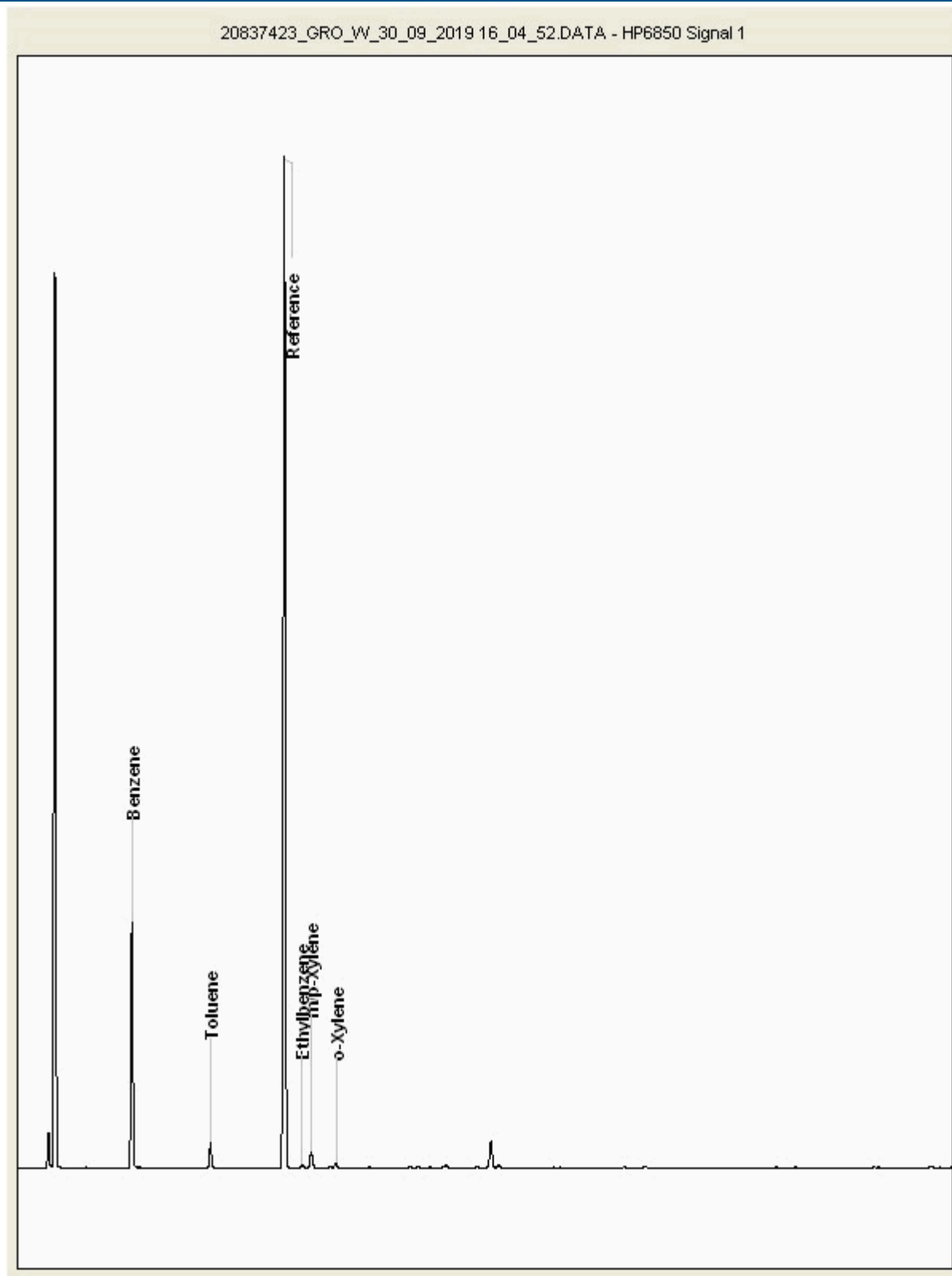
Report Number: 523853  
Superseded Report: 523696

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20837423  
Sample ID : BH105A

Depth : 0.00 - 0.00



# Chemical Oil Fingerprint

Client: H\_WSP\_BRI

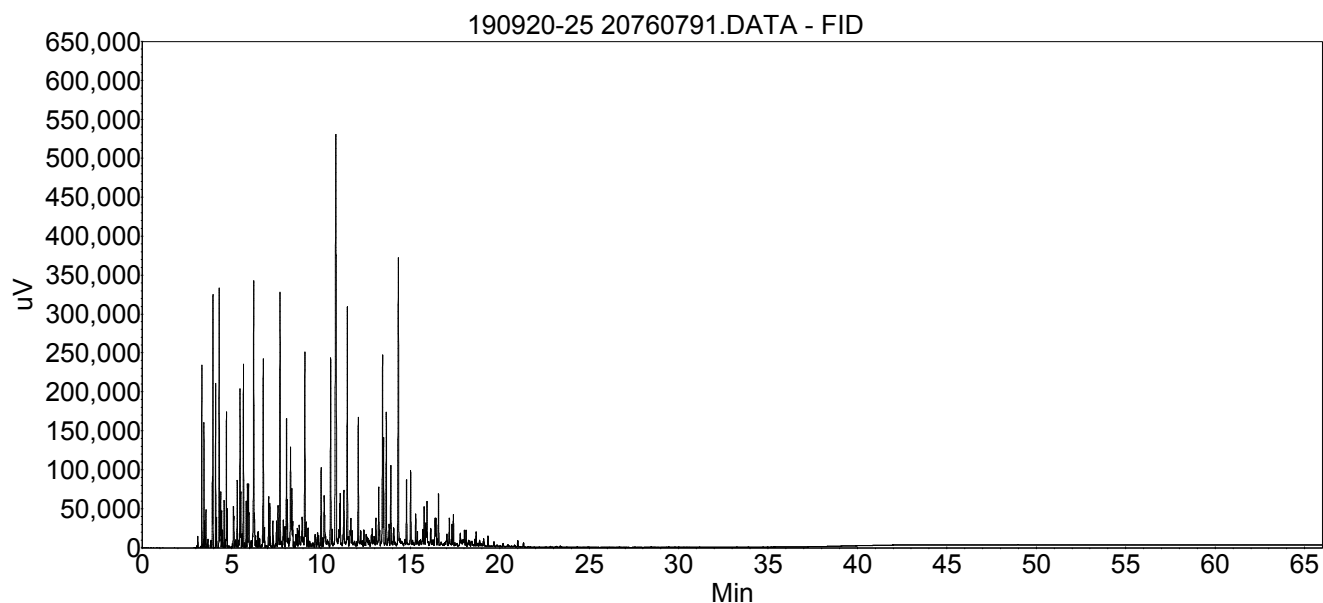
Job number: 190920-25 20760791

Identity: BH104

Description: Amber Product on Liquid

Carbon Range: C6 - C13  
Boiling Point Range: 69 -235°C

Fingerprint: Petrol Range Hydrocarbons  
Comments: N/A



**ALS Hawarden****Forensic Chemical Fingerprint Summary Report**

**Client :** H\_WSP\_BRI  
**Job Number :** 190920-25  
**Location:** Port Talbot Harbourside

| Sample Number | Sample Identity | Visual Interpretation   | Carbon Range | Boiling point Range °C | Age*       |
|---------------|-----------------|-------------------------|--------------|------------------------|------------|
| 20760791      | BH104           | Amber Product on Liquid | C6 - C13     | 69 - 235               | > 10 Years |
|               |                 |                         |              |                        |            |
|               |                 |                         |              |                        |            |
|               |                 |                         |              |                        |            |
|               |                 |                         |              |                        |            |
|               |                 |                         |              |                        |            |
|               |                 |                         |              |                        |            |
|               |                 |                         |              |                        |            |
|               |                 |                         |              |                        |            |
|               |                 |                         |              |                        |            |
|               |                 |                         |              |                        |            |

\* (Kaplan et al. 1997) It must be noted that this calculation is only really applicable to a gasoline layer on water.  
The age must be used as a guidance figure only as there could be several other factors that could affect the ageing process such as environment, climatic conditions etc.



## CERTIFICATE OF ANALYSIS

|              |                                                                                             |              |                                                               |
|--------------|---------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------|
| Work Order   | : PR19A0578                                                                                 | Issue Date   | : 01-Oct-2019                                                 |
| Customer     | : ALS Life Sciences Ltd                                                                     | Laboratory   | : ALS Czech Republic, s.r.o.                                  |
| Contact      | : Reporting                                                                                 | Contact      | : Client Service                                              |
| Address      | : Unit 7-8 Hawarden Business Park<br>Manor Road, Hawarden<br>CH5 3US Deeside United Kingdom | Address      | : Na Harfe 336/9 Prague 9 - Vysocany<br>190 00 Czech Republic |
| E-mail       | : euhdsubconresults@ALSGlobal.com                                                           | E-mail       | : customer.support@alsglobal.com                              |
| Telephone    | : ----                                                                                      | Telephone    | : +420 226 226 228                                            |
| Project      | : 190920-25                                                                                 | Page         | : 1 of 2                                                      |
| Order number | : ----                                                                                      | Date Samples | : 24-Sep-2019                                                 |
|              |                                                                                             | Received     |                                                               |
|              |                                                                                             | Quote number | : PR2018ALSAL-GB0004<br>(CZ-256-18-0022)                      |
| Site         | : ----                                                                                      | Date of test | : 30-Sep-2019 - 01-Oct-2019                                   |
| Sampled by   | : ----                                                                                      | QC Level     | : ALS CR Standard Quality Control<br>Schedule                 |

### General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.

The laboratory declares that the test results relate only to the listed samples. If the section "Sampled by" of the Certificate of analysis states: "Sampled by Customer" then the results relate to the sample as received.

### Responsible for accuracy

#### Signatories

Zdeněk Jiráček

#### Position

Environmental Business Unit  
Manager

ALS Czech Republic, s.r.o.

Na Harfe 336/9

190 00 Praha 9

DIČ: CZ 27407551





## Analytical Results

Sub-Matrix: **PRODUCT**

Client sample ID

**20767306**  
**BH104**

----

----

Laboratory sample ID

PR19A0578-001

----

----

Client sampling date / time

18-Sep-2019 00:00

----

----

| Parameter                  | Method    | LOR   | Unit | Result | MU     | Result | MU  | Result | MU  |
|----------------------------|-----------|-------|------|--------|--------|--------|-----|--------|-----|
| <b>Physical Parameters</b> |           |       |      |        |        |        |     |        |     |
| Density (volume weight)    | I-DENS-GR | 0.010 | g/mL | 0.890  | ± 5.0% | ----   | --- | ----   | --- |

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, delivery date in brackets without a time component will be displayed instead. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.

Key: LOR = Limit of reporting; MU = Measurement Uncertainty. The MU does not include sampling uncertainty.

## The end of result part of the certificate of analysis

### Brief Method Summaries

| Analytical Methods                                                             | Method Descriptions                                               |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Location of test performance: Bendlova 1687/7 Ceska Lipa Czech Republic 470 01 |                                                                   |
| *I-DENS-GR                                                                     | Density determination of liquid sample by weighing of the volume. |

A "\*" symbol preceding any method indicates laboratory or subcontractor non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information. If the report contains subcontracted analysis, those are made in a subcontracted laboratory outside the laboratories ALS Czech Republic, s.r.o.

The calculation methods of summation parameters are available on request in the client service.



# CERTIFICATE OF ANALYSIS

|                  |                         |                          |              |                           |        |
|------------------|-------------------------|--------------------------|--------------|---------------------------|--------|
| <b>SDG:</b>      | 190920-25               | <b>Client Reference:</b> | 62253048-GI2 | <b>Report Number:</b>     | 523853 |
| <b>Location:</b> | Port Talbot Harbourside | <b>Order Number:</b>     | 62253048-GI2 | <b>Superseded Report:</b> | 523696 |

## Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH<sub>4</sub> by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

### 18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

|   |                                                                             |
|---|-----------------------------------------------------------------------------|
| 1 | Container with Headspace provided for volatiles analysis                    |
| 2 | Incorrect container received                                                |
| 3 | Deviation from method                                                       |
| § | Sampled on date not provided                                                |
| ♦ | Sample holding time exceeded in laboratory                                  |
| @ | Sample holding time exceeded due to late arrival of instructions or samples |

### 19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of

#### Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

| Asbestos Type         | Common Name    |
|-----------------------|----------------|
| Chrysotile            | White Asbestos |
| Amosite               | Brown Asbestos |
| Crocidolite           | Blue Asbestos  |
| Fibrous Actinolite    | -              |
| Fibrous Anthophyllite | -              |
| Fibrous Tremolite     | -              |

#### Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

#### Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2107).

**Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.**

**The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**

# Appendix E

GQRA SCREENING TABLES



## Appendix E.1 - Bioavailable AA-EQS Calculation and Screening

## Metal Bioavailability Assessment Tool (M-BAT)

|            |            |           |            |                                                             |                                                             |                                                             |                                                             |     |     |    |                                                           |                  |                                                         |                             |                                                         |                |                                                       |                             |                                                              |              |                                                            |                             |                                                           |              |                                                         |                             |  |  |
|------------|------------|-----------|------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-----|-----|----|-----------------------------------------------------------|------------------|---------------------------------------------------------|-----------------------------|---------------------------------------------------------|----------------|-------------------------------------------------------|-----------------------------|--------------------------------------------------------------|--------------|------------------------------------------------------------|-----------------------------|-----------------------------------------------------------|--------------|---------------------------------------------------------|-----------------------------|--|--|
| Back       | INPUT DATA |           |            |                                                             |                                                             |                                                             |                                                             |     |     |    |                                                           | RESULTS (Copper) |                                                         |                             |                                                         | RESULTS (Zinc) |                                                       |                             |                                                              | RESULTS (Mn) |                                                            |                             |                                                           | RESULTS (Ni) |                                                         |                             |  |  |
|            |            |           |            |                                                             |                                                             |                                                             |                                                             |     |     |    |                                                           |                  |                                                         |                             |                                                         |                |                                                       |                             |                                                              |              |                                                            |                             |                                                           |              |                                                         |                             |  |  |
| Calculate  |            |           |            |                                                             |                                                             |                                                             |                                                             |     |     |    |                                                           |                  |                                                         |                             |                                                         |                |                                                       |                             |                                                              |              |                                                            |                             |                                                           |              |                                                         |                             |  |  |
| Clear Data |            |           |            |                                                             |                                                             |                                                             |                                                             |     |     |    |                                                           |                  |                                                         |                             |                                                         |                |                                                       |                             |                                                              |              |                                                            |                             |                                                           |              |                                                         |                             |  |  |
| ID         | Location   | Waterbody | Date       | Measured Cu Concentration (dissolved) (µg l <sup>-1</sup> ) | Measured Zn Concentration (dissolved) (µg l <sup>-1</sup> ) | Measured Mn Concentration (dissolved) (µg l <sup>-1</sup> ) | Measured Ni Concentration (dissolved) (µg l <sup>-1</sup> ) | pH  | DOC | Ca | Site-specific PNEC Dissolved Copper (µg l <sup>-1</sup> ) | BioF             | Bioavailable Copper Concentration (µg l <sup>-1</sup> ) | Risk Characterisation Ratio | Site-specific PNEC Dissolved Zinc (µg l <sup>-1</sup> ) | BioF           | Bioavailable Zinc Concentration (µg l <sup>-1</sup> ) | Risk Characterisation Ratio | Site-specific PNEC Dissolved Manganese (µg l <sup>-1</sup> ) | BioF         | Bioavailable Manganese Concentration (µg l <sup>-1</sup> ) | Risk Characterisation Ratio | Site-specific PNEC Dissolved Nickel (µg l <sup>-1</sup> ) | BioF         | Bioavailable Nickel Concentration (µg l <sup>-1</sup> ) | Risk Characterisation Ratio |  |  |
| 1          | BH102      |           | 21/08/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 2          | BH103      |           | 21/08/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 3          | BH106      |           | 21/08/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 4          | BHC5       |           | 21/08/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 5          | BHH02 (D)  |           | 21/08/2019 | 0.30                                                        | 1.01                                                        |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.59                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 6          | BHH02 (S)  |           | 21/08/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 7          | BHH03      |           | 21/08/2019 | 1.27                                                        | 2.35                                                        |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.09                                                    | 0.09                        | 18.71                                                   | 0.58           | 1.37                                                  | 0.13                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 8          | BH101      |           | 23/08/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 9          | BH105A     |           | 23/08/2019 | 0.30                                                        | 3.82                                                        |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 2.23                                                  | 0.20                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 10         | BH107      |           | 23/08/2019 | 0.30                                                        | 3.73                                                        |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 2.17                                                  | 0.20                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 11         | BHH04      |           | 23/08/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 12         | BHH05      |           | 23/08/2019 | 2.94                                                        | 5.76                                                        |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.20                                                    | 0.20                        | 18.71                                                   | 0.58           | 3.36                                                  | 0.31                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 13         | BHH07(D)   |           | 23/08/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 14         | BHH07(S)   |           | 23/08/2019 | 0.30                                                        | 2.79                                                        |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 1.63                                                  | 0.15                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 15         | MW1        |           | 23/08/2019 | 0.30                                                        | 6.73                                                        |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 3.92                                                  | 0.36                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 16         | BH101      |           | 18/09/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       | 0.25         |                                                            |                             | 10.14                                                     | 0.39         |                                                         |                             |  |  |
| 17         | BH102      |           | 18/09/2019 | 0.30                                                        | 1                                                           |                                                             |                                                             | 7.3 | 3.5 | 9  | 14.82                                                     | 0.07             | 0.02                                                    | 0.02                        | 18.71                                                   | 0.58           | 0.58                                                  | 0.05                        | 486.91                                                       |              |                                                            |                             |                                                           |              |                                                         |                             |  |  |

## Appendix E.1 - Bioavailability Calculations and Screening

### Pb Screening Tool 1.0

Back

Calculate

Clear Data

| INPUT DATA |           |           |            |                                                                |      | RESULTS (Pb)                                             |      |                                       |                             |
|------------|-----------|-----------|------------|----------------------------------------------------------------|------|----------------------------------------------------------|------|---------------------------------------|-----------------------------|
| ID         | Location  | Waterbody | Date       | Measured Pb Concentration (dissolved) ( $\mu\text{g l}^{-1}$ ) | DOC  | Site Specific PNEC Dissolved Pb ( $\mu\text{g l}^{-1}$ ) | BioF | Available Pb ( $\mu\text{g l}^{-1}$ ) | Risk Characterisation Ratio |
| 1          | BH102     |           | 21/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 2          | BH103     |           | 21/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 3          | BH106     |           | 21/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 4          | BHC5      |           | 21/08/2019 | 0.32                                                           | 3.50 | 4.20                                                     | 0.29 | 0.09                                  | 0.08                        |
| 5          | BHH02 (D) |           | 21/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 6          | BHH02 (S) |           | 21/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 7          | BHH03     |           | 21/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 8          | BH101     |           | 23/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 9          | BH105A    |           | 23/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 10         | BH107     |           | 23/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 11         | BHH04     |           | 23/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 12         | BHH05     |           | 23/08/2019 | 1.42                                                           | 3.50 | 4.20                                                     | 0.29 | 0.41                                  | 0.34                        |
| 13         | BHH07(D)  |           | 23/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 14         | BHH07(S)  |           | 23/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 15         | MW1       |           | 23/08/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 16         | BH101     |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 17         | BH102     |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 18         | BH103     |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 19         | BH105A    |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 20         | BH106     |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 21         | BH107     |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 22         | BHH02(D)  |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 23         | BHH02(S)  |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 24         | BHH03     |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 25         | BHH05     |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 26         | BHH07(D)  |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 27         | BHH07(S)  |           | 18/09/2019 | 0.20                                                           | 3.50 | 4.20                                                     | 0.29 | 0.06                                  | 0.05                        |
| 28         | MW1       |           | 18/09/2019 | 0.30                                                           | 3.50 | 4.20                                                     | 0.29 | 0.09                                  | 0.07                        |

<0.000 Concentration below the LOD  
0.000 Concentration in exceedance of the AA- EQS

|                                       |       |       |        |        | BH102      | BH103      | BH106      | BHC5       | BHH02 (D)  | BHH02 (S)  | BHH03      | BH101      | BH105A     | BH107      | BHH04      | BHH05      | BHH07(D)   | BHH07(S)   | MW1        | BH101      |            |
|---------------------------------------|-------|-------|--------|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Port Talbot Harbourside               |       |       |        |        | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 18/09/2019 |
| Test                                  | Units | LOD   | max    | AA-EQS |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Inorganics                            |       |       |        |        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Chloride                              | µg/l  | <80   | 115000 | -      | 30800      | 26800      | 39900      | 17700      | 32900      | 17200      | 34300      | 91500      | 43700      | 54800      | 10400      | 20100      | 39900      | 19500      | 29900      | 115000     |            |
| Nitrate as N                          | µg/l  | <20   | 4790   | -      | <40.000    | 24.5       | <20.000    | 36.2       | <20.000    | 2480       | <20.000    | 706        | <20.000    | <20.000    | 1590       | 853        | 107        | 1220       | 4790       | <20.000    |            |
| Sulphate as S                         | µg/l  | <40   | 47700  | -      | 25500      | 31300      | 34700      | 10000      | 29500      | 18400      | 27900      | 31600      | 30500      | 41700      | 45000      | 7730       | 17200      | 11400      | 10400      | 35700      |            |
| Filtered (Dissolved) Metals           |       |       |        |        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Low Level Hexavalent Chromium         | µg/l  | <15   | 178    | 3.4    | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | 42         | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | 178        | <3.000     | 29.5       | <3.000     | <3.000     |            |
| Mercury (diss.filt)                   | µg/l  | <0.01 | 0.0332 | 0.07   | <0.010     | <0.010     | <0.010     | 0.0281     | <0.010     | <0.010     | <0.010     | 0.0146     | 0.0167     | 0.0152     | <0.010     | <0.010     | 0.0112     | 0.0119     | 0.0106     | <0.010     |            |
| Arsenic (diss.filt)                   | µg/l  | <0.5  | 31.7   | 50     | 8.68       | 9.14       | 6.66       | 31.7       | 3.05       | 2.63       | 2.67       | 5.6        | 11.3       | 5.25       | 18.6       | 5.55       | <0.500     | 2.67       | <0.500     | 6.24       |            |
| Cadmium (diss.filt)                   | µg/l  | <0.08 | 0.109  | 0.2    | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | 0.0963     | <0.080     |            |
| Chromium (diss.filt)                  | µg/l  | <1    | 182    | -      | <1.000     | <1.000     | 2.13       | <1.000     | <1.000     | 50.3       | 8.54       | <1.000     | <1.000     | <1.000     | <1.000     | 182        | <1.000     | 24.9       | <1.000     | <1.000     |            |
| Copper (diss.filt)                    | µg/l  | <0.3  | 8.18   | 14.82  | <0.300     | <0.300     | <0.300     | <0.300     | <0.300     | <0.300     | 1.27       | <0.300     | <0.300     | <0.300     | <0.300     | 2.94       | <0.300     | <0.300     | <0.300     | <0.300     |            |
| Lead (diss.filt)                      | µg/l  | <0.2  | 1.42   | 4.2    | <0.200     | <0.200     | <0.200     | 0.32       | <0.200     | <0.200     | <0.200     | <0.200     | <0.200     | <0.200     | <0.200     | 1.42       | <0.200     | <0.200     | <0.200     | <0.200     |            |
| Nickel (diss.filt)                    | µg/l  | <0.4  | 2.11   | 8.6    | <0.400     | <0.400     | 0.704      | 1.37       | 0.546      | <0.400     | 1.23       | 0.519      | <0.400     | 1.31       | 2.11       | 1.34       | 0.679      | <0.400     | 0.884      | <0.400     |            |
| Selenium (diss.filt)                  | µg/l  | <1    | 7.15   | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | 7.15       | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | 3.03       | <1.000     | 2.83       | 2.51       | <1.000     |            |
| Zinc (diss.filt)                      | µg/l  | <1    | 13     | 18.71  | <1.000     | <1.000     | <1.000     | <1.000     | 1.01       | <1.000     | 2.35       | <1.000     | 3.82       | 3.73       | <1.000     | 5.76       | <1.000     | 2.79       | 6.73       | <1.000     |            |
| Phenols                               |       |       |        |        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Phenol                                | µg/l  | <2    | 50     | 7.7    | <2.000     | <2.000     | <2.000     | 90         | <2.000     | <2.000     | <2.000     | <2.000     | 20         | <2.000     | <2.000     | <2.000     | <2.000     | <2.000     | <2.000     | <2.000     |            |
| TPH Criteria Working Group (TPH CWG)  |       |       |        |        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| GRO Surrogate % recovery**            | %     |       | 114    | -      | 107        | 79         | 95         | 68         | 92         | 89         | 96         | 109        | 92         | 113        | 111        | 98         | 108        | 93         | 109        | 108        |            |
| GRO >C5-C12                           | µg/l  | <50   | 179000 | -      | <50.000    | <50.000    | <50.000    | 179000     | <50.000    | <50.000    | <50.000    | <50.000    | 5080       | <50.000    | <50.000    | <50.000    | <50.000    | <50.000    | <50.000    | <50.000    |            |
| Methyl tertiary butyl ether (MTBE)    | µg/l  | <3    | 150    | -      | <3.000     | <3.000     | <3.000     | <150.000   | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     |            |
| Benzene                               | µg/l  | <7    | 58300  | -      | <7.000     | <7.000     | <7.000     | 58300      | <7.000     | <7.000     | <7.000     | <7.000     | 3410       | <7.000     | <7.000     | <7.000     | <7.000     | <7.000     | <7.000     | <7.000     |            |
| Toluene                               | µg/l  | <4    | 54500  | -      | <4.000     | <4.000     | <4.000     | 54500      | <4.000     | <4.000     | <4.000     | <4.000     | 519        | <4.000     | <4.000     | <4.000     | <4.000     | <4.000     | <4.000     | <4.000     |            |
| Ethylbenzene                          | µg/l  | <5    | 3810   | -      | <5.000     | <5.000     | <5.000     | 3810       | <5.000     | <5.000     | <5.000     | <5.000     | 51         | <5.000     | <5.000     | <5.000     | <5.000     | <5.000     | <5.000     | <5.000     |            |
| m,p-Xylene                            | µg/l  | <8    | 12100  | -      | <8.000     | <8.000     | <8.000     | 12100      | <8.000     | <8.000     | <8.000     | <8.000     | 251        | <8.000     | <8.000     | <8.000     | <8.000     | <8.000     | <8.000     | <8.000     |            |
| o-Xylene                              | µg/l  | <3    | 2440   | -      | <3.000     | <3.000     | <3.000     | 2440       | <3.000     | <3.000     | <3.000     | <3.000     | 59         | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     |            |
| Sum of detected Xylenes               | µg/l  | <11   | 14500  | -      | <11.000    | <11.000    | <11.000    | 14500      | <11.000    | <11.000    | <11.000    | <11.000    | 310        | <11.000    | <11.000    | <11.000    | <11.000    | <11.000    | <11.000    | <11.000    |            |
| Sum of detected BTEX                  | µg/l  | <28   | 131000 | -      | <28.000    | <28.000    | <28.000    | 131000     | <28.000    | <28.000    | <28.000    | <28.000    | 4290       | <28.000    | <28.000    | <28.000    | <28.000    | <28.000    | <28.000    | <28.000    |            |
| Aliphatics >C5-C6                     | µg/l  | <10   | 500    | -      | <10.000    | <10.000    | <10.000    | <500.000   | <10.000    | <10.000    | <10.000    | <10.000    | 10         | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aliphatics >C6-C8                     | µg/l  | <10   | 500    | -      | <10.000    | <10.000    | <10.000    | <500.000   | <10.000    | <10.000    | <10.000    | <10.000    | 30         | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aliphatics >C8-C10                    | µg/l  | <10   | 4650   | -      | <10.000    | <10.000    | <10.000    | 4650       | <10.000    | <10.000    | <10.000    | <10.000    | 89         | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aliphatics >C10-C12                   | µg/l  | <10   | 23700  | -      | <10.000    | <10.000    | <10.000    | 23700      | <10.000    | <10.000    | <10.000    | <10.000    | 365        | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aliphatics >C12-C16 (diss.filt)       | µg/l  | <10   | 50     | -      | <10.000    | <10.000    | <10.000    | 50         | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aliphatics >C16-C21 (diss.filt)       | µg/l  | <10   | 10     | -      | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aliphatics >C21-C35 (diss.filt)       | µg/l  | <10   | 10     | -      | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Total Aliphatics >C12-C35 (diss.filt) | µg/l  | <10   | 50     | -      | <10.000    | <10.000    | <10.000    | 50         | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aromatics >EC5-EC7                    | µg/l  | <10   | 58300  | 8      | <10.000    | <10.000    | <10.000    | 58300      | <10.000    | <10.000    | <10.000    | <10.000    | 3410       | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aromatics >EC7-EC8                    | µg/l  | <10   | 54500  | 74     | <10.000    | <10.000    | <10.000    | 54500      | <10.000    | <10.000    | <10.000    | <10.000    | 519        | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aromatics >EC8-EC10                   | µg/l  | <10   | 21400  | 20     | <10.000    | <10.000    | <10.000    | 21400      | <10.000    | <10.000    | <10.000    | <10.000    | 421        | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aromatics >EC10-EC12                  | µg/l  | <10   | 15800  | 2      | <10.000    | <10.000    | <10.000    | 15800      | <10.000    | <10.000    | <10.000    | <10.000    | 243        | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aromatics >EC12-EC16 (diss.filt)      | µg/l  | <10   | 758    | 2      | <10.000    | <10.000    | <10.000    | 758        | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aromatics >EC16-EC21 (diss.filt)      | µg/l  | <10   | 61     | 0.1    | <10.000    | <10.000    | <10.000    | 61         | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aromatics >EC21-EC35 (diss.filt)      | µg/l  | <10   | 45     | 0.022  | <10.000    | <10.000    | <10.000    | 45         | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            |
| Aromatics >EC16-EC35 (diss.filt)      | µg/l  | <10   | 106    | -      | <10.000    | <10.000    | <10.000    | 106        | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.       |            |            |            |            |            |            |            |

<0.000 Concentration below the LOD

~~0.000~~ Concentration in exceedance of the AA- EQS

|                                    |       |        |       |        | BH102      | BH103      | BH106      | BHC5       | BHH02 (D)  | BHH02 (S)  | BHH03      | BH101      | BH105A     | BH107      | BHH04      | BHH05      | BHH07(D)   | BHH07(S)   | MW1        | BH101      |
|------------------------------------|-------|--------|-------|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Port Talbot Harbourside            |       |        |       |        | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 18/09/2019 |
| Test                               | Units | LOD    | max   | AA-EQS |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Polyaromatic Hydrocarbons (PAHs)   |       |        |       |        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Naphthalene (aq)                   | µg/l  | <0.01  | 675   | 2      | <0.010     | <0.010     | <0.010     | 0.0107     | 0.0107     | <0.010     | <0.010     | <0.010     | 0.0101     | 0.0145     | <0.010     | 0.0296     | <0.010     | <0.010     | <0.010     | <0.010     |
| Acenaphthene (aq)                  | µg/l  | <0.005 | 6.19  | -      | 0.021      | <0.005     | <0.005     | 2.1        | <0.005     | <0.005     | <0.005     | <0.005     | 4.68       | <0.005     | <0.005     | 0.0112     | <0.005     | <0.005     | 0.057      | <0.005     |
| Acenaphthylene (aq)                | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | 0.0547     | <0.005     | <0.005     | 0.00508    | <0.005     | <0.005     | <0.005     | <0.005     |
| Fluoranthene (aq)                  | µg/l  | <0.005 | 0.5   | 0.12   | <0.005     | <0.005     | 0.0276     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | <0.229     | <0.005     | 0.0108     | 0.0479     | <0.005     | <0.005     | <0.005     | <0.005     |
| Anthracene (aq)                    | µg/l  | <0.005 | 0.5   | 0.1    | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | 0.058      | <0.005     | <0.005     | 0.00635    | <0.005     | <0.005     | <0.005     | <0.005     |
| Phenanthrene (aq)                  | µg/l  | <0.005 | 0.784 | -      | <0.005     | <0.005     | <0.005     | 0.784      | <0.005     | <0.005     | <0.005     | <0.005     | 0.523      | <0.005     | 0.0051     | 0.0288     | <0.005     | <0.005     | <0.005     | <0.005     |
| Fluorene (aq)                      | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | 0.352      | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | 0.00661    | <0.005     |
| Chrysene (aq)                      | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | 0.00744    | <0.005     | <0.005     | 0.0171     | <0.005     | <0.005     | <0.005     | <0.005     |
| Pyrene (aq)                        | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | 0.021      | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | 0.168      | <0.005     | 0.00901    | 0.0433     | <0.005     | <0.005     | <0.005     | <0.005     |
| Benzo(a)anthracene (aq)            | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | 0.0159     | <0.005     | <0.005     | 0.0104     | <0.005     | <0.005     | <0.005     | <0.005     |
| Benzo(b)fluoranthene (aq)          | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | 0.00732    | 0.0366     | <0.005     | <0.005     | <0.005     | <0.005     |
| Benzo(k)fluoranthene (aq)          | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | 0.013      | <0.005     | <0.005     | <0.005     | <0.005     |
| Benzo(a)pyrene (aq)                | µg/l  | <0.002 | 0.2   | 0.22   | <0.002     | <0.002     | <0.002     | <0.200     | <0.002     | <0.002     | <0.002     | <0.002     | <0.002     | <0.002     | 0.00461    | 0.0204     | <0.002     | <0.002     | <0.002     | <0.002     |
| Dibenzo(a,h)anthracene (aq)        | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     |
| Benzo(g,h,i)perylene (aq)          | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     |
| Indeno(1,2,3-cd)pyrene (aq)        | µg/l  | <0.005 | 0.5   | -      | <0.005     | <0.005     | <0.005     | <0.500     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     | <0.005     |
| PAH sum of 4 (calculated)          | µg/l  |        | 2     | -      | 0.02       | 0.02       | 0.02       | 2.00       | 0.02       | 0.02       | 0.02       | 0.02       | 0.02       | 0.02       | 0.02       | 0.06       | 0.02       | 0.02       | 0.02       | 0.02       |
| PAH, Total Detected USEPA 16 (aq)  | µg/l  | <0.082 | 678   | -      | <0.082     | <0.082     | <0.082     | 678        | <0.082     | <0.082     | <0.082     | <0.082     | 6.09       | <0.082     | <0.082     | 0.27       | <0.082     | <0.082     | <0.082     | <0.082     |
| Volatile Organic Compounds (VOCs)  |       |        |       |        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Dibromofluoromethane**             | %     |        | 124   | -      | 107        | 120        | 114        | 17.8       | 114        | 114        | 115        | 109        | 108        | 114        | 106        | 24.6       | 114        | 107        | 105        | 109        |
| Toluene-d8**                       | %     |        | 102   | -      | 98.8       | 97.4       | 96.3       | 93.6       | 97.6       | 97         | 97.3       | 102        | 91.7       | 99.2       | 97.1       | 96.5       | 97.6       | 97.5       | 102        | 99.1       |
| 4-Bromofluorobenzene**             | %     |        | 105   | -      | 99.4       | 99.7       | 98.9       | 78.8       | 97.9       | 98.5       | 98.2       | 102        | 105        | 99.2       | 98.1       | 98.5       | 98.1       | 97.6       | 103        | 95.9       |
| Dichlorodifluoromethane            | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Chloromethane                      | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Vinyl chloride                     | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Bromomethane                       | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Chloroethane                       | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Trichlorofluoromethane             | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,1-Dichloroethene                 | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Carbon disulphide                  | µg/l  | <1     | 2.37  | -      | <1.000     | <1.000     | <1.000     | 2.37       | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Dichloromethane                    | µg/l  | <3     | 3     | -      | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     |
| Methyl tertiary butyl ether (MTBE) | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| trans-1,2-Dichloroethene           | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,1-Dichloroethane                 | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| cis-1,2-Dichloroethene             | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 2,2-Dichloropropane                | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Bromochloromethane                 | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Chloroform                         | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,1,1-Trichloroethane              | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,1-Dichloropropene                | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Carbontetrachloride                | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,2-Dichloroethane                 | µg/l  | <1     | 1.01  | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Benzene                            | µg/l  | <1     | 64100 | 8      | <1.000     | <1.000     | <1.000     | <64100     | <1.000     | <1.000     | <1.000     | <1.000     | <3430      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Trichloroethene                    | µg/l  | <1     | 1.18  | -      | <1.000     | <1.000     | <1.000     | 1.18       | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,2-Dichloropropane                | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Dibromomethane                     | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Bromodichloromethane               | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| cis-1,3-Dichloropropene            | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Toluene                            | µg/l  | <1     | 61100 | 74     | <1.000     | <1.000     | <1.000     | <61100     | <1.000     | <1.000     | <1.000     | <1.000     | <254       | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| trans-1,3-Dichloropropene          | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,1,1,2-Trichloroethane            | µg/l  | <1     | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,3-Dichloropropane                | µg/l  | &lt    |       |        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

<0.000 Concentration below the LOD  
0.000 Concentration in exceedance of the AA- EQS

|                               |       |     |       |        | BH102      | BH103      | BH106      | BHC5       | BHH02 (D)  | BHH02 (S)  | BHH03      | BH101      | BH105A     | BH107      | BHH04      | BHH05      | BHH07(D)   | BHH07(S)   | MW1        | BH101      |            |
|-------------------------------|-------|-----|-------|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Port Talbot Harbourside       |       |     |       |        | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 21/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 23/08/2019 | 18/09/2019 |
| Test                          | Units | LOD | max   | AA-EQS |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Bromobenzene                  | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| Propylbenzene                 | µg/l  | <1  | 32.3  | -      | <1.000     | <1.000     | <1.000     | 32.3       | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 2-Chlorotoluene               | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 1,3,5-Trimethylbenzene        | µg/l  | <1  | 1130  | -      | <1.000     | <1.000     | <1.000     | 1130       | <1.000     | <1.000     | <1.000     | <1.000     | 17         | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 4-Chlorotoluene               | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| tert-Butylbenzene             | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 1,2,4-Trimethylbenzene        | µg/l  | <1  | 1310  | -      | <1.000     | <1.000     | <1.000     | 1310       | <1.000     | <1.000     | <1.000     | <1.000     | 24.7       | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| sec-Butylbenzene              | µg/l  | <1  | 2.02  | -      | <1.000     | <1.000     | <1.000     | 2.02       | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 4-iso-Propyltoluene           | µg/l  | <1  | 1.56  | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 1,3-Dichlorobenzene           | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 1,4-Dichlorobenzene           | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| n-Butylbenzene                | µg/l  | <1  | 23.2  | -      | <1.000     | <1.000     | <1.000     | 23.2       | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 1,2-Dichlorobenzene           | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 1,2-Dibromo-3-chloropropane   | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 1,2,4-Trichlorobenzene        | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| Hexachlorobutadiene           | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| tert-Amyl methyl ether (TAME) | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| Naphthalene                   | µg/l  | <1  | 13300 | 2      | <1.000     | <1.000     | <1.000     | 13300      | <1.000     | <1.000     | <1.000     | <1.000     | 94.8       | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 1,2,3-Trichlorobenzene        | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |
| 1,3,5-Trichlorobenzene        | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            |

<0.000

Concentration below the LOD

0.000

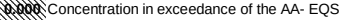
Concentration in exceedance of the AA- EQS

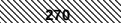
|                                                 |       |       |        |        | BH102      | BH103      | BH105A     | BH106      | BH107      | BHC5       | BHH02(D)   | BHH02(S)   | BHH03      | BHH05      | BHH07(D)   | BHH07(S)   | MW1        |
|-------------------------------------------------|-------|-------|--------|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Port Talbot Harbourside                         |       |       |        |        | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 |
| Test                                            | Units | LOD   | max    | AA-EQS |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Inorganics                                      |       |       |        |        |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Chloride                                        | µg/l  | <80   | 115000 | -      | 26900      | 28800      | 31000      | 41900      | 44900      |            | 23200      | 16700      | 37600      | 20800      | 50800      | 28400      | 36500      |
| Nitrate as N                                    | µg/l  | <20   | 4790   | -      | <20.000    | <20.000    | <20.000    | <20.000    | <20.000    |            | 28.5       | 1050       | 24.2       | 687        | 130        | 1890       | 4130       |
| Sulphate as S                                   | µg/l  | <40   | 47700  | -      | 23900      | 32500      | 15400      | 47700      | 34700      |            | 20400      | 21800      | 31700      | 7530       | 20900      | 13900      | 14700      |
| Filtered (Dissolved) Metals                     |       |       |        |        |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Low Level Hexavalent Chromium                   | µg/l  | <15   | 178    | 3.4    | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     |            | <3.000     | 16.2       | <3.000     | 18.8       | <3.000     | 11.7       | <3.000     |
| Mercury (diss.filt)                             | µg/l  | <0.01 | 0.0332 | 0.07   | <0.010     | <0.010     | <0.010     | <0.010     | 0.0332     |            | <0.010     | <0.010     | <0.010     | <0.010     | <0.010     | <0.010     | <0.010     |
| Arsenic (diss.filt)                             | µg/l  | <0.5  | 31.7   | 50     | 10.6       | 1.53       | 12         | 6.95       | 2.41       |            | 1.83       | 2.33       | 2.46       | 6.29       | <0.500     | 2.4        | <0.500     |
| Cadmium (diss.filt)                             | µg/l  | <0.08 | 0.109  | 0.2    | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     |            | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | <0.080     | 0.109      |
| Chromium (diss.filt)                            | µg/l  | <1    | 182    | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            | <1.000     | 15.9       | <1.000     | 157        | <1.000     | 10.4       | <1.000     |
| Copper (diss.filt)                              | µg/l  | <0.3  | 8.18   | 14.82  | <0.300     | <0.300     | <0.300     | <0.300     | <0.300     |            | <0.300     | <0.300     | <0.300     | 8.18       | <0.300     | <0.300     | <0.300     |
| Lead (diss.filt)                                | µg/l  | <0.2  | 1.42   | 4.2    | <0.200     | <0.200     | <0.200     | <0.200     | <0.200     |            | <0.200     | <0.200     | <0.200     | <0.200     | <0.200     | <0.200     | 0.302      |
| Nickel (diss.filt)                              | µg/l  | <0.4  | 2.11   | 8.6    | <0.400     | <0.400     | <0.400     | <0.400     | <0.400     |            | 0.478      | <0.400     | <0.400     | <0.400     | <0.400     | <0.400     | <0.400     |
| Selenium (diss.filt)                            | µg/l  | <1    | 7.15   | -      | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |            | <1.000     | 5.16       | <1.000     | 3.2        | <1.000     | 2.67       | 1.81       |
| Zinc (diss.filt)                                | µg/l  | <1    | 13     | 18.71  | <1.000     | <1.000     | <1.000     | 1.84       | 4.26       |            | 7.8        | 1.48       | 1.51       | <1.000     | 1.64       | 1.44       | 13         |
| Phenols                                         |       |       |        |        |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Phenol                                          | µg/l  | <2    | 50     | 7.7    | <2.000     | <2.000     | 40         | <2.000     | <2.000     |            | <2.000     | <2.000     | <2.000     | <2.000     | <2.000     | <2.000     | <2.000     |
| TPH Criteria Working Group (TPH CWG)            |       |       |        |        |            |            |            |            |            |            |            |            |            |            |            |            |            |
| GRO Surrogate % recovery**                      | %     |       | 114    | -      | 93         | 104        | 109        | 107        | 106        |            | 110        | 105        | 108        | 109        | 114        | 110        | 113        |
| GRO >C5-C12                                     | µg/l  | <50   | 179000 | -      | <50.000    | <50.000    | 6630       | <50.000    | <50.000    |            | <50.000    | <50.000    | <50.000    | <50.000    | <50.000    | <50.000    | <50.000    |
| Methyl tertiary butyl ether (MTBE)              | µg/l  | <3    | 150    | -      | <3.000     | <3.000     | <15.000    | <3.000     | <3.000     |            | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     |
| Benzene                                         | µg/l  | <7    | 58300  | -      | <7.000     | <7.000     | 4580       | <7.000     | <7.000     |            | <7.000     | <7.000     | <7.000     | <7.000     | <7.000     | <7.000     | <7.000     |
| Toluene                                         | µg/l  | <4    | 54500  | -      | <4.000     | <4.000     | 462        | <4.000     | <4.000     |            | <4.000     | <4.000     | <4.000     | <4.000     | <4.000     | <4.000     | <4.000     |
| Ethylbenzene                                    | µg/l  | <5    | 3810   | -      | <5.000     | <5.000     | 54         | <5.000     | <5.000     |            | <5.000     | <5.000     | <5.000     | <5.000     | <5.000     | <5.000     | <5.000     |
| m,p-Xylene                                      | µg/l  | <8    | 12100  | -      | <8.000     | <8.000     | 367        | <8.000     | <8.000     |            | <8.000     | <8.000     | <8.000     | <8.000     | <8.000     | <8.000     | <8.000     |
| o-Xylene                                        | µg/l  | <3    | 2440   | -      | <3.000     | <3.000     | 104        | <3.000     | <3.000     |            | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     | <3.000     |
| Sum of detected Xylenes                         | µg/l  | <11   | 14500  | -      | <11.000    | <11.000    | 471        | <11.000    | <11.000    |            | <11.000    | <11.000    | <11.000    | <11.000    | <11.000    | <11.000    | <11.000    |
| Sum of detected BTEX                            | µg/l  | <28   | 131000 | -      | <28.000    | <28.000    | 5570       | <28.000    | <28.000    |            | <28.000    | <28.000    | <28.000    | <28.000    | <28.000    | <28.000    | <28.000    |
| Aliphatics >C5-C6                               | µg/l  | <10   | 500    | -      | <10.000    | <10.000    | <50.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aliphatics >C6-C8                               | µg/l  | <10   | 500    | -      | <10.000    | <10.000    | 50         | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aliphatics >C8-C10                              | µg/l  | <10   | 4650   | -      | <10.000    | <10.000    | 107        | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aliphatics >C10-C12                             | µg/l  | <10   | 23700  | -      | <10.000    | <10.000    | 491        | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aliphatics >C12-C16 (diss.filt)                 | µg/l  | <10   | 50     | -      | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aliphatics >C16-C21 (diss.filt)                 | µg/l  | <10   | 10     | -      | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aliphatics >C21-C35 (diss.filt)                 | µg/l  | <10   | 10     | -      | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Total Aliphatics >C12-C35 (diss.filt)           | µg/l  | <10   | 50     | -      | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aromatics >EC5-EC7                              | µg/l  | <10   | 58300  | 8      | <10.000    | <10.000    | 4580       | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aromatics >EC7-EC8                              | µg/l  | <10   | 54500  | 74     | <10.000    | <10.000    | 462        | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aromatics >EC8-EC10                             | µg/l  | <10   | 21400  | 20     | <10.000    | <10.000    | 598        | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aromatics >EC10-EC12                            | µg/l  | <10   | 15800  | 2      | <10.000    | <10.000    | 327        | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aromatics >EC12-EC16 (diss.filt)                | µg/l  | <10   | 758    | 2      | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aromatics >EC16-EC21 (diss.filt)                | µg/l  | <10   | 61     | 0.1    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aromatics >EC21-EC35 (diss.filt)                | µg/l  | <10   | 45     | 0.022  | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Aromatics >EC16-EC35 (diss.filt)                | µg/l  | <10   | 106    | -      | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Total Aromatics >EC12-EC35 (diss.filt)          | µg/l  | <10   | 864    | -      | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |
| Total Aliphatics & Aromatics >C5-35 (diss.filt) | µg/l  | <10   | 180000 | -      | <10.000    | <10.000    | 6630       | <10.000    | <10.000    |            | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    | <10.000    |

<0.000 Concentration below the LOD

0.000 Concentration in exceedance of the AA- EQS

[illegible]

 <0.000 Concentration below the LOD  
 0.000 Concentration in exceedance of the AA- EQS

|                               |       |     |       |        | BH102      | BH103      | BH105A                                                                                  | BH106      | BH107      | BHC5       | BHH02(D)   | BHH02(S)   | BHH03      | BHH05      | BHH07(D)   | BHH07(S)   | MW1        |
|-------------------------------|-------|-----|-------|--------|------------|------------|-----------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Port Talbot Harbourside       |       |     |       |        | 18/09/2019 | 18/09/2019 | 18/09/2019                                                                              | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 | 18/09/2019 |
| Test                          | Units | LOD | max   | AA-EQS |            |            |                                                                                         |            |            |            |            |            |            |            |            |            |            |
| Bromobenzene                  | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Propylbenzene                 | µg/l  | <1  | 32.3  | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 2-Chlorotoluene               | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,3,5-Trimethylbenzene        | µg/l  | <1  | 1130  | -      | <1.000     | <1.000     | 16.9                                                                                    | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 4-Chlorotoluene               | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| tert-Butylbenzene             | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,2,4-Trimethylbenzene        | µg/l  | <1  | 1310  | -      | <1.000     | <1.000     | 44.9                                                                                    | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| sec-Butylbenzene              | µg/l  | <1  | 2.02  | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 4-Iso-Propyltoluene           | µg/l  | <1  | 1.56  | -      | <1.000     | <1.000     | 1.56                                                                                    | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,3-Dichlorobenzene           | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,4-Dichlorobenzene           | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| n-Butylbenzene                | µg/l  | <1  | 23.2  | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,2-Dichlorobenzene           | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,2-Dibromo-3-chloropropane   | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,2,4-Trichlorobenzene        | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Hexachlorobutadiene           | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| tert-Amyl methyl ether (TAME) | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| Naphthalene                   | µg/l  | <1  | 13300 | 2      | <1.000     | <1.000     |  270 | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,2,3-Trichlorobenzene        | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |
| 1,3,5-Trichlorobenzene        | µg/l  | <1  | 1     | -      | <1.000     | <1.000     | <1.000                                                                                  | <1.000     | <1.000     |            | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     | <1.000     |

# Appendix F

DQRA INFORMATION



Table F.1: Contaminants Properties

| Determinands        | Source                             | half Life                |              | Henry's Law  |           | Koc/Kd                           |           | Solubility   |           |
|---------------------|------------------------------------|--------------------------|--------------|--------------|-----------|----------------------------------|-----------|--------------|-----------|
|                     | (mg/l)                             | (years)                  | Reference    | (unitless)   | Reference | (l/kg)                           | Reference | (mg/l)       | Reference |
| Naphthalene         | LU (9.48E-02, 2.70E-01 )           | LU (2.74E-01, 8.22E-01 ) | 1            | S (1.74E-02) | 2         | T (6.75E+02, 8.44E+02, 1.01E+03) | 2         | S (3.10E+01) | 2         |
| Benzene             | LU (3.43E+00, 2.46E+01 )           | LU (1.37E-01, 9.59E-01 ) | 1            | S (2.25E-01) | 2         | T (6.49E+01, 8.44E+02, 9.74E+01) | 2         | S (1.78E+03) | 2         |
| Toluene             | LU (4.88E-01, 1.00E+00 )           | LU (5.48E-02, 5.48E-01 ) | 1            | S (2.74E-01) | 2         | T (1.87E+02, 2.34E+02, 2.80E+02) | 2         | S (5.15E+02) | 2         |
| Ethylbenzene        | LU (3.88E-02, 1.70E-01 )           | LU (1.37E-01, 5.48E-01 ) | 1            | S (3.58E-01) | 2         | T (4.29E+02, 5.37E+02, 6.44E+02) | 2         | S (1.52E+02) | 2         |
| Xylenes             | LU (3.46E-01, 5.99E-01 )           | LU (1.37E-01, 5.48E-01 ) | 1            | S (2.95E-01) | 2         | T (4.89E+02, 6.1E+02, 7.34E+02)  | 2         | S (1.60E+02) | 2         |
| Hexavalent chromium | LT (3.00E-03, 5.30E-03, 1.78E-01 ) | S(9.00E+30)              | conservative | N/A          | N/A       | S (6.70E+01)                     | 4         | S (4.40E+05) | 6         |
| Phenol              | LU (3.00E-02, 4.00E-02 )           | LU (2.74E-02, 2.74E-01 ) | 1            | S (2.62E-05) | 3         | T (2.16E-01, 2.70E-01, 3.24E-01  | 3         | S (9.30E+04) | 5         |

LU - Log Uniform Distribution  
S - Single Distribution  
T - Triangular Distribution  
LT - Log Triangular Distribution

1 The Effects of Contaminant Concentration on the Potential for Natural Attenuation R & D Technical Report P2-228/TR  
2 TPH Criteria Working Group Series, Volume 3: Selection of Representative TPH Fractions based on Fate and Transport Considerations  
3 Environment Agency, 2008 (Martin. I & Cowie. C). Compilation of data for priority organic pollutants for derivation of soil guideline values. Science report SC050021/SR7  
4 Golder Associates; communication with Ian Miller at Golder office, Washington D.C. 25/5/95  
5 Fetter,C.W.,1988; Applied Hydrogeology. Prentice Hall. pp. 458  
6 USEPA, 1989 (October). EPA/540/2-89/057. Determining Soil Response Action Levels Based on Potential Contaminant Migration to Groundwater: A Compendium of Examples. Office of Emergency and Re

Table F.2: Model Input Parameters

| Parameter                 | Unit     | Distribution type | Range            |          |             | Justification                                                                                                                                           |
|---------------------------|----------|-------------------|------------------|----------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |          |                   | Minimum          | Expected | Maximum     |                                                                                                                                                         |
| source dimensions         |          |                   |                  |          |             |                                                                                                                                                         |
| Cell length               | m        | single            |                  | 60       |             | Based on area between BH104, BH105 and BHC5                                                                                                             |
| Cell width                | m        | single            |                  | 40       |             | Based on area between BH104, BH105 and BHC5                                                                                                             |
| Infiltration              |          |                   |                  |          |             |                                                                                                                                                         |
| Infiltration              | mm/yr    | uniform           | mean<br>255      |          | SD<br>35.51 | Based on a mean annual rainfall of 2128 mm (Marcroft Weir Gaunging Station at River Afan (SS7719100)) with 40% evapotranspiration and 80% hardstanding. |
| Saturated pathway         |          |                   |                  |          |             |                                                                                                                                                         |
| Thickness                 | m        | Uniform           | 6                |          | 15          | Based on the depth between water table and top of bedrock observed in boreholes and an estimate based on the wetter perimeter of the Dock               |
| Mixing Zone               | m        |                   | model calculated |          |             |                                                                                                                                                         |
| Hydraulic conductivity    | m/s      | Log triangular    | 2.89E-06         | 5.60E-05 | 1.00E-04    | Minimum and maximum values based on literature data (Waters et al), and likley value based on geomean of slug tests results.                            |
| Hydraulic gradient        | -        | Triangular        | 0.002            | 0.006    | 0.008       | Based on four groundwater monitoring results from between August and September 2019.                                                                    |
| Effective Porosity        | fraction | Uniform           | 0.14             |          | 0.21        | Based on 60% of total porosity from Domenico and Schwartz 1990 for a coarse gravel.                                                                     |
| Density                   | kg/l     | uniform           | 1.37             |          | 2.19        | Gravelly sand and gravels based ConSim help files                                                                                                       |
| CP                        | m        | single            | 130              |          |             | Based on distance from site source to the Port Talbot Dock in a south direction.                                                                        |
| FOC                       | %        | triangular        | 0.2              | 0.27     | 0.38        | Geomean of 6 soil saturated samples and 20% variability                                                                                                 |
| Longitudinal dispersivity | m        | single            |                  | 13       |             | 10% of the pathway                                                                                                                                      |
| Lateral dispersivity      | m        | single            |                  | 0.3      |             | 30% of the longitudinal dispersivity                                                                                                                    |

**Project: Port Talbot Harbourside**

**Project Number: 60053048**

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**Project Details**

Title: Port Talbot Harbourside

Project Number: 60053048

Prepared By: A Jimenez

Date: 2019-10-24 15:17:27

Client Name: Neath Port Talbot County Borough Council

Comments:

Consim version 2.05

**Simulation Level**

Level 3a

**Simulation Parameters**

Iterations 1001

Timeslices:50, 100, 300, 500, 1000

**Water Quality Standard**

No Standard

Project: Port Talbot Harbourside

Project Number: 60053048

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### Source

BH104, BHC5, BH105

### Infiltration

Infiltration [mm/year] NORMAL(255,36.51)

### Source Inventory:

#### *Benzene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(3.43,24.6)

Organic

#### *Chromium*

Aquifer Source Concentration [mg/l] LOGTRIANGULAR(0.003,0.0053,0.178)

Inorganic

#### *Ethylbenzene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(0.0388,0.17)

Organic

#### *Naphthalene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(0.0948,0.27)

Organic

#### *Phenol*

Aquifer Source Concentration [mg/l] UNIFORM(0.03,0.04)

Organic

#### *Toluene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(0.488,1)

Organic

#### *Xylene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(0.3456,0.599)

Organic

**Project: Port Talbot Harbourside****Project Number: 60053048****Aquifer Pathway**

Thickness [m] UNIFORM(5.5,15)

Dry Bulk Density [g/cm<sup>3</sup>] UNIFORM(1.37,2.19)

Fraction of Organic Carbon [%] TRIANGULAR(0.2,0.27,0.38)

Calculated Mixing Zone Thickness

Hydraulic Conductivity [m/s] TRIANGULAR(2.89e-006,5.6e-005,0.0001)

Effective Porosity [fraction] UNIFORM(0.14,0.21)

Hydraulic Gradient TRIANGULAR(0.002,0.006,0.008)

Groundwater Flow Direction (degrees), 180.00

Longitudinal Dispersivity [m] SINGLE(13)

Lateral Dispersivity [m] SINGLE(3.9)

**Contaminant Inventory***Benzene*

koc [ml/g] TRIANGULAR(64.96,81.2,97.44) Calculate kd

Simulate Degradation in Dissolved Phase only

Half-life [years] UNIFORM(0.137,0.959)

*Chromium*

Partition Coefficient [ml/g] TRIANGULAR(53.6,67,80.4)

Simulate Degradation in Dissolved Phase only

Half-life [years] SINGLE(9e+029)

*Ethylbenzene*

koc [ml/g] TRIANGULAR(429.6,537,644.4) Calculate kd

Simulate Degradation in Dissolved Phase only

Half-life [years] LOGUNIFORM(0.137,0.548)

*Naphthalene*

koc [ml/g] TRIANGULAR(675.2,844,1012) Calculate kd

Simulate Degradation in Dissolved Phase only

Half-life [years] LOGUNIFORM(0.274,0.822)

*Phenol*

koc [ml/g] TRIANGULAR(66.4,83,99.6) Calculate kd

Simulate Degradation in Dissolved Phase only

Half-life [years] LOGUNIFORM(0.027,0.274)

*Toluene*

koc [ml/g] TRIANGULAR(187.2,234,280) Calculate kd

Simulate Degradation in Dissolved Phase only

Half-life [years] LOGUNIFORM(0.055,0.548)

*Xylene*

koc [ml/g] TRIANGULAR(489,612,734) Calculate kd

Simulate Degradation in Dissolved Phase only

Half-life [years] LOGUNIFORM(0.137,0.548)

Project: Port Talbot Harbourside

Project Number: 60053048

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Receptor

|                             |                 |                 |
|-----------------------------|-----------------|-----------------|
| BH104, BHC5, BH105 Receptor | X 276525.721000 | Y 189484.955000 |
| Port Talbot Dock            | X 276540.000000 | Y 189346.000000 |
| BH101 - Centinel            | X 276541.645000 | Y 189427.592000 |
| MW1- Centinel               | X 276633.210000 | Y 189439.703000 |
| Dock Feeder                 | X 275853.000000 | Y 189516.000000 |

Input Correlations

|     |      |
|-----|------|
| n-K | 0.8  |
| i-K | -0.8 |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Source Inventory:**

*Benzene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(3.43,24.6)

*Chromium*

Aquifer Source Concentration [mg/l] LOGTRIANGULAR(0.003,0.0053,0.178)

*Ethylbenzene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(0.0388,0.17)

*Naphthalene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(0.0948,0.27)

*Phenol*

Aquifer Source Concentration [mg/l] UNIFORM(0.03,0.04)

*Toluene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(0.488,1)

*Xylene*

Aquifer Source Concentration [mg/l] LOGUNIFORM(0.3456,0.599)

Project: Port Talbot Harbourside

Project Number: 60053048

## Benzene

*Unretarded Travel Time to BH104, BHC5, BH105 Receptor [years]*

|                                  |                                   |                                  |
|----------------------------------|-----------------------------------|----------------------------------|
| 05% of values less than 0        | 10% of values less than 0.0340628 | 25% of values less than 0.125325 |
| 50% of values less than 0.236757 | 75% of values less than 0.362446  | 90% of values less than 0.519497 |
| Minimum 0.0es less than 0.631235 | Maximum 2.06055                   |                                  |
| Mean 0.270684                    | SD 0.21832                        | Variance 0.0476634               |

*Retarded Travel Time to BH104, BHC5, BH105 Receptor [years]*

|                                  |                                  |                                  |
|----------------------------------|----------------------------------|----------------------------------|
| 05% of values less than 0        | 10% of values less than 0.109451 | 25% of values less than 0.419919 |
| 50% of values less than 0.780339 | 75% of values less than 1.20449  | 90% of values less than 1.77174  |
| Minimum 0.0es less than 2.19299  | Maximum 8.06898                  |                                  |
| Mean 0.920909                    | SD 0.799744                      | Variance 0.639591                |

**Chromium***Unretarded Travel Time to BH104, BHC5, BH105 Receptor [years]*

|                                  |                                   |                                  |
|----------------------------------|-----------------------------------|----------------------------------|
| 05% of values less than 0        | 10% of values less than 0.0340628 | 25% of values less than 0.125325 |
| 50% of values less than 0.236757 | 75% of values less than 0.362446  | 90% of values less than 0.519497 |
| Minimum 0.05 less than 0.631235  | Maximum 2.06055                   |                                  |
| Mean 0.270684                    | SD 0.21832                        | Variance 0.0476634               |

*Retarded Travel Time to BH104, BHC5, BH105 Receptor [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0       | 10% of values less than 22.667  | 25% of values less than 83.8748 |
| 50% of values less than 159.987 | 75% of values less than 252.246 | 90% of values less than 362.968 |
| Minimum 0.05 less than 456.675  | Maximum 2021.88                 |                                 |
| Mean 188.904                    | SD 169.964                      | Variance 28887.8                |

**Ethylbenzene***Unretarded Travel Time to BH104, BHC5, BH105 Receptor [years]*

|                                  |                                   |                                  |
|----------------------------------|-----------------------------------|----------------------------------|
| 05% of values less than 0        | 10% of values less than 0.0340628 | 25% of values less than 0.125325 |
| 50% of values less than 0.236757 | 75% of values less than 0.362446  | 90% of values less than 0.519497 |
| Minimum 0.05 less than 0.631235  | Maximum 2.06055                   |                                  |
| Mean 0.270684                    | SD 0.21832                        | Variance 0.0476634               |

*Retarded Travel Time to BH104, BHC5, BH105 Receptor [years]*

|                                 |                                  |                                 |
|---------------------------------|----------------------------------|---------------------------------|
| 05% of values less than 0       | 10% of values less than 0.541608 | 25% of values less than 2.00681 |
| 50% of values less than 3.78084 | 75% of values less than 6.01016  | 90% of values less than 8.77427 |
| Minimum 0.05 less than 11.0879  | Maximum 56.6488                  |                                 |
| Mean 4.57699                    | SD 4.194                         | Variance 17.5896                |

Project: Port Talbot Harbourside

Project Number: 60053048

Naphthalene

Unretarded Travel Time to BH104, BHC5, BH105 Receptor [years]

|                                  |                                   |                                  |
|----------------------------------|-----------------------------------|----------------------------------|
| 05% of values less than 0        | 10% of values less than 0.0340628 | 25% of values less than 0.125325 |
| 50% of values less than 0.236757 | 75% of values less than 0.362446  | 90% of values less than 0.519497 |
| Minimum 0.065 less than 0.631235 | Maximum 2.06055                   |                                  |
| Mean 0.270684                    | SD 0.21832                        | Variance 0.0476634               |

Retarded Travel Time to BH104, BHC5, BH105 Receptor [years]

|                                 |                                  |                                 |
|---------------------------------|----------------------------------|---------------------------------|
| 05% of values less than 0       | 10% of values less than 0.779023 | 25% of values less than 3.08906 |
| 50% of values less than 5.78973 | 75% of values less than 9.33057  | 90% of values less than 13.9147 |
| Minimum 0.065 less than 17.3121 | Maximum 72.8236                  |                                 |
| Mean 7.06175                    | SD 6.40537                       | Variance 41.0288                |

Phenol

Unretarded Travel Time to BH104, BHC5, BH105 Receptor [years]

|                                  |                                   |                                  |
|----------------------------------|-----------------------------------|----------------------------------|
| 05% of values less than 0        | 10% of values less than 0.0340628 | 25% of values less than 0.125325 |
| 50% of values less than 0.236757 | 75% of values less than 0.362446  | 90% of values less than 0.519497 |
| Minimum 0.0es less than 0.631235 | Maximum 2.06055                   |                                  |
| Mean 0.270684                    | SD 0.21832                        | Variance 0.0476634               |

Retarded Travel Time to BH104, BHC5, BH105 Receptor [years]

|                                  |                                  |                                  |
|----------------------------------|----------------------------------|----------------------------------|
| 05% of values less than 0        | 10% of values less than 0.110517 | 25% of values less than 0.426997 |
| 50% of values less than 0.784316 | 75% of values less than 1.22437  | 90% of values less than 1.83027  |
| Minimum 0.0es less than 2.23291  | Maximum 8.88345                  |                                  |
| Mean 0.936037                    | SD 0.818332                      | Variance 0.669668                |

Toluene

Unretarded Travel Time to BH104, BHC5, BH105 Receptor [years]

|                                  |                                   |                                  |
|----------------------------------|-----------------------------------|----------------------------------|
| 05% of values less than 0        | 10% of values less than 0.0340628 | 25% of values less than 0.125325 |
| 50% of values less than 0.236757 | 75% of values less than 0.362446  | 90% of values less than 0.519497 |
| Minimum 0.0es less than 0.631235 | Maximum 2.06055                   |                                  |
| Mean 0.270684                    | SD 0.21832                        | Variance 0.0476634               |

Retarded Travel Time to BH104, BHC5, BH105 Receptor [years]

|                                 |                                  |                                  |
|---------------------------------|----------------------------------|----------------------------------|
| 05% of values less than 0       | 10% of values less than 0.238458 | 25% of values less than 0.982837 |
| 50% of values less than 1.7738  | 75% of values less than 2.82951  | 90% of values less than 4.1714   |
| Minimum 0.0es less than 5.24258 | Maximum 22.3257                  |                                  |
| Mean 2.152                      | SD 1.92793                       | Variance 3.7169                  |

Project: Port Talbot Harbourside

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Xylene

Unretarded Travel Time to BH104, BHC5, BH105 Receptor [years]

|                                  |                                   |                                  |
|----------------------------------|-----------------------------------|----------------------------------|
| 05% of values less than 0        | 10% of values less than 0.0340628 | 25% of values less than 0.125325 |
| 50% of values less than 0.236757 | 75% of values less than 0.362446  | 90% of values less than 0.519497 |
| Minimum 0.0es less than 0.631235 | Maximum 2.06055                   |                                  |
| Mean 0.270684                    | SD 0.21832                        | Variance 0.0476634               |

Retarded Travel Time to BH104, BHC5, BH105 Receptor [years]

|                                 |                                  |                                 |
|---------------------------------|----------------------------------|---------------------------------|
| 05% of values less than 0       | 10% of values less than 0.573669 | 25% of values less than 2.21147 |
| 50% of values less than 4.26272 | 75% of values less than 6.76981  | 90% of values less than 10.1176 |
| Minimum 0.0es less than 13.073  | Maximum 59.1317                  |                                 |
| Mean 5.16077                    | SD 4.65707                       | Variance 21.6883                |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Benzene**

*Concentration at BH104, BHC5, BH105 Receptor [mg/l] - 1000 years*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.599368 | 10% of values less than 1.12255 | 25% of values less than 3.01845 |
| 50% of values less than 5.9729   | 75% of values less than 11.0297 | 90% of values less than 18.1132 |
| Minimum 0.03370091               | Maximum 24.3865                 |                                 |
| Mean 7.71411                     | SD 6.11745                      | Variance 37.4232                |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Chromium**

*Concentration at BH104, BHC5, BH105 Receptor [mg/l] - 1000 years*

|                                     |                                   |                                    |
|-------------------------------------|-----------------------------------|------------------------------------|
| 05% of values less than 0.000990821 | 10% of values less than 0.0015926 | 25% of values less than 0.00358973 |
| 50% of values less than 0.00754652  | 75% of values less than 0.0166576 | 90% of values less than 0.0324527  |
| Minimum 0.0001155621 0.0474102      | Maximum 0.13729                   |                                    |
| Mean 0.0137342                      | SD 0.0177831                      | Variance 0.000316238               |

Project: Port Talbot Harbourside

Project Number: 60053048

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Ethylbenzene

Concentration at BH104, BHC5, BH105 Receptor [mg/l] - 1000 years

|                                    |                                    |                                    |
|------------------------------------|------------------------------------|------------------------------------|
| 05% of values less than 0.00257026 | 10% of values less than 0.00416914 | 25% of values less than 0.00872351 |
| 50% of values less than 0.0194051  | 75% of values less than 0.041067   | 90% of values less than 0.0727703  |
| Minimum 0.0002306931 0.100411      | Maximum 0.16977                    |                                    |
| Mean 0.0307254                     | SD 0.0315853                       | Variance 0.00099763                |

Project: Port Talbot Harbourside

Project Number: 60053048

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Naphthalene

Concentration at BH104, BHC5, BH105 Receptor [mg/l] - 1000 years

|                                    |                                   |                                   |
|------------------------------------|-----------------------------------|-----------------------------------|
| 05% of values less than 0.00743538 | 10% of values less than 0.0137443 | 25% of values less than 0.0296581 |
| 50% of values less than 0.0551991  | 75% of values less than 0.0924232 | 90% of values less than 0.131536  |
| Minimum 0.0006925811 0.1681        | Maximum 0.269647                  |                                   |
| Mean 0.0674723                     | SD 0.050697                       | Variance 0.00257018               |

Project: Port Talbot Harbourside

Project Number: 60053048

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Phenol

Concentration at BH104, BHC5, BH105 Receptor [mg/l] - 1000 years

|                                    |                                     |                                   |
|------------------------------------|-------------------------------------|-----------------------------------|
| 05% of values less than 0.00010766 | 10% of values less than 0.000293665 | 25% of values less than 0.0023254 |
| 50% of values less than 0.0318412  | 75% of values less than 0.0358907   | 90% of values less than 0.038367  |
| Minimum 1.69944E-007 0.0391791     | Maximum 0.0399454                   |                                   |
| Mean 0.0226284                     | SD 0.0161194                        | Variance 0.000259835              |

Project: Port Talbot Harbourside

Project Number: 60053048

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Toluene

Concentration at BH104, BHC5, BH105 Receptor [mg/l] - 1000 years

|                                   |                                   |                                   |
|-----------------------------------|-----------------------------------|-----------------------------------|
| 05% of values less than 0.0100058 | 10% of values less than 0.0177876 | 25% of values less than 0.0442369 |
| 50% of values less than 0.134606  | 75% of values less than 0.51798   | 90% of values less than 0.738028  |
| Minimum 0.0001668981 0.864236     | Maximum 0.999934                  |                                   |
| Mean 0.26953                      | SD 0.285465                       | Variance 0.0814905                |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Xylene**

*Concentration at BH104, BHC5, BH105 Receptor [mg/l] - 1000 years*

|                                  |                                   |                                   |
|----------------------------------|-----------------------------------|-----------------------------------|
| 05% of values less than 0.014543 | 10% of values less than 0.0261853 | 25% of values less than 0.0571522 |
| 50% of values less than 0.117316 | 75% of values less than 0.200908  | 90% of values less than 0.391121  |
| Minimum 0.00179066 and 0.474945  | Maximum 0.597975                  |                                   |
| Mean 0.158372                    | SD 0.140904                       | Variance 0.019854                 |

Project: Port Talbot Harbourside

Project Number: 60053048

## Benzene

### *Unretarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.21751 | 10% of values less than 2.36505 | 25% of values less than 2.71708 |
| 50% of values less than 3.21822 | 75% of values less than 3.93171 | 90% of values less than 5.1814  |
| Minimum 1.82966s than 6.90503   | Maximum 15.3846                 |                                 |
| Mean 3.65603                    | SD 1.67526                      | Variance 2.80649                |

### *Retarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 6.68683 | 10% of values less than 7.41289 | 25% of values less than 8.63102 |
| 50% of values less than 10.701  | 75% of values less than 13.9446 | 90% of values less than 18.2577 |
| Minimum 4.95864s than 25.4519   | Maximum 65.3512                 |                                 |
| Mean 12.4188                    | SD 6.64897                      | Variance 44.2088                |

Project: Port Talbot Harbourside

Project Number: 60053048

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Chromium

*Unretarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.21751 | 10% of values less than 2.36505 | 25% of values less than 2.71708 |
| 50% of values less than 3.21822 | 75% of values less than 3.93171 | 90% of values less than 5.1814  |
| Minimum 1.82966s than 6.90503   | Maximum 15.3846                 |                                 |
| Mean 3.65603                    | SD 1.67526                      | Variance 2.80649                |

*Retarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 1320.57 | 10% of values less than 1452    | 25% of values less than 1733.25 |
| 50% of values less than 2175.98 | 75% of values less than 2876.45 | 90% of values less than 3720.3  |
| Minimum 916.007s than 5155.74   | Maximum 15722.6                 |                                 |
| Mean 2546.03                    | SD 1419.34                      | Variance 2.01452E+006           |

**Ethylbenzene***Unretarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.21751 | 10% of values less than 2.36505 | 25% of values less than 2.71708 |
| 50% of values less than 3.21822 | 75% of values less than 3.93171 | 90% of values less than 5.1814  |
| Minimum 1.82966s than 6.90503   | Maximum 15.3846                 |                                 |
| Mean 3.65603                    | SD 1.67526                      | Variance 2.80649                |

*Retarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 30.4906 | 10% of values less than 34.1797 | 25% of values less than 41.6424 |
| 50% of values less than 52.5084 | 75% of values less than 69.9132 | 90% of values less than 92.6711 |
| Minimum 19.1482s than 121.505   | Maximum 440.515                 |                                 |
| Mean 61.3841                    | SD 34.6063                      | Variance 1197.59                |

**Naphthalene***Unretarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.21751 | 10% of values less than 2.36505 | 25% of values less than 2.71708 |
| 50% of values less than 3.21822 | 75% of values less than 3.93171 | 90% of values less than 5.1814  |
| Minimum 1.82966s than 6.90503   | Maximum 15.3846                 |                                 |
| Mean 3.65603                    | SD 1.67526                      | Variance 2.80649                |

*Retarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 47.3295 | 10% of values less than 52.8463 | 25% of values less than 63.669  |
| 50% of values less than 80.589  | 75% of values less than 108.12  | 90% of values less than 146.018 |
| Minimum 33.066ss than 198.08    | Maximum 566.294                 |                                 |
| Mean 95.0311                    | SD 54.2788                      | Variance 2946.19                |

**Phenol***Unretarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.21751 | 10% of values less than 2.36505 | 25% of values less than 2.71708 |
| 50% of values less than 3.21822 | 75% of values less than 3.93171 | 90% of values less than 5.1814  |
| Minimum 1.82966s than 6.90503   | Maximum 15.3846                 |                                 |
| Mean 3.65603                    | SD 1.67526                      | Variance 2.80649                |

*Retarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 6.84778 | 10% of values less than 7.54532 | 25% of values less than 8.73273 |
| 50% of values less than 10.6737 | 75% of values less than 14.1291 | 90% of values less than 18.6948 |
| Minimum 4.946ess than 25.3371   | Maximum 69.0799                 |                                 |
| Mean 12.6055                    | SD 6.81517                      | Variance 46.4466                |

**Toluene***Unretarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.21751 | 10% of values less than 2.36505 | 25% of values less than 2.71708 |
| 50% of values less than 3.21822 | 75% of values less than 3.93171 | 90% of values less than 5.1814  |
| Minimum 1.82966s than 6.90503   | Maximum 15.3846                 |                                 |
| Mean 3.65603                    | SD 1.67526                      | Variance 2.80649                |

*Retarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 15.0091 | 10% of values less than 16.4994 | 25% of values less than 19.8439 |
| 50% of values less than 24.6082 | 75% of values less than 32.4407 | 90% of values less than 43.8709 |
| Minimum 10.2271s than 57.474    | Maximum 173.61                  |                                 |
| Mean 28.9865                    | SD 16.3952                      | Variance 268.804                |

**Xylene***Unretarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.21751 | 10% of values less than 2.36505 | 25% of values less than 2.71708 |
| 50% of values less than 3.21822 | 75% of values less than 3.93171 | 90% of values less than 5.1814  |
| Minimum 1.82966s than 6.90503   | Maximum 15.3846                 |                                 |
| Mean 3.65603                    | SD 1.67526                      | Variance 2.80649                |

*Retarded Travel Time to Port Talbot Dock [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 34.5237 | 10% of values less than 38.6322 | 25% of values less than 46.7007 |
| 50% of values less than 59.3177 | 75% of values less than 79.2995 | 90% of values less than 104.373 |
| Minimum 22.3277s than 146.674   | Maximum 459.822                 |                                 |
| Mean 69.5343                    | SD 39.9517                      | Variance 1596.14                |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Benzene**

*Concentration at Port Talbot Dock [mg/l] - 1000 years*

|                                     |                                    |                                   |
|-------------------------------------|------------------------------------|-----------------------------------|
| 05% of values less than 0.000483999 | 10% of values less than 0.00177262 | 25% of values less than 0.0172729 |
| 50% of values less than 0.104369    | 75% of values less than 0.364536   | 90% of values less than 0.780284  |
| Minimum 2.1543E-008n 1.16891        | Maximum 2.57601                    |                                   |
| Mean 0.275483                       | SD 0.417643                        | Variance 0.174426                 |

Project: Port Talbot Harbourside

Project Number: 60053048

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Chromium

Concentration at Port Talbot Dock [mg/l] - 1000 years

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 1.89565E-008 | 10% of values less than 8.03394E-007 | 25% of values less than 1.39668E-005 |
| 50% of values less than 0.000154633  | 75% of values less than 0.000645396  | 90% of values less than 0.00172752   |
| Minimum 2.39783E-0140.00332617       | Maximum 0.0209241                    |                                      |
| Mean 0.000714968                     | SD 0.00174058                        | Variance 3.02961E-006                |

Project: Port Talbot Harbourside

Project Number: 60053048

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Ethylbenzene

Concentration at Port Talbot Dock [mg/l] - 1000 years

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 2.2802E-007  | 10% of values less than 1.57696E-006 | 25% of values less than 1.19545E-005 |
| 50% of values less than 8.10955E-005 | 75% of values less than 0.000474385  | 90% of values less than 0.00132847   |
| Minimum 3.41589E-0130.00204653       | Maximum 0.00697104                   |                                      |
| Mean 0.000417913                     | SD 0.000761435                       | Variance 5.79783E-007                |

Project: Port Talbot Harbourside

Project Number: 60053048

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Naphthalene

Concentration at Port Talbot Dock [mg/l] - 1000 years

|                                     |                                     |                                     |
|-------------------------------------|-------------------------------------|-------------------------------------|
| 05% of values less than 4.3245E-005 | 10% of values less than 0.000138402 | 25% of values less than 0.000576472 |
| 50% of values less than 0.00157813  | 75% of values less than 0.00390165  | 90% of values less than 0.00764142  |
| Minimum 6.6983E-009n 0.0111346      | Maximum 0.02748                     |                                     |
| Mean 0.00302625                     | SD 0.00384879                       | Variance 1.48132E-005               |

Project: Port Talbot Harbourside

Project Number: 60053048

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Phenol

Concentration at Port Talbot Dock [mg/l] - 1000 years

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 2.32763E-015 | 10% of values less than 1.27046E-013 | 25% of values less than 3.29083E-011 |
| 50% of values less than 1.23986E-008 | 75% of values less than 1.65953E-006 | 90% of values less than 1.56924E-005 |
| Minimum 2.8469E-028n 3.54855E-005    | Maximum 0.000344406                  |                                      |
| Mean 7.22272E-006                    | SD 2.69436E-005                      | Variance 7.25958E-010                |

Project: Port Talbot Harbourside

Project Number: 60053048

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Toluene

Concentration at Port Talbot Dock [mg/l] - 1000 years

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 4.07577E-009 | 10% of values less than 3.93493E-008 | 25% of values less than 8.78047E-007 |
| 50% of values less than 6.29976E-005 | 75% of values less than 0.00158454   | 90% of values less than 0.0073549    |
| Minimum 3.70454E-0160.0130915        | Maximum 0.0383722                    |                                      |
| Mean 0.00213578                      | SD 0.00481998                        | Variance 2.32322E-005                |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Xylene**

*Concentration at Port Talbot Dock [mg/l] - 1000 years*

|                                      |                                     |                                      |
|--------------------------------------|-------------------------------------|--------------------------------------|
| 05% of values less than 2.29887E-006 | 10% of values less than 1.0879E-005 | 25% of values less than 8.63768E-005 |
| 50% of values less than 0.000588147  | 75% of values less than 0.00272195  | 90% of values less than 0.00731668   |
| Minimum 1.29497E-0090.0103123        | Maximum 0.0241732                   |                                      |
| Mean 0.00231378                      | SD 0.00385685                       | Variance 1.48753E-005                |

**Benzene***Unretarded Travel Time to BH101 - Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.982649 | 10% of values less than 1.04797 | 25% of values less than 1.21426 |
| 50% of values less than 1.46184  | 75% of values less than 1.81821 | 90% of values less than 2.38685 |
| Minimum 0.761959                 | Maximum 7.35051                 |                                 |
| Mean 1.66587                     | SD 0.786168                     | Variance 0.61806                |

*Retarded Travel Time to BH101 - Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.94648 | 10% of values less than 3.26447 | 25% of values less than 3.84745 |
| 50% of values less than 4.86838 | 75% of values less than 6.358   | 90% of values less than 8.44508 |
| Minimum 1.88542                 | Maximum 30.6407                 |                                 |
| Mean 5.6596                     | SD 3.10375                      | Variance 9.63323                |

**Chromium***Unretarded Travel Time to BH101 - Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.982649 | 10% of values less than 1.04797 | 25% of values less than 1.21426 |
| 50% of values less than 1.46184  | 75% of values less than 1.81821 | 90% of values less than 2.38685 |
| Minimum 0.761959                 | Maximum 7.35051                 |                                 |
| Mean 1.66587                     | SD 0.786168                     | Variance 0.61806                |

*Retarded Travel Time to BH101 - Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 582.036 | 10% of values less than 649.564 | 25% of values less than 781.634 |
| 50% of values less than 985.854 | 75% of values less than 1319.35 | 90% of values less than 1694.47 |
| Minimum 407.776                 | Maximum 7677.78                 |                                 |
| Mean 1160.3                     | SD 663.554                      | Variance 440304                 |

**Ethylbenzene***Unretarded Travel Time to BH101 - Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.982649 | 10% of values less than 1.04797 | 25% of values less than 1.21426 |
| 50% of values less than 1.46184  | 75% of values less than 1.81821 | 90% of values less than 2.38685 |
| Minimum 0.761959                 | Maximum 7.35051                 |                                 |
| Mean 1.66587                     | SD 0.786168                     | Variance 0.61806                |

*Retarded Travel Time to BH101 - Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 13.7837 | 10% of values less than 15.1891 | 25% of values less than 18.5925 |
| 50% of values less than 23.9268 | 75% of values less than 32.1876 | 90% of values less than 43.0207 |
| Minimum 7.28069                 | Maximum 215.115                 |                                 |
| Mean 27.9907                    | SD 16.2469                      | Variance 263.962                |

**Naphthalene***Unretarded Travel Time to BH101 - Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.982649 | 10% of values less than 1.04797 | 25% of values less than 1.21426 |
| 50% of values less than 1.46184  | 75% of values less than 1.81821 | 90% of values less than 2.38685 |
| Minimum 0.761959                 | Maximum 7.35051                 |                                 |
| Mean 1.66587                     | SD 0.786168                     | Variance 0.61806                |

*Retarded Travel Time to BH101 - Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 20.7968 | 10% of values less than 23.6277 | 25% of values less than 28.5722 |
| 50% of values less than 36.1542 | 75% of values less than 49.9244 | 90% of values less than 66.5144 |
| Minimum 13.0611                 | Maximum 276.537                 |                                 |
| Mean 43.3178                    | SD 25.3543                      | Variance 642.839                |

Project: Port Talbot Harbourside

Project Number: 60053048

## Phenol

### *Unretarded Travel Time to BH101 - Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.982649 | 10% of values less than 1.04797 | 25% of values less than 1.21426 |
| 50% of values less than 1.46184  | 75% of values less than 1.81821 | 90% of values less than 2.38685 |
| Minimum 0.761959                 | Maximum 7.35051                 |                                 |
| Mean 1.66587                     | SD 0.786168                     | Variance 0.61806                |

### *Retarded Travel Time to BH101 - Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 3.01556 | 10% of values less than 3.33752 | 25% of values less than 3.94786 |
| 50% of values less than 4.87214 | 75% of values less than 6.44975 | 90% of values less than 8.6444  |
| Minimum 1.88061                 | Maximum 33.7336                 |                                 |
| Mean 5.74561                    | SD 3.18406                      | Variance 10.1382                |

Project: Port Talbot Harbourside

Project Number: 60053048

**Toluene**

*Unretarded Travel Time to BH101 - Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.982649 | 10% of values less than 1.04797 | 25% of values less than 1.21426 |
| 50% of values less than 1.46184  | 75% of values less than 1.81821 | 90% of values less than 2.38685 |
| Minimum 0.761959                 | Maximum 7.35051                 |                                 |
| Mean 1.66587                     | SD 0.786168                     | Variance 0.61806                |

*Retarded Travel Time to BH101 - Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 6.57177 | 10% of values less than 7.38191 | 25% of values less than 8.92615 |
| 50% of values less than 11.174  | 75% of values less than 14.9424 | 90% of values less than 20.1977 |
| Minimum 4.20362                 | Maximum 84.7784                 |                                 |
| Mean 13.2117                    | SD 7.6441                       | Variance 58.4323                |

**Xylene***Unretarded Travel Time to BH101 - Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.982649 | 10% of values less than 1.04797 | 25% of values less than 1.21426 |
| 50% of values less than 1.46184  | 75% of values less than 1.81821 | 90% of values less than 2.38685 |
| Minimum 0.761959                 | Maximum 7.35051                 |                                 |
| Mean 1.66587                     | SD 0.786168                     | Variance 0.61806                |

*Retarded Travel Time to BH101 - Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 15.2635 | 10% of values less than 17.3494 | 25% of values less than 21.0015 |
| 50% of values less than 27.0391 | 75% of values less than 36.1437 | 90% of values less than 49.1434 |
| Minimum 9.93958                 | Maximum 224.544                 |                                 |
| Mean 31.6921                    | SD 18.6143                      | Variance 346.492                |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Benzene**

*Concentration at BH101 - Centinel [mg/l] - 1000 years*

|                                   |                                  |                                  |
|-----------------------------------|----------------------------------|----------------------------------|
| 05% of values less than 0.0545109 | 10% of values less than 0.107071 | 25% of values less than 0.334332 |
| 50% of values less than 0.814246  | 75% of values less than 1.69885  | 90% of values less than 3.23307  |
| Minimum 0.0002464971 4.3613       | Maximum 8.23827                  |                                  |
| Mean 1.3091                       | SD 1.41719                       | Variance 2.00844                 |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Chromium**

*Concentration at BH101 - Centinel [mg/l] - 1000 years*

|                                     |                                     |                                    |
|-------------------------------------|-------------------------------------|------------------------------------|
| 05% of values less than 0.000394175 | 10% of values less than 0.000847885 | 25% of values less than 0.00186226 |
| 50% of values less than 0.00400179  | 75% of values less than 0.00893396  | 90% of values less than 0.0186937  |
| Minimum 1.0422E-008n 0.0272524      | Maximum 0.0849774                   |                                    |
| Mean 0.00753996                     | SD 0.0101894                        | Variance 0.000103823               |

Project: Port Talbot Harbourside

Project Number: 60053048

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Ethylbenzene

Concentration at BH101 - Centinel [mg/l] - 1000 years

|                                     |                                     |                                     |
|-------------------------------------|-------------------------------------|-------------------------------------|
| 05% of values less than 0.000130777 | 10% of values less than 0.000304742 | 25% of values less than 0.000886639 |
| 50% of values less than 0.00233069  | 75% of values less than 0.00571417  | 90% of values less than 0.0107119   |
| Minimum 7.65336E-0080.0152683       | Maximum 0.0390996                   |                                     |
| Mean 0.00422037                     | SD 0.00483114                       | Variance 2.33399E-005               |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Naphthalene**

*Concentration at BH101 - Centinel [mg/l] - 1000 years*

|                                    |                                    |                                    |
|------------------------------------|------------------------------------|------------------------------------|
| 05% of values less than 0.00217319 | 10% of values less than 0.00363508 | 25% of values less than 0.00806195 |
| 50% of values less than 0.0146865  | 75% of values less than 0.0246829  | 90% of values less than 0.0371882  |
| Minimum 1.78112E-0050.0468385      | Maximum 0.0898055                  |                                    |
| Mean 0.0181781                     | SD 0.0142439                       | Variance 0.000202889               |

Project: Port Talbot Harbourside

Project Number: 60053048

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Phenol

Concentration at BH101 - Centinel [mg/l] - 1000 years

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 7.15214E-009 | 10% of values less than 6.68209E-008 | 25% of values less than 1.03078E-006 |
| 50% of values less than 2.1114E-005  | 75% of values less than 0.000234262  | 90% of values less than 0.000740308  |
| Minimum 4.65839E-0160.00117585       | Maximum 0.0042099                    |                                      |
| Mean 0.000230583                     | SD 0.000471638                       | Variance 2.22442E-007                |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Toluene**

*Concentration at BH101 - Centinel [mg/l] - 1000 years*

|                                      |                                     |                                     |
|--------------------------------------|-------------------------------------|-------------------------------------|
| 05% of values less than 4.19734E-005 | 10% of values less than 0.000145051 | 25% of values less than 0.000824531 |
| 50% of values less than 0.00591853   | 75% of values less than 0.0316277   | 90% of values less than 0.0721886   |
| Minimum 1.25762E-0080.0969518        | Maximum 0.205471                    |                                     |
| Mean 0.0223117                       | SD 0.0333191                        | Variance 0.00111016                 |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Xylene**

*Concentration at BH101 - Centinel [mg/l] - 1000 years*

|                                     |                                    |                                   |
|-------------------------------------|------------------------------------|-----------------------------------|
| 05% of values less than 0.000839135 | 10% of values less than 0.00181087 | 25% of values less than 0.0056902 |
| 50% of values less than 0.015211    | 75% of values less than 0.0335575  | 90% of values less than 0.0562728 |
| Minimum 1.94134E-0050.0725793       | Maximum 0.123656                   |                                   |
| Mean 0.0232354                      | SD 0.0234505                       | Variance 0.000549924              |

Project: Port Talbot Harbourside

Project Number: 60053048

## Benzene

### *Unretarded Travel Time to MW1- Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.795282 | 10% of values less than 0.8459  | 25% of values less than 0.99178 |
| 50% of values less than 1.20466  | 75% of values less than 1.50685 | 90% of values less than 1.97994 |
| Minimum 0.599186                 | Maximum 6.23365                 |                                 |
| Mean 1.37047                     | SD 0.656826                     | Variance 0.43142                |

### *Retarded Travel Time to MW1- Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.40173 | 10% of values less than 2.6368  | 25% of values less than 3.16973 |
| 50% of values less than 3.99328 | 75% of values less than 5.20516 | 90% of values less than 7.06357 |
| Minimum 1.42925                 | Maximum 25.8752                 |                                 |
| Mean 4.65631                    | SD 2.58563                      | Variance 6.68551                |

**Chromium***Unretarded Travel Time to MW1- Centinel [years]*

05% of values less than 0.795282

10% of values less than 0.8459

25% of values less than 0.99178

50% of values less than 1.20466

75% of values less than 1.50685

90% of values less than 1.97994

Minimum 0.599186

Maximum 6.23365

Mean 1.37047

SD 0.656826

Variance 0.43142

*Retarded Travel Time to MW1- Centinel [years]*

05% of values less than 473.264

10% of values less than 522.596

25% of values less than 644.374

50% of values less than 811.456

75% of values less than 1091

90% of values less than 1409.13

Minimum 322.765

Maximum 6483.66

Mean 954.608

SD 553.005

Variance 305814

Project: Port Talbot Harbourside

Project Number: 60053048

### Ethylbenzene

#### *Unretarded Travel Time to MW1- Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.795282 | 10% of values less than 0.8459  | 25% of values less than 0.99178 |
| 50% of values less than 1.20466  | 75% of values less than 1.50685 | 90% of values less than 1.97994 |
| Minimum 0.599186                 | Maximum 6.23365                 |                                 |
| Mean 1.37047                     | SD 0.656826                     | Variance 0.43142                |

#### *Retarded Travel Time to MW1- Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 10.9393 | 10% of values less than 12.4419 | 25% of values less than 15.199  |
| 50% of values less than 19.62   | 75% of values less than 26.4706 | 90% of values less than 35.7494 |
| Minimum 5.51915                 | Maximum 181.659                 |                                 |
| Mean 23.034                     | SD 13.5591                      | Variance 183.85                 |

**Naphthalene***Unretarded Travel Time to MW1- Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.795282 | 10% of values less than 0.8459  | 25% of values less than 0.99178 |
| 50% of values less than 1.20466  | 75% of values less than 1.50685 | 90% of values less than 1.97994 |
| Minimum 0.599186                 | Maximum 6.23365                 |                                 |
| Mean 1.37047                     | SD 0.656826                     | Variance 0.43142                |

*Retarded Travel Time to MW1- Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 16.8294 | 10% of values less than 19.229  | 25% of values less than 23.4554 |
| 50% of values less than 29.7356 | 75% of values less than 41.2467 | 90% of values less than 54.6737 |
| Minimum 9.90101                 | Maximum 233.527                 |                                 |
| Mean 35.6418                    | SD 21.1199                      | Variance 446.052                |

Project: Port Talbot Harbourside

Project Number: 60053048

Phenol

*Unretarded Travel Time to MW1- Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.795282 | 10% of values less than 0.8459  | 25% of values less than 0.99178 |
| 50% of values less than 1.20466  | 75% of values less than 1.50685 | 90% of values less than 1.97994 |
| Minimum 0.599186                 | Maximum 6.23365                 |                                 |
| Mean 1.37047                     | SD 0.656826                     | Variance 0.43142                |

*Retarded Travel Time to MW1- Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 2.42584 | 10% of values less than 2.68599 | 25% of values less than 3.2185  |
| 50% of values less than 4.03585 | 75% of values less than 5.34003 | 90% of values less than 7.19655 |
| Minimum 1.4256                  | Maximum 28.487                  |                                 |
| Mean 4.72737                    | SD 2.65314                      | Variance 7.03913                |

Project: Port Talbot Harbourside

Project Number: 60053048

**Toluene**

*Unretarded Travel Time to MW1- Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.795282 | 10% of values less than 0.8459  | 25% of values less than 0.99178 |
| 50% of values less than 1.20466  | 75% of values less than 1.50685 | 90% of values less than 1.97994 |
| Minimum 0.599186                 | Maximum 6.23365                 |                                 |
| Mean 1.37047                     | SD 0.656826                     | Variance 0.43142                |

*Retarded Travel Time to MW1- Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 5.28169 | 10% of values less than 6.01767 | 25% of values less than 7.27847 |
| 50% of values less than 9.13438 | 75% of values less than 12.4018 | 90% of values less than 16.846  |
| Minimum 3.18657                 | Maximum 71.5928                 |                                 |
| Mean 10.8702                    | SD 6.36357                      | Variance 40.495                 |

**Xylene***Unretarded Travel Time to MW1- Centinel [years]*

|                                  |                                 |                                 |
|----------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 0.795282 | 10% of values less than 0.8459  | 25% of values less than 0.99178 |
| 50% of values less than 1.20466  | 75% of values less than 1.50685 | 90% of values less than 1.97994 |
| Minimum 0.599186                 | Maximum 6.23365                 |                                 |
| Mean 1.37047                     | SD 0.656826                     | Variance 0.43142                |

*Retarded Travel Time to MW1- Centinel [years]*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 12.3319 | 10% of values less than 14.1362 | 25% of values less than 17.146  |
| 50% of values less than 22.1837 | 75% of values less than 29.8308 | 90% of values less than 41.0456 |
| Minimum 7.68815                 | Maximum 189.62                  |                                 |
| Mean 26.075                     | SD 15.4909                      | Variance 239.968                |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Benzene**

*Concentration at MW1- Centinel [mg/l] - 1000 years*

|                                     |                                    |                                    |
|-------------------------------------|------------------------------------|------------------------------------|
| 05% of values less than 0.000614016 | 10% of values less than 0.00141268 | 25% of values less than 0.00426786 |
| 50% of values less than 0.0160624   | 75% of values less than 0.0609854  | 90% of values less than 0.174477   |
| Minimum 1.01563E-005 0.323212       | Maximum 1.46539                    |                                    |
| Mean 0.0668858                      | SD 0.14399                         | Variance 0.020733                  |

Project: Port Talbot Harbourside

Project Number: 60053048

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Chromium

Concentration at MW1- Centinel [mg/l] - 1000 years

|                                      |                                      |                                     |
|--------------------------------------|--------------------------------------|-------------------------------------|
| 05% of values less than 3.81992E-006 | 10% of values less than 7.19999E-006 | 25% of values less than 2.3296E-005 |
| 50% of values less than 8.20985E-005 | 75% of values less than 0.000313457  | 90% of values less than 0.000969418 |
| Minimum 8.20206E-0090.00183723       | Maximum 0.00939133                   |                                     |
| Mean 0.000401234                     | SD 0.000968748                       | Variance 9.38473E-007               |

Ethylbenzene

Concentration at MW1- Centinel [mg/l] - 1000 years

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 1.9462E-006  | 10% of values less than 4.20386E-006 | 25% of values less than 1.51639E-005 |
| 50% of values less than 5.19677E-005 | 75% of values less than 0.000204766  | 90% of values less than 0.000617334  |
| Minimum 4.90374E-0090.00110496       | Maximum 0.00956155                   |                                      |
| Mean 0.000248495                     | SD 0.000586348                       | Variance 3.43804E-007                |

Project: Port Talbot Harbourside

Project Number: 60053048

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Naphthalene

Concentration at MW1- Centinel [mg/l] - 1000 years

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 1.69524E-005 | 10% of values less than 3.23002E-005 | 25% of values less than 9.30176E-005 |
| 50% of values less than 0.000294041  | 75% of values less than 0.000978632  | 90% of values less than 0.00256717   |
| Minimum 5.90937E-007 0.00403804      | Maximum 0.016404                     |                                      |
| Mean 0.000945037                     | SD 0.00179289                        | Variance 3.21444E-006                |

Phenol

Concentration at MW1- Centinel [mg/l] - 1000 years

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 1.24779E-009 | 10% of values less than 6.25797E-009 | 25% of values less than 6.41494E-008 |
| 50% of values less than 9.32688E-007 | 75% of values less than 6.7152E-006  | 90% of values less than 2.98091E-005 |
| Minimum 3.11665E-016 7.55778E-005    | Maximum 0.000666236                  |                                      |
| Mean 1.41476E-005                    | SD 4.7444E-005                       | Variance 2.25093E-009                |

Project: Port Talbot Harbourside

Project Number: 60053048

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Toluene

Concentration at MW1- Centinel [mg/l] - 1000 years

|                                      |                                      |                                     |
|--------------------------------------|--------------------------------------|-------------------------------------|
| 05% of values less than 1.55943E-006 | 10% of values less than 4.10475E-006 | 25% of values less than 2.5052E-005 |
| 50% of values less than 0.000166198  | 75% of values less than 0.000860282  | 90% of values less than 0.00308597  |
| Minimum 2.5696E-009n 0.00634331      | Maximum 0.0360332                    |                                     |
| Mean 0.00117732                      | SD 0.00287467                        | Variance 8.26372E-006               |

**Xylene**

*Concentration at MW1- Centinel [mg/l] - 1000 years*

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 1.47076E-005 | 10% of values less than 2.94108E-005 | 25% of values less than 9.99986E-005 |
| 50% of values less than 0.000322265  | 75% of values less than 0.00114227   | 90% of values less than 0.00331886   |
| Minimum 1.49472E-007 0.00606723      | Maximum 0.0276268                    |                                      |
| Mean 0.00129875                      | SD 0.00275771                        | Variance 7.60499E-006                |

**Benzene**

*Unretarded Travel Time to Dock Feeder [years]*

|                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| 05% of values less than 0      | 10% of values less than 0      | 25% of values less than 1E+006 |
| 50% of values less than 1E+006 | 75% of values less than 1E+006 | 90% of values less than 1E+006 |
| Minimum 0.es less than 1E+006  | Maximum 1E+006                 |                                |
| Mean 840160                    | SD 366641                      | Variance 1.34426E+011          |

*Retarded Travel Time to Dock Feeder [years]*

|                                     |                                      |                                      |
|-------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 0           | 10% of values less than 0            | 25% of values less than 2.75065E+006 |
| 50% of values less than 3.1623E+006 | 75% of values less than 3.59553E+006 | 90% of values less than 4.11372E+006 |
| Minimum 0.es less than 4.33983E+006 | Maximum 5.14213E+006                 |                                      |
| Mean 2.82567E+006                   | SD 1.33042E+006                      | Variance 1.77002E+012                |

**Chromium**

*Unretarded Travel Time to Dock Feeder [years]*

|                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| 05% of values less than 0      | 10% of values less than 0      | 25% of values less than 1E+006 |
| 50% of values less than 1E+006 | 75% of values less than 1E+006 | 90% of values less than 1E+006 |
| Minimum 0.es less than 1E+006  | Maximum 1E+006                 |                                |
| Mean 840160                    | SD 366641                      | Variance 1.34426E+011          |

*Retarded Travel Time to Dock Feeder [years]*

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 0            | 10% of values less than 0            | 25% of values less than 5.25791E+008 |
| 50% of values less than 6.41829E+008 | 75% of values less than 7.53838E+008 | 90% of values less than 8.63341E+008 |
| Minimum 0.es less than 9.1578E+008   | Maximum 1.13366E+009                 |                                      |
| Mean 5.79223E+008                    | SD 2.8163E+008                       | Variance 7.93156E+016                |

Ethylbenzene

*Unretarded Travel Time to Dock Feeder [years]*

|                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| 05% of values less than 0      | 10% of values less than 0      | 25% of values less than 1E+006 |
| 50% of values less than 1E+006 | 75% of values less than 1E+006 | 90% of values less than 1E+006 |
| Minimum 0.es less than 1E+006  | Maximum 1E+006                 |                                |
| Mean 840160                    | SD 366641                      | Variance 1.34426E+011          |

*Retarded Travel Time to Dock Feeder [years]*

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 0            | 10% of values less than 0            | 25% of values less than 1.24876E+007 |
| 50% of values less than 1.54546E+007 | 75% of values less than 1.81606E+007 | 90% of values less than 2.10158E+007 |
| Minimum 0.es less than 2.26977E+007  | Maximum 2.92086E+007                 |                                      |
| Mean 1.39441E+007                    | SD 6.91814E+006                      | Variance 4.78606E+013                |

**Naphthalene**

*Unretarded Travel Time to Dock Feeder [years]*

|                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| 05% of values less than 0      | 10% of values less than 0      | 25% of values less than 1E+006 |
| 50% of values less than 1E+006 | 75% of values less than 1E+006 | 90% of values less than 1E+006 |
| Minimum 0.es less than 1E+006  | Maximum 1E+006                 |                                |
| Mean 840160                    | SD 366641                      | Variance 1.34426E+011          |

*Retarded Travel Time to Dock Feeder [years]*

|                                      |                                     |                                      |
|--------------------------------------|-------------------------------------|--------------------------------------|
| 05% of values less than 0            | 10% of values less than 0           | 25% of values less than 1.90104E+007 |
| 50% of values less than 2.37658E+007 | 75% of values less than 2.8301E+007 | 90% of values less than 3.30553E+007 |
| Minimum 0.es less than 3.53743E+007  | Maximum 4.73554E+007                |                                      |
| Mean 2.15876E+007                    | SD 1.08114E+007                     | Variance 1.16886E+014                |

Phenol

*Unretarded Travel Time to Dock Feeder [years]*

|                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| 05% of values less than 0      | 10% of values less than 0      | 25% of values less than 1E+006 |
| 50% of values less than 1E+006 | 75% of values less than 1E+006 | 90% of values less than 1E+006 |
| Minimum 0.es less than 1E+006  | Maximum 1E+006                 |                                |
| Mean 840160                    | SD 366641                      | Variance 1.34426E+011          |

*Retarded Travel Time to Dock Feeder [years]*

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 0            | 10% of values less than 0            | 25% of values less than 2.76476E+006 |
| 50% of values less than 3.21785E+006 | 75% of values less than 3.65549E+006 | 90% of values less than 4.12503E+006 |
| Minimum 0.es less than 4.43292E+006  | Maximum 5.52487E+006                 |                                      |
| Mean 2.86767E+006                    | SD 1.35698E+006                      | Variance 1.84138E+012                |

Toluene

*Unretarded Travel Time to Dock Feeder [years]*

|                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| 05% of values less than 0      | 10% of values less than 0      | 25% of values less than 1E+006 |
| 50% of values less than 1E+006 | 75% of values less than 1E+006 | 90% of values less than 1E+006 |
| Minimum 0.es less than 1E+006  | Maximum 1E+006                 |                                |
| Mean 840160                    | SD 366641                      | Variance 1.34426E+011          |

*Retarded Travel Time to Dock Feeder [years]*

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 0            | 10% of values less than 0            | 25% of values less than 5.97197E+006 |
| 50% of values less than 7.30981E+006 | 75% of values less than 8.49317E+006 | 90% of values less than 9.76134E+006 |
| Minimum 0.es less than 1.04774E+007  | Maximum 1.38017E+007                 |                                      |
| Mean 6.57755E+006                    | SD 3.2146E+006                       | Variance 1.03336E+013                |

Xylene

Unretarded Travel Time to Dock Feeder [years]

|                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| 05% of values less than 0      | 10% of values less than 0      | 25% of values less than 1E+006 |
| 50% of values less than 1E+006 | 75% of values less than 1E+006 | 90% of values less than 1E+006 |
| Minimum 0.es less than 1E+006  | Maximum 1E+006                 |                                |
| Mean 840160                    | SD 366641                      | Variance 1.34426E+011          |

Retarded Travel Time to Dock Feeder [years]

|                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 05% of values less than 0            | 10% of values less than 0            | 25% of values less than 1.3975E+007  |
| 50% of values less than 1.72641E+007 | 75% of values less than 2.04422E+007 | 90% of values less than 2.39167E+007 |
| Minimum 0.es less than 2.61451E+007  | Maximum 3.5663E+007                  |                                      |
| Mean 1.57743E+007                    | SD 7.8779E+006                       | Variance 6.20613E+013                |

**Benzene**

*Concentration at Dock Feeder [mg/l] - 1000 years*

|                                |                           |                                 |
|--------------------------------|---------------------------|---------------------------------|
| 05% of values less than 0      | 10% of values less than 0 | 25% of values less than 0       |
| 50% of values less than 0      | 75% of values less than 0 | 90% of values less than 6.44687 |
| Minimum 0.es less than 11.9357 | Maximum 24.3572           |                                 |
| Mean 1.63132                   | SD 4.44856                | Variance 19.7897                |

Project: Port Talbot Harbourside

Project Number: 60053048

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**Chromium**

*Concentration at Dock Feeder [mg/l] - 1000 years*

|                                  |                           |                                    |
|----------------------------------|---------------------------|------------------------------------|
| 05% of values less than 0        | 10% of values less than 0 | 25% of values less than 0          |
| 50% of values less than 0        | 75% of values less than 0 | 90% of values less than 0.00892172 |
| Minimum 0.es less than 0.0251481 | Maximum 0.149979          |                                    |
| Mean 0.00366618                  | SD 0.0128265              | Variance 0.000164519               |

Project: Port Talbot Harbourside

Project Number: 60053048

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Ethylbenzene

Concentration at Dock Feeder [mg/l] - 1000 years

|                                 |                           |                                   |
|---------------------------------|---------------------------|-----------------------------------|
| 05% of values less than 0       | 10% of values less than 0 | 25% of values less than 0         |
| 50% of values less than 0       | 75% of values less than 0 | 90% of values less than 0.0624779 |
| Minimum 0.es less than 0.102012 | Maximum 0.167195          |                                   |
| Mean 0.0134049                  | SD 0.0338633              | Variance 0.00114672               |

Project: Port Talbot Harbourside

Project Number: 60053048

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Naphthalene

Concentration at Dock Feeder [mg/l] - 1000 years

|                                 |                           |                                  |
|---------------------------------|---------------------------|----------------------------------|
| 05% of values less than 0       | 10% of values less than 0 | 25% of values less than 0        |
| 50% of values less than 0       | 75% of values less than 0 | 90% of values less than 0.136322 |
| Minimum 0.es less than 0.170632 | Maximum 0.265518          |                                  |
| Mean 0.0253542                  | SD 0.0611489              | Variance 0.00373919              |

Project: Port Talbot Harbourside

Project Number: 60053048

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Phenol

Concentration at Dock Feeder [mg/l] - 1000 years

|                                  |                           |                                   |
|----------------------------------|---------------------------|-----------------------------------|
| 05% of values less than 0        | 10% of values less than 0 | 25% of values less than 0         |
| 50% of values less than 0        | 75% of values less than 0 | 90% of values less than 0.0333735 |
| Minimum 0.es less than 0.0368438 | Maximum 0.0399576         |                                   |
| Mean 0.00557218                  | SD 0.0128332              | Variance 0.00016469               |

Project: Port Talbot Harbourside

Project Number: 60053048

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Toluene

Concentration at Dock Feeder [mg/l] - 1000 years

|                                 |                           |                                  |
|---------------------------------|---------------------------|----------------------------------|
| 05% of values less than 0       | 10% of values less than 0 | 25% of values less than 0        |
| 50% of values less than 0       | 75% of values less than 0 | 90% of values less than 0.647639 |
| Minimum 0.es less than 0.775296 | Maximum 0.997289          |                                  |
| Mean 0.114082                   | SD 0.267525               | Variance 0.0715697               |

Xylene

Concentration at Dock Feeder [mg/l] - 1000 years

|                                 |                           |                                 |
|---------------------------------|---------------------------|---------------------------------|
| 05% of values less than 0       | 10% of values less than 0 | 25% of values less than 0       |
| 50% of values less than 0       | 75% of values less than 0 | 90% of values less than 0.40595 |
| Minimum 0.es less than 0.487488 | Maximum 0.594822          |                                 |
| Mean 0.0717291                  | SD 0.166972               | Variance 0.0278795              |

**Aquifer Flow [m³/yr]**

*BH104, BHC5, BH105*

|                                 |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|
| 05% of values less than 1300.19 | 10% of values less than 1609.93 | 25% of values less than 2023.78 |
| 50% of values less than 2430.47 | 75% of values less than 2833.09 | 90% of values less than 3166.61 |
| Minimum 551.383s than 3394.83   | Maximum 3912.25                 |                                 |
| Mean 2412.14                    | SD 610.039                      | Variance 372147                 |

# Appendix G

LEGISLATIVE CONTEXT



## APPENDIX G: LEGISLATIVE CONTEXT

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The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. Part IIA was introduced into the Environmental Protection Act 1990.

Relevant sections of the Act as reflected also under planning legislation include:

- Section 78A(2): “contaminated land” as any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that – (a) significant harm is being caused or there is a significant possibility of such harm being caused; or (b) significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused;
- Section 78A(9) defines the term pollution of Controlled waters in terms of the direct or indirect introduction into the water environment of substances which may give rise to harm to human health or the quality of ecosystems, result in damage to material property or impair or interfere with amenities and other legitimate uses of the water environment.

The following types of pollution would be considered to constitute significant pollution of controlled waters:

- Pollution equivalent to “environmental damage” to surface water or groundwater as defined by The Environmental Damage (Prevention and Remediation) Regulations 2009, but which cannot be dealt with under those Regulations;
- Inputs resulting in deterioration of the quality of water abstracted, or intended to be used in the future, for human consumption such that additional treatment would be required to enable that use;
- A breach of a statutory surface water Environment Quality Standard (EQS), either directly or via a groundwater pathway; and/or
- Input of a substance into groundwater resulting in a significant and sustained upward trend in the concentration of contaminants (as defined in Article 2(3) of the Groundwater Daughter Directive (2006/118/EC)).

The Governments approach to protecting controlled waters additionally seeks to achieve the objectives of the relevant European Directives for those regulatory regimes where groundwater quality is, or may be, affected by inputs of polluting substances. The principles described are based on the European Commission Common Implementation Strategy for the Water Framework Directive (WFD) Guidance Document 17, ‘Guidance on Preventing or Limiting Inputs in the context of the Groundwater Directive 2006/118/EC (GWD)’ and the UK Technical Advisory Group (UKTAG) technical report 11 b (iii) ‘Application of Groundwater Standards to Regulation’, where these do not conflict with existing legislation.

In relation to the site:

- Part IIA of The Environmental Protection Act 1990 effectively controls the passive release of pollutants from land where the original activity that led to the contamination has ceased. (If subsequent activities disturb the land and cause a release of pollutants that discharge to groundwater, an Environmental Permit may be required at that stage.);

- The observed hydrocarbons reported at the Port Talbot site would be classified as hazardous substances. Hazardous substances are defined in the WFD as “substances or groups of substances that are toxic, persistent and liable to bio-accumulate, and other substances or groups of substances which give rise to an equivalent level of concern”;
- Where groundwater contamination already exists as at the Port Talbot site (Minimum Reporting Value/LoD exceeded), the regulator would typically seek the problem holder to:
  - Minimise expansion of the groundwater contaminant plume to protect future groundwater users and offsite receptors;
  - Prevent future pollution/damage of dependent surface water bodies; and
  - Prevent future deterioration in status of a groundwater or associated surface water bodies.
- Finally, as previously noted, LNAPL has been observed at site and will require removal/treatment. Where NAPL is to be removed then it is typically recommended that the remediation endpoint is based on residual saturation. Residual NAPL is the fraction of an LNAPL body that will remain immobile and hydraulically unrecoverable under prevailing hydraulic conditions (i.e., will not flow into a well). Residual LNAPL represents a pore-scale concept whereby LNAPL occupies a fraction of pore space that is discontinuous and too small for LNAPL flow to occur. Residual NAPL is immobile/hydraulically unrecoverable and therefore should not contribute to migration risk. Residual NAPL may however continue to act as a source of dissolved phase contamination. Consequently, the risk assessment herein must continue to account for this dissolved phase risk if retained on site.

To close then the framework for assessing the risks to groundwater and surface water risk from pollutants are the:

- Environment Agency, 'Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination' 2006. (RTM); and
- Groundwater Protection, Groundwater Protection guides covering: requirements, permissions, risk assessments and controls (previously covered in GP3), 2017.

Although the RTM preceded the formal adoption of the WFD in England and Wales, the document was cognisant of the requirements of the forthcoming requirements of the WFD i.e. no entry of hazardous substances into water bodies, and no new pollution by all other substances.



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