



TECHNICAL NOTE

DATE:	21 May 2021	CONFIDENTIALITY:	Public
SUBJECT:	Port Talbot Harbourside - Gasholder Excavation Watching Brief & Sampling		
PROJECT:	70057278	AUTHOR:	R. Evans
CHECKED:	R. Evans	APPROVED:	S. Cory

INTRODUCTION

Instruction

WSP UK Ltd. (WSP) was instructed by Andrew Scott Ltd. (the Client) to undertake additional ground investigation works and laboratory testing at Port Talbot Harbourside (the 'site'), SA13 1RZ. The watching brief and sampling works were undertaken to further assess ground conditions and potential contamination associated with the historical gasholder present on site. This report details the findings of the works. The site location is shown on Figure 1 in **Appendix A**.

Background

Several phases of ground investigation and assessment works have been completed at the site to facilitate development in line with planning application P2020/0294. Some remediation works have been identified as being required for parts of the site based on the data provided from these completed investigations. Natural Resources Wales (NRW) indicated that supplementary investigation and assessment associated with the historical gasholder feature located at the east of the site was required to fully characterise the site in advance of development.

In response, WSP prepared the below documents relating to completed supplementary investigations relating to the gasholder to the east of the site:

- § Port Talbot Harbourside – Additional Gasholder Intrusive Investigation, November 2020, WSP, Ref. 70057278-GH1; and
- § Gas Holder at the British Steelworks, Port Talbot, February 2021, WSP.

A summary of these reports is provided below:

ADDITIONAL GASHOLDER INTRUSIVE INVESTIGATION

WSP oversaw the excavation of five trial pits in the location of the gasholder to assess subsurface conditions. Soil sample data from both the field and following laboratory analysis did not indicate the presence of gross hydrocarbon impact at any of the exploratory locations. Natural ground was proven below the base of the structure at shallow depth, confirming the absence of any underground tank structures which can often be associated with gasholders. Groundwater was noted to inflow to the trial pits from a depth of 1.6m bgl, and no field evidence for contamination was noted in the groundwater ingress.

Given both the soils laboratory data and the field evidence (both soils and groundwater), No significant source of hydrocarbon contamination has been identified in close proximity to the gasholder capable of altering the existing site assessment findings.

Consistent with the above, samples of groundwater from wells located surrounding the gasholder record typically low concentrations of potential contaminants of concern. No additional remedial works specifically

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associated with the gasholder were deemed to be necessary over and above those already identified for the site as per the Remediation Strategy¹.

GAS HOLDER AT THE BRITISH STEELWORKS

WSP provided a memorandum which summarised the history of the gasholder at the site, with emphasis on the type of gasholder and typical construction details.

The gasholder at the site was a Klönne gasholder, a German design of gasholder often referred to as a dry gasholder. The dry gasholder had no water filled tank. The water filled tank formed a key part of the water sealed gasholder and it was this tank which contained tarry sludge typically associated with a gasholder tank. The base of the tank was constructed from steel, built on concrete and steel foundation.

This construction detail of the Klönne gasholder matches the observed structure that has been encountered during previous phases of investigation at the site.

Objectives

The abovementioned documents were provided to Natural Resources Wales who provided the below comment:

“From the documents supplied, they are the same that I have already reviewed, except the Memo on the type of gas holder on the site. This provides evidence that the gas holder is much less likely to cause land contamination issues.

Thank you for confirming that there will be a watching brief on the breaking out activity, on the west of the site.”

On the basis of the above, the objectives of this assessment were to:

- § Provide a summary of the breaking out activities associated with the gasholder;
- § Summarise the results of soil sampling and laboratory analysis of representative samples collected from ground immediately adjacent to the gasholder structure; and
- § Review and confirm on the basis all the available data the whether any supplementary remediation works are required associated with the gasholder.

Limitations

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

- § Andrew Scott Ltd.

The contents 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 technical note is used, either in its entirety or in part, by any other party.

¹ Port Talbot Harbourside – Remediation Strategy, WSP, June 2020, ref. 62253048-004



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Where this document 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 B**.

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GASHOLDER EXCAVATION

Excavation Works

Andrew Scott commenced the breaking out and excavation of the gasholder structure in April 2021.

The ground conditions and construction of the gasholder foundation encountered were as expected, based on the typical construction of a Klönne gasholder. A reinforced concrete ring-beam encircled the gasholder foundation with these foundations reaching a depth of approximately 1.5m bgl around the structure. Within the ring-beam was a reinforced concrete pad approximately 0.3m thick. Occasional pipework (associated with the gasholder and other historic site activities) were present beneath the pad, with Made Ground immediately present underlain by natural strata typically encountered at <2m bgl.

The ground conditions encountered were similar to those observed during the trial pitting activities reported by WSP in November 2020.

Watching Brief and Soil Sampling

WSP attended site on 6th May 2021 to inspect the excavation works and to collect representative soil samples from the gasholder to assess potential risks associated with contamination of the soils immediately surrounding the gasholder.

A selection of photos showing the excavation of the gasholder structure is presented below.



*Left - Reinforced concrete ring-beam encircling gasholder.
Right – Excavation following removal of ring beam.*

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At the time of the visit, approximately 75% of the ring-beam had been exposed with approximately 50% of the ring-beam broken out. WSP observed no signs of visual or olfactory evidence in the exposed soils, and none had been noted by the on-site Andrew Scott supervisor during the works.

The WSP engineer collected four soil samples (GH1 – GH4) from the excavation extents (soil surrounding the ring-beam) with the locations presented in Figure 2 (**Appendix A**). Samples were taken from approximately 1.5m bgl.

Samples were collected with a clean sampling trowel or by hand (using dedicated nitrile gloves for each sampling location). Samples were placed immediately into laboratory supplied containers, specific to the type of analyses required. All sample containers were sealed and labelled with a unique location identity, depth and date of sampling. The samples for chemical laboratory testing were sent to ALS Ltd, a UKAS and MCERTS accredited laboratory, for the below analysis:

Asbestos identification;
pH;
Total organic carbon;
Cyanide;
Metals and metalloids;
Phenol;
Total petroleum hydrocarbons criteria working group (TPH CWG);
Polyaromatic hydrocarbons (PAH);
Benzene, toluene, ethylbenzene and xylenes (BTEX); and
Methyl tertiary butyl ether (MTBE).

Laboratory Results

The analytical results are summarised in Table 1, and the laboratory testing certificates are provided in full in **Appendix C**. The determinands selected for the summary reflect the contaminants of concern (CoC) identified in the detailed quantitative risk assessment (DQRA)² and remediation strategy³ for protection of controlled waters.

Table 1 - Summary of soil laboratory analysis

Determinand	Laboratory Result (mg/kg)	Comments
Asbestos Identification	Not detected	Asbestos was not identified in any sample.
Cyanide (Total)	<1	All samples were recorded below limit of detection (LOD).
Hexavalent Chromium	<0.6	All samples were recorded below LOD.

² Port Talbot Harbourside – Controlled Waters Detailed Quantitative Risk Assessment, WSP, February 2020, ref. 62253048-002

³ Port Talbot Harbourside – Remediation Strategy, WSP, June 2020, ref. 62253048-004

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Determinand	Laboratory Result (mg/kg)	Comments
Phenol	<0.01 – 0.0107	Trace concentrations above LOD were identified in sample GH2 only.
TPH CWG	146 - 552	TPH primarily comprised mid to heavy range hydrocarbons (>21 – C35) with light range compounds typically <LOD.
PAH	12.8 - 124	PAH compounds were recorded above LOD in GH1, GH3 and GH4; with generally the same concentrations of individual determinands, the highest typically comprising fluoranthene and benzo(b)fluoranthene.
BTEX & MTBE	<LOD	All samples were recorded below limit of detection.

Assessment

CONTROLLED WATERS

The key risk drivers associated with the protection of controlled waters, as identified in the DQRA and remediation strategy (WSP, 2020) are presented in Table 4-2 where remediation criteria have been compared to concentrations observed during the gasholder investigation works.

Table 2 - Comparison of soil concentrations against remediation criteria

Determinand	Remediation Criteria (mg/kg)	Maximum Concentration (mg/kg)	No. of Exceedances
Hexavalent Chromium	1.2	<0.6	0
Benzene	1.0	<0.09	0
Toluene	0.557	<0.07	0
Ethylbenzene	0.450	<0.04	0
Total Xylenes	1.0	<0.2	0
Naphthalene	0.4	0.235	0
Phenol	2.4	<0.01	0

No exceedances of the remediation criteria were recorded, with the concentration of the majority of CoCs below laboratory LOD. As such the risk of adverse impact to controlled waters from the soils adjacent to the former gasholder is considered to be low.

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CONCLUSIONS

Summary

Following liaison with Natural Resources Wales, WSP have completed additional assessment works at Port Talbot Harbourside as part of the site redevelopment to ensure that the historic gasholder present does not present an adverse risk to the identified controlled waters receptors.

During the breaking out and excavation of the gasholder foundation, WSP attended site during the removal of the gasholder to inspect ground conditions. The gasholder structure construction was confirmed to be as anticipated (Klönne gasholder with no underground storage tank) with no source of contaminated material (contaminated soil, groundwater or tar/sludge tank) identified.

Representative soil samples were collected from the excavation boundaries by the WSP engineer and scheduled for laboratory analysis. The laboratory results show that concentrations of the primary CoCs are typically recorded below LOD; with no exceedances of the remediation criteria considered protective of controlled waters.

Recommendations

This data has been used to supplement the existing dataset presented by WSP which highlighted an absence of a source of potentially contaminated material at the location of the gasholder that would present an adverse risk to controlled waters. These findings are consistent with existing groundwater quality data from the monitoring well network in close proximity to the gasholder which have historically recorded low concentrations of potential contaminants of concern within groundwater, as well as from trial pitting works within the gasholder which identified a general absence of contaminated material.

As such, WSP deem that sufficient investigation has been completed from the area in and around of the former gasholder to confirm that the gasholder and immediately surrounding ground and groundwater do not present an unacceptable risk to controlled waters. As such, the findings of the DQRA⁴ remain valid and the completed supplementary works (as reported herein) provide the required data to resolve the queries and concerns set out by Natural Resources Wales (CAS-116525-N2P7).

WSP and Andrew Scott will continue working to the supplied Remediation Strategy⁵ which involves the below activities:

- § Removal of LNAPL containing soils from the areas identified towards the centre and west of the site;
 - Validation sampling of excavation extents following source removal and comparison against derived remediation criteria;
 - Groundwater / LNAPL monitoring and sampling post removal from monitoring well network;

⁴ Port Talbot Harbourside – Controlled Waters Detailed Quantitative Risk Assessment, WSP, February 2020, ref. 62253048-002

⁵ Port Talbot Harbourside – Remediation Strategy, WSP, June 2020, ref. 62253048-004

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- § Installation of a 600mm thickness of clean cover material;
- Validation excavation to prove thickness and collection of representative samples to confirm concentrations below commercial generic assessment criteria for human health;

The above works will be summarised in a verification report to be produced by WSP following completion of the remediation works, submission and acceptance of which will then allow the discharge of Condition 6.

On the basis of the above and previous information submitted, WSP recommends that Planning Condition 5 can now be discharged.

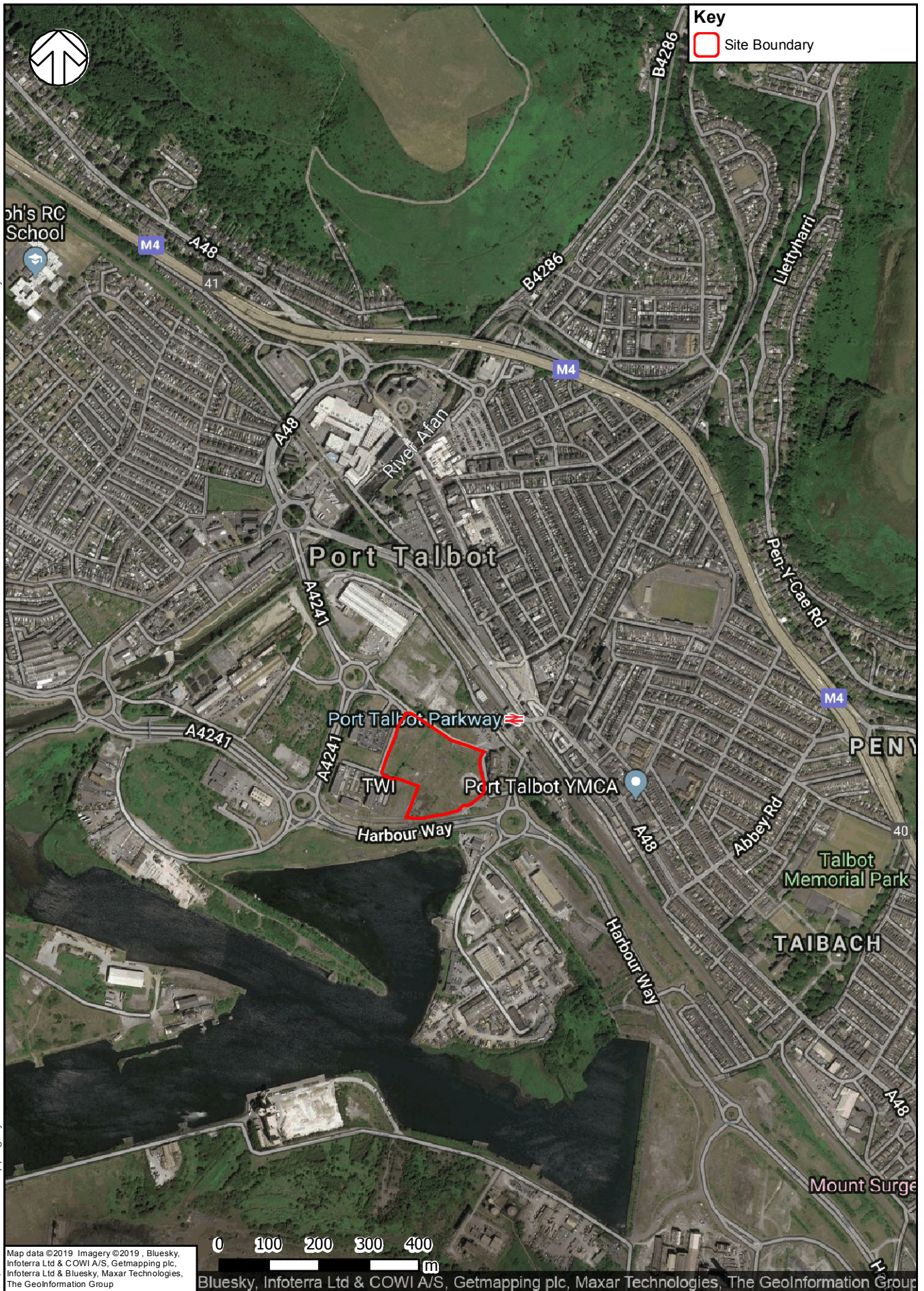
Details of any previously unidentified contamination identified during the residual ongoing works will be presented to the relevant authority as per Planning Condition 11.

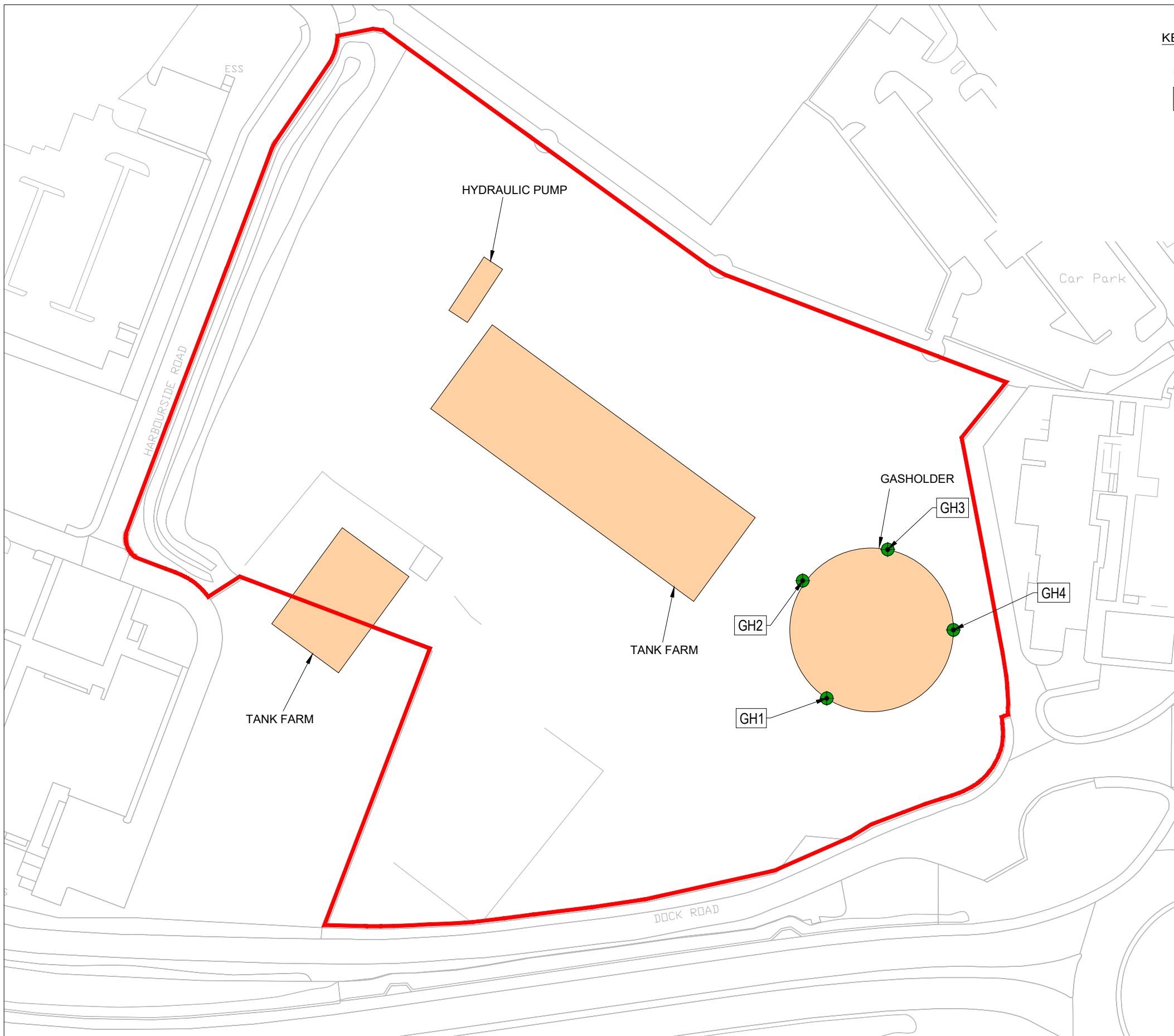
Encl.

Appendix A – Figures

Appendix B – Limitations

Appendix C – Laboratory Certificates





KEY

- Site Boundary
- Potential historical source areas
- Validation samples collected May 2021

Note
Gasholder validation samples are approximate. Collected from excavation extents following removal of ring beam at approximately 1.5m bgl

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Rev	Date	Description	By	Chk	App	Notes



Kings Orchard
1 Queen Street
Bristol BS2 0HQ

Tel: 44-(0)1179-306200

Client: **ANDREW SCOTT LTD**

Project: **PORT TALBOT HARBOURSIDE**

Title: **GASHOLDER
EXPLORATORY HOLE
LOCATION PLAN
WSP 2021**

Drawn: NB		Checked: RE	
Designed: RE		Approved:	
Date: 20/05/2021	Scale: 1:1000	A3	Sheet:
Project Number:		Drawing Number:	
70057278		Figure 2	
Revision:			
© Copyright WSP			

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

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

effects of any future changes or amendments to these values. Specific assumptions associated 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.



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WSP PB BBC
3rd Floor, Kings Orchard,
1 Queen Street
Bristol
Gloucestershire
BS2 0HQ

Attention: Rhys Evans

CERTIFICATE OF ANALYSIS

Date of report Generation:	17 May 2021
Customer:	WSP PB BBC
Sample Delivery Group (SDG):	210508-31
Your Reference:	Port Talbot Harbourside
Location:	Port Talbot Harbourside
Report No:	598260

We received 4 samples on Saturday May 08, 2021 and 4 of these samples were scheduled for analysis which was completed on Monday May 17, 2021. 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

SDG:	210508-31	Client Reference:	Port Talbot Harbourside	Report Number:	598260
Location:	Port Talbot Harbourside	Order Number:	70057278-GH1	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
24233372	GH1	ES	0.00 - 0.00	06/05/2021
24233380	GH2	ES	0.00 - 0.00	06/05/2021
24233386	GH3	ES	0.00 - 0.00	06/05/2021
24233393	GH4	ES	0.00 - 0.00	06/05/2021

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 210508-31 Client Reference: Port Talbot Harbourside Report Number: 598260
Location: Port Talbot Harbourside Order Number: 70057278-GH1 Superseded Report:

Results Legend



Test



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 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
	24233372		GH1		ES		0.00 - 0.00		1kg Cardboard Container 250g Amber Jar (ALE215) 60g VOC (ALE215)		S
	24233380		GH2		ES		0.00 - 0.00		1kg Cardboard Container 250g Amber Jar (ALE215) 60g VOC (ALE215)		S
	24233386		GH3		ES		0.00 - 0.00		1kg Cardboard Container 250g Amber Jar (ALE215) 60g VOC (ALE215)		S
	24233393		GH4		ES		0.00 - 0.00		1kg Cardboard Container 250g Amber Jar (ALE215) 60g VOC (ALE215)		S
											S
											S
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 4	X		X		X		X		
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 4		X		X		X		X	
EPH CWG GC (S)	All	NDPs: 0 Tests: 4		X		X		X		X	
GRO by GC-FID (S)	All	NDPs: 0 Tests: 4			X		X		X	X	
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 4		X		X		X		X	
Metals in solid samples by OES	All	NDPs: 0 Tests: 4		X		X		X		X	
PAH by GCMS	All	NDPs: 0 Tests: 4		X		X		X		X	
pH	All	NDPs: 0 Tests: 4		X		X		X		X	
Phenols by HPLC (S)	All	NDPs: 0 Tests: 4		X		X		X		X	
Sample description	All	NDPs: 0 Tests: 4		X		X		X		X	
Total Organic Carbon	All	NDPs: 0 Tests: 4		X		X		X		X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 4		X		X		X		X	
VOC MS (S)	All	NDPs: 0 Tests: 4			X		X		X	X	



CERTIFICATE OF ANALYSIS

Validated

SDG: 210508-31 Client Reference: Port Talbot Harbourside Report Number: 598260
Location: Port Talbot Harbourside Order Number: 70057278-GH1 Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
24233372	GH1	0.00 - 0.00	Dark Brown	Sandy Loam	Stones	Vegetation
24233380	GH2	0.00 - 0.00	Dark Brown	Sandy Loam	Stones	None
24233386	GH3	0.00 - 0.00	Dark Brown	Sandy Loam	Stones	None
24233393	GH4	0.00 - 0.00	Dark Brown	Sandy Loam	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

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 materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG: 210508-31 Client Reference: Port Talbot Harbourside Report Number: 598260
Location: Port Talbot Harbourside Order Number: 70057278-GH1 Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample Ref.	GH1	GH2	GH3	GH4		
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
M	mCERTS accredited.			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)		
aq	Aqueous / settled sample.			06/05/2021	06/05/2021	06/05/2021	06/05/2021		
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.			08/05/2021	08/05/2021	08/05/2021	08/05/2021		
*	Subcontracted - refer to subcontractor report for accreditation status.			210508-31	210508-31	210508-31	210508-31		
**	% 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			24233372	24233380	24233386	24233393		
(F)	Trigger breach confirmed			ES	ES	ES	ES		
1-4*\$@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM089		96.3	56.1	94.8	88.3		
Aliphatics >C5-C6	<0.01 mg/kg	TM089		<0.01	<0.01	<0.01	<0.01		
Aliphatics >C6-C8	<0.01 mg/kg	TM089		<0.01	<0.01	<0.01	<0.01		
Aliphatics >C8-C10	<0.01 mg/kg	TM089		0.0108	<0.01	<0.01	<0.01		
Aliphatics >C10-C12	<1 mg/kg	TM414		<1	<1	<1	<1		
Aliphatics >C12-C16	<1 mg/kg	TM414		<1	3.76	<1	1.12		
Aliphatics >C16-C21	<1 mg/kg	TM414		6.08	12.2	4.76	10.6		
Aliphatics >C21-C35	<1 mg/kg	TM414		17.1	51.1	10.5	21.7		
Aliphatics >C35-C44	<1 mg/kg	TM414		2.39	8.21	1.52	1.76		
Total Aliphatics >C10-C44	<5 mg/kg	TM414		26.2	75.4	17.6	35.2		
Total Aliphatics & Aromatics >C10-C44	<10 mg/kg	TM414		552	146	339	444		
Aromatics >EC5-EC7	<0.01 mg/kg	TM089		<0.01	<0.01	<0.01	<0.01		
Aromatics >EC7-EC8	<0.01 mg/kg	TM089		<0.01	<0.01	<0.01	<0.01		
Aromatics >EC8-EC10	<0.01 mg/kg	TM089		<0.01	<0.01	<0.01	<0.01		
Aromatics > EC10-EC12	<1 mg/kg	TM414		<1	<1	<1	<1		
Aromatics > EC12-EC16	<1 mg/kg	TM414		9.04	2.37	5.02	6.35		
Aromatics > EC16-EC21	<1 mg/kg	TM414		81.2	6.35	47.6	63.5		
Aromatics > EC21-EC35	<1 mg/kg	TM414		372	54.9	227	285		
Aromatics >EC35-EC44	<1 mg/kg	TM414		63.6	7.28	41.1	53.8		
Aromatics > EC40-EC44	<1 mg/kg	TM414		7.97	1.78	4.74	6.44		
Total Aromatics > EC10-EC44	<5 mg/kg	TM414		526	70.9	321	409		
Total Aliphatics & Aromatics >C5-C44	<10 mg/kg	TM414		552	146	339	444		
Total Aliphatics >C5-C10	<0.05 mg/kg	TM089		<0.05	<0.05	<0.05	<0.05		
Total Aromatics >EC5-EC10	<0.05 mg/kg	TM089		<0.05	<0.05	<0.05	<0.05		
GRO >C5-C10	<0.02 mg/kg	TM089		<0.02	<0.02	<0.02	<0.02		



CERTIFICATE OF ANALYSIS

Validated

SDG: 210508-31 Client Reference: Port Talbot Harbourside Report Number: 598260
Location: Port Talbot Harbourside Order Number: 70057278-GH1 Superseded Report:

Asbestos Identification - Solid Samples

Results Legend

ISO17025 accredited.
M mCERTS accredited.
* Subcontracted test.
(F) Trigger breach confirmed
1-5&*&@ Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	GH1ES 0.00 - 0.00 SOLID 06/05/2021 00:00:00 08/05/2021 05:00:00 210508-31 24233372 TM048	11/05/2021	Barbara Urbanek-Walsh	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	GH2ES 0.00 - 0.00 SOLID 06/05/2021 00:00:00 08/05/2021 05:00:00 210508-31 24233380 TM048	11/05/2021	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	GH3ES 0.00 - 0.00 SOLID 06/05/2021 00:00:00 08/05/2021 05:00:00 210508-31 24233386 TM048	11/05/2021	Paul Poynton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	GH4ES 0.00 - 0.00 SOLID 06/05/2021 00:00:00 08/05/2021 05:00:00 210508-31 24233393 TM048	11/05/2021	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 210508-31 **Client Reference:** Port Talbot Harbourside **Report Number:** 598260
Location: Port Talbot Harbourside **Order Number:** 70057278-GH1 **Superseded Report:**

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

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: 210508-31 Client Reference: Port Talbot Harbourside Report Number: 598260
Location: Port Talbot Harbourside Order Number: 70057278-GH1 Superseded Report:

Test Completion Dates

Lab Sample No(s)	24233372	24233380	24233386	24233393
Customer Sample Ref.	GH1	GH2	GH3	GH4
AGS Ref.	ES	ES	ES	ES
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	11-May-2021	11-May-2021	11-May-2021	11-May-2021
Cyanide Comp/Free/Total/Thiocyanate	14-May-2021	14-May-2021	14-May-2021	14-May-2021
EPH CWG GC (S)	11-May-2021	11-May-2021	11-May-2021	11-May-2021
GRO by GC-FID (S)	12-May-2021	13-May-2021	12-May-2021	12-May-2021
Hexavalent Chromium (s)	14-May-2021	14-May-2021	14-May-2021	14-May-2021
Metals in solid samples by OES	13-May-2021	13-May-2021	17-May-2021	17-May-2021
PAH by GCMS	11-May-2021	11-May-2021	11-May-2021	11-May-2021
pH	12-May-2021	12-May-2021	12-May-2021	12-May-2021
Phenols by HPLC (S)	12-May-2021	11-May-2021	12-May-2021	12-May-2021
Sample description	08-May-2021	08-May-2021	08-May-2021	08-May-2021
Total Organic Carbon	14-May-2021	14-May-2021	14-May-2021	14-May-2021
TPH CWG GC (S)	12-May-2021	13-May-2021	12-May-2021	12-May-2021
VOC MS (S)	11-May-2021	11-May-2021	11-May-2021	11-May-2021

SDG:	210508-31
Location:	Port Talbot Harbourside

Client Reference:	Port Talbot Harbourside
Order Number:	70057278-GH1

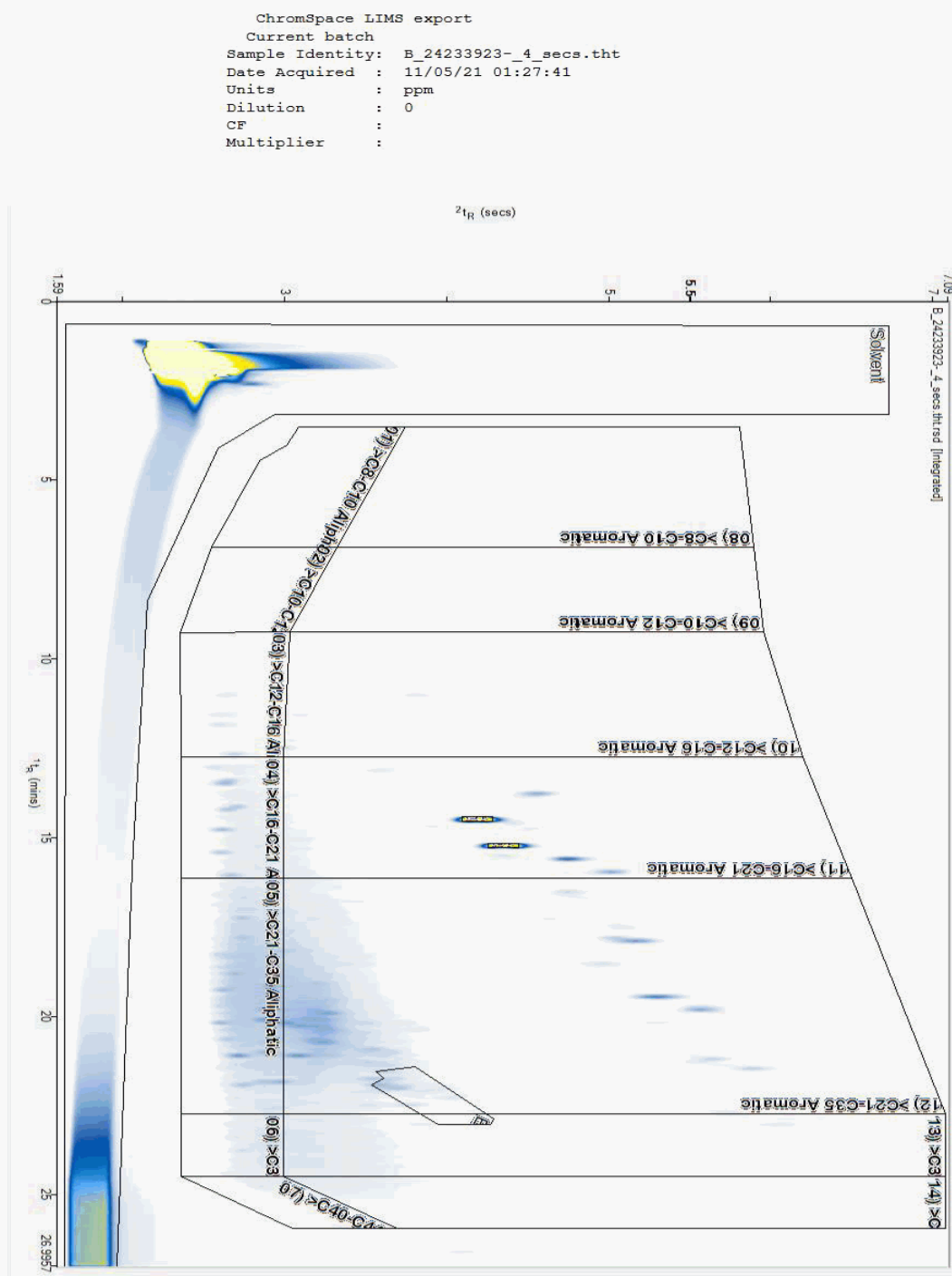
Report Number: 598260
Superseded Report:

Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 24233923
Sample ID : GH2

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

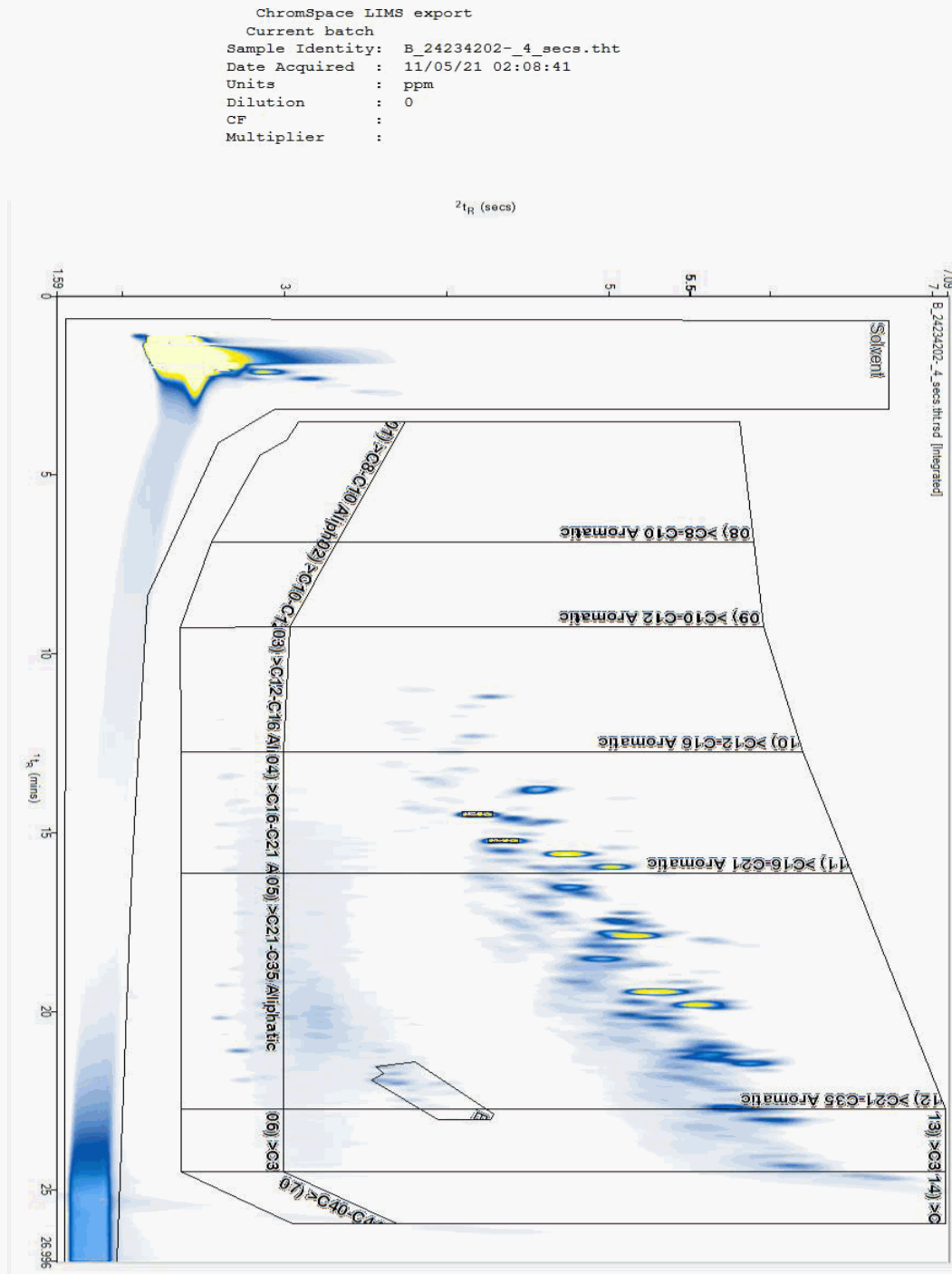
SDG:	210508-31	Client Reference:	Port Talbot Harbourside	Report Number:	598260
Location:	Port Talbot Harbourside	Order Number:	70057278-GH1	Superseded Report:	

Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 24234202
Sample ID : GH4

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

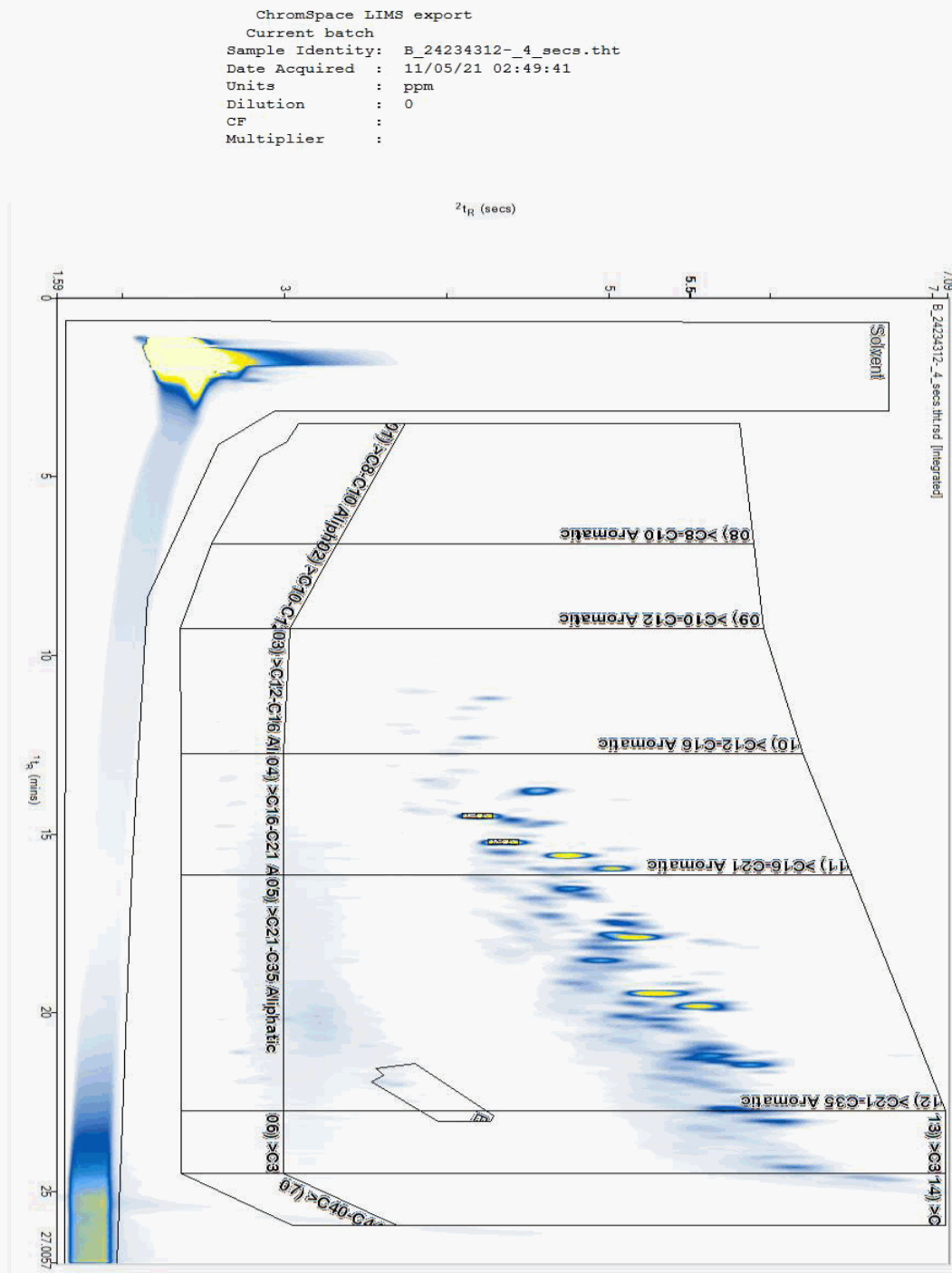
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Location:	Port Talbot Harbourside	Order Number:	70057278-GH1	Superseded Report:	

Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 24234312
Sample ID : GH3

Depth : 0.00 - 0.00



SDG:	210508-31
Location:	Port Talbot Harbourside

Client Reference:	Port Talbot Harbourside
Order Number:	70057278-GH1

Report Number:
Superseded Report:

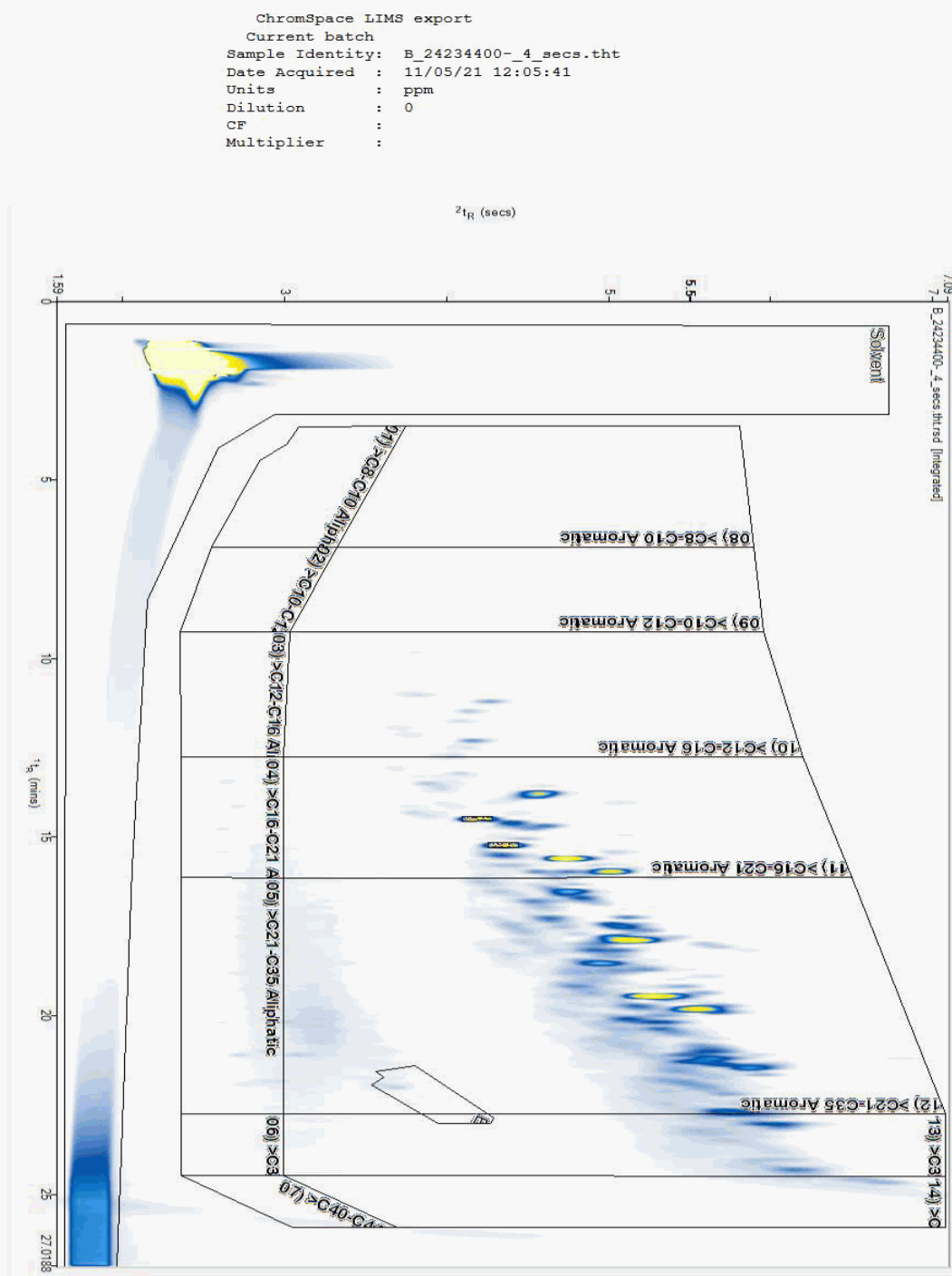
598260

Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 24234400
Sample ID : GH1

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

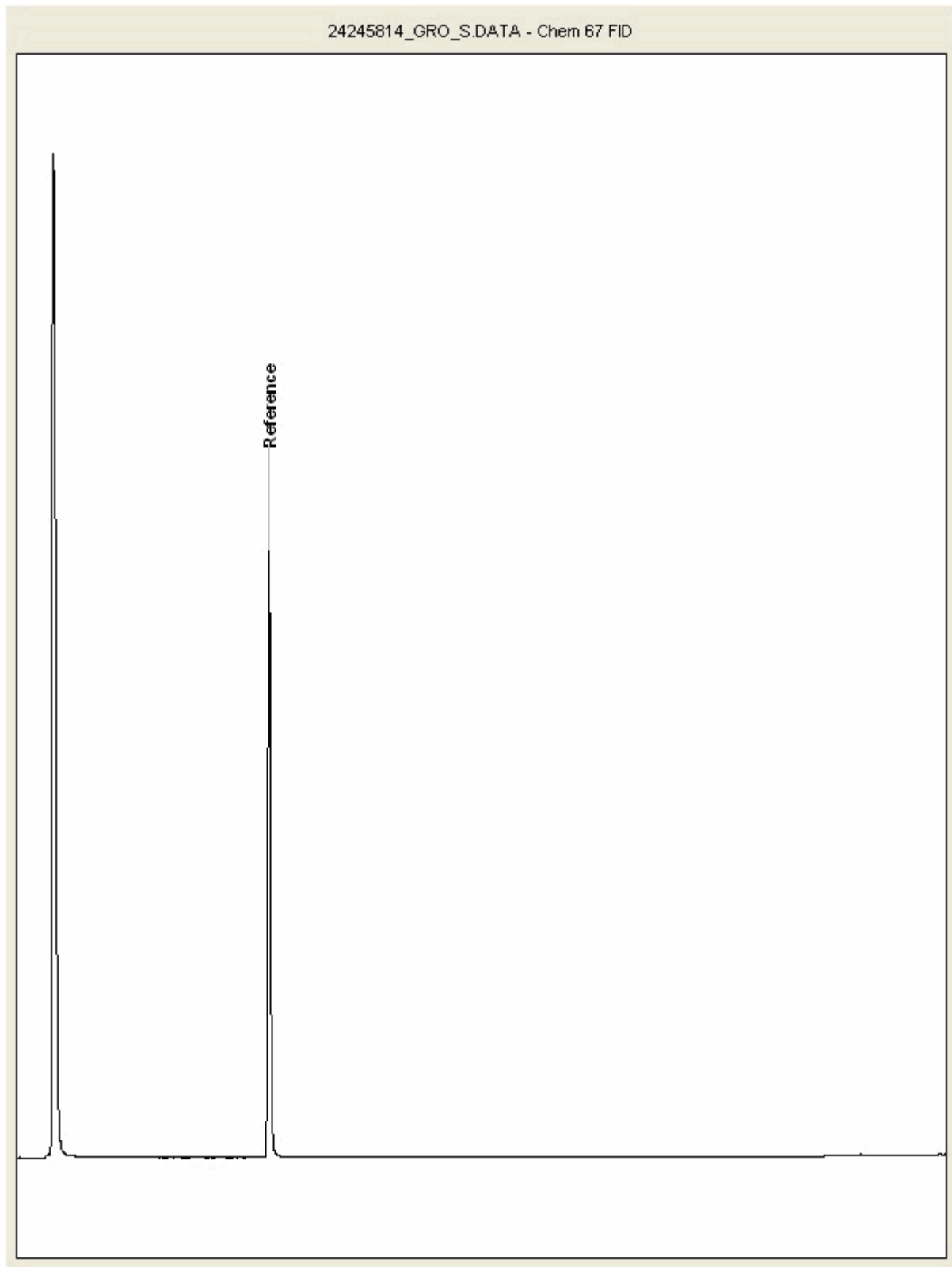
SDG:	210508-31	Client Reference:	Port Talbot Harbourside	Report Number:	598260
Location:	Port Talbot Harbourside	Order Number:	70057278-GH1	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 24245814
Sample ID : GH4

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

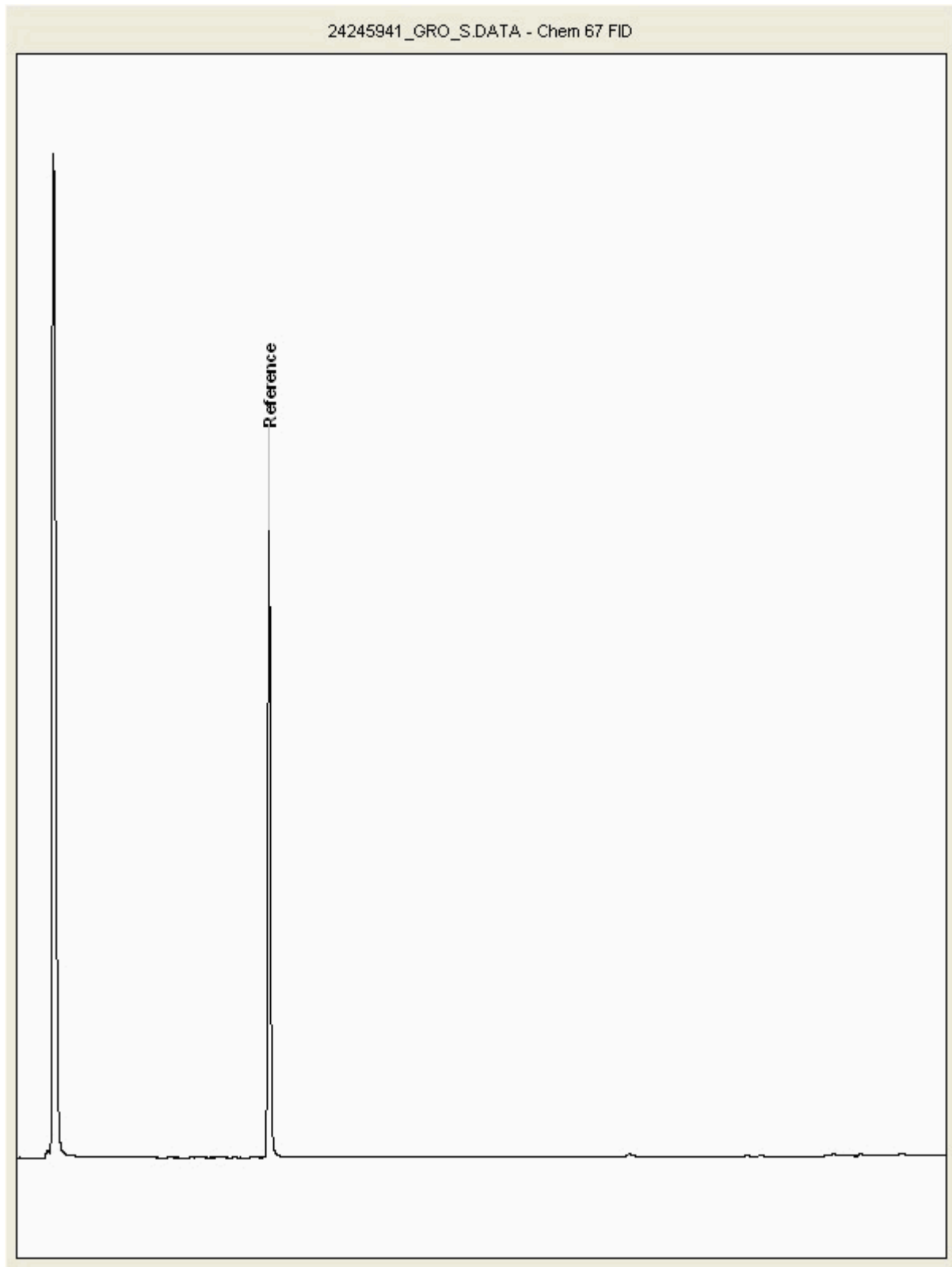
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Location:	Port Talbot Harbourside	Order Number:	70057278-GH1	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 24245941
Sample ID : GH1

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

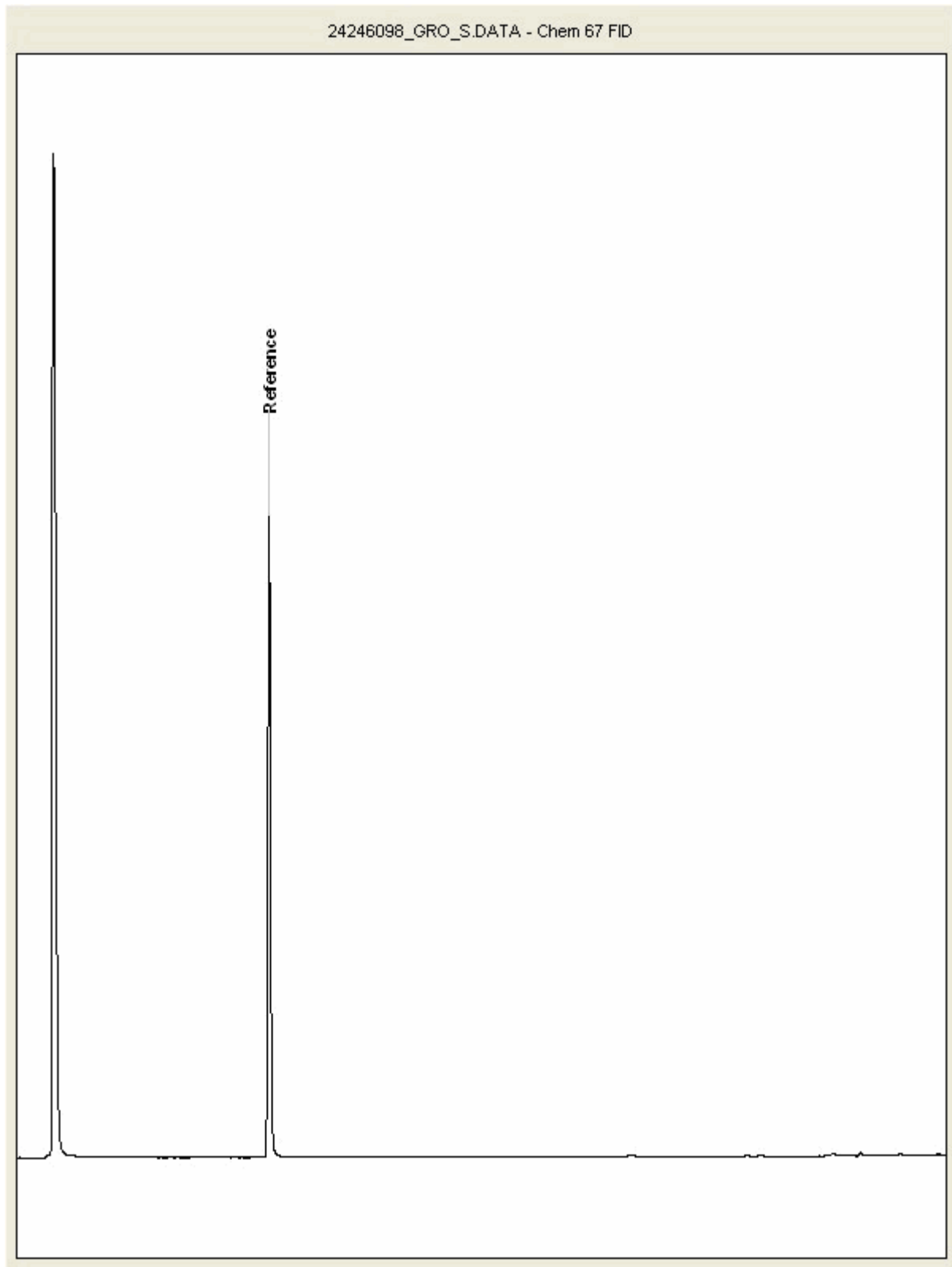
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Location:	Port Talbot Harbourside	Order Number:	70057278-GH1	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 24246098
Sample ID : GH3

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

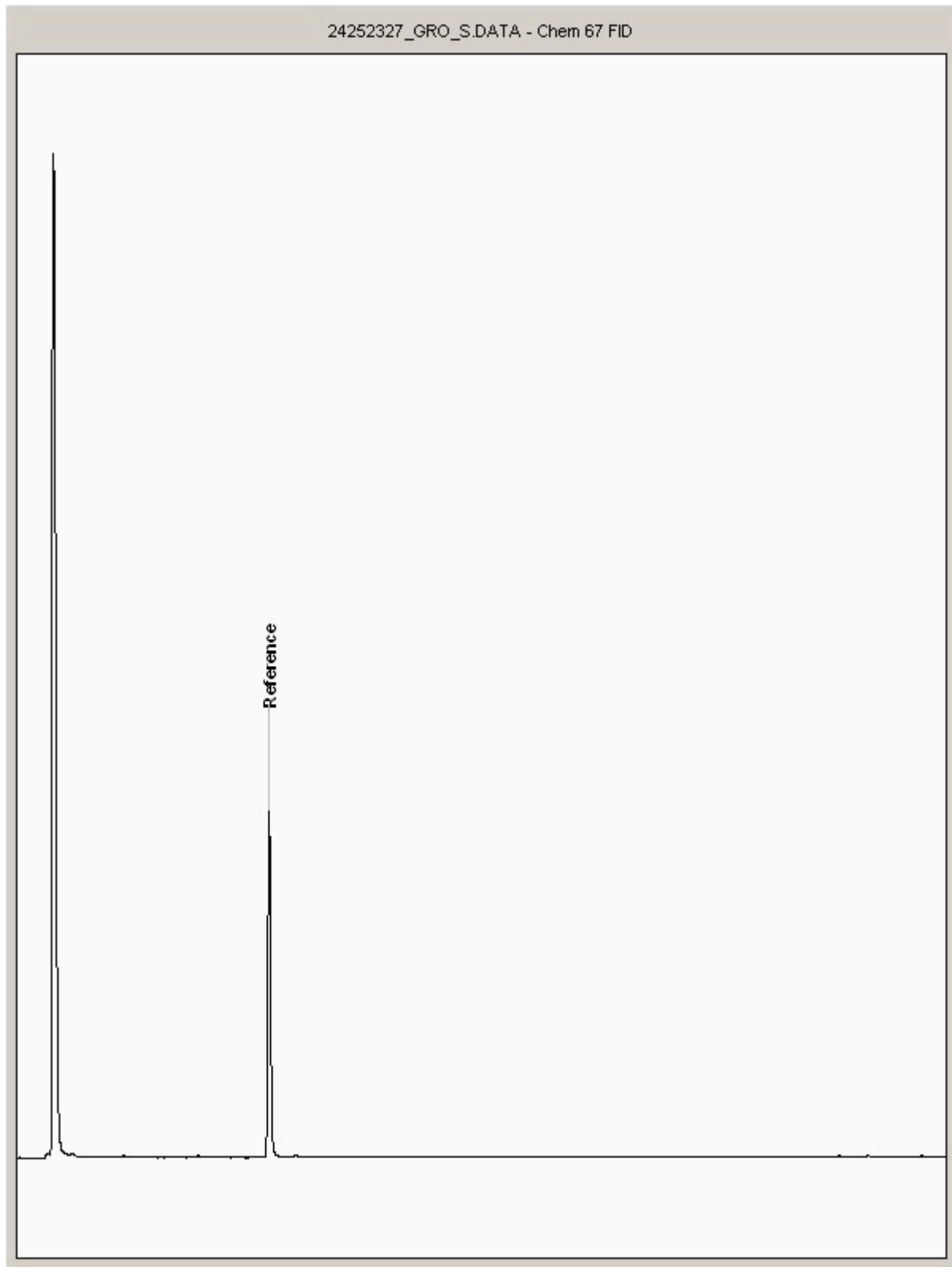
SDG:	210508-31	Client Reference:	Port Talbot Harbourside	Report Number:	598260
Location:	Port Talbot Harbourside	Order Number:	70057278-GH1	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 24252327
Sample ID : GH2

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

SDG:	210508-31	Client Reference:	Port Talbot Harbourside	Report Number:	598260
Location:	Port Talbot Harbourside	Order Number:	70057278-GH1	Superseded Report:	

Appendix

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 NH₄ 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.

General

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
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

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 asbestos present is not determined unless specifically requested.

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* (2017).

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.