



# e3p

Validation Report  
Pacific Park, Wrexham

Reference: 14-255-R5-1  
Date: August 2023



# REMEDIATION AND ENABLING WORKS VALIDATION

Land to the south of Bridge Road North  
Pacific Park  
Wrexham  
LL13 9PN

Prepared for:



**Report Ref: 14-255-R5-1**  
**Date Issued: August 2023**

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|                |                                   |  |  |
|----------------|-----------------------------------|--|--|
| PROJECT NUMBER | 14-255                            |  |  |
| VERSION        | Version 1                         |  |  |
| REMARKS        | Final                             |  |  |
| DATE           | August 2023                       |  |  |
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## 1. INTRODUCTION

### 1.1. BACKGROUND

This report details the remediation and enabling works operations that were undertaken by Portal Construction NW Ltd under the part-time supervision of E3P to facilitate the preparation of the commercial and industrial development on a parcel of land to the south of Bridge Road North, Wrexham; herein referred to as the site.

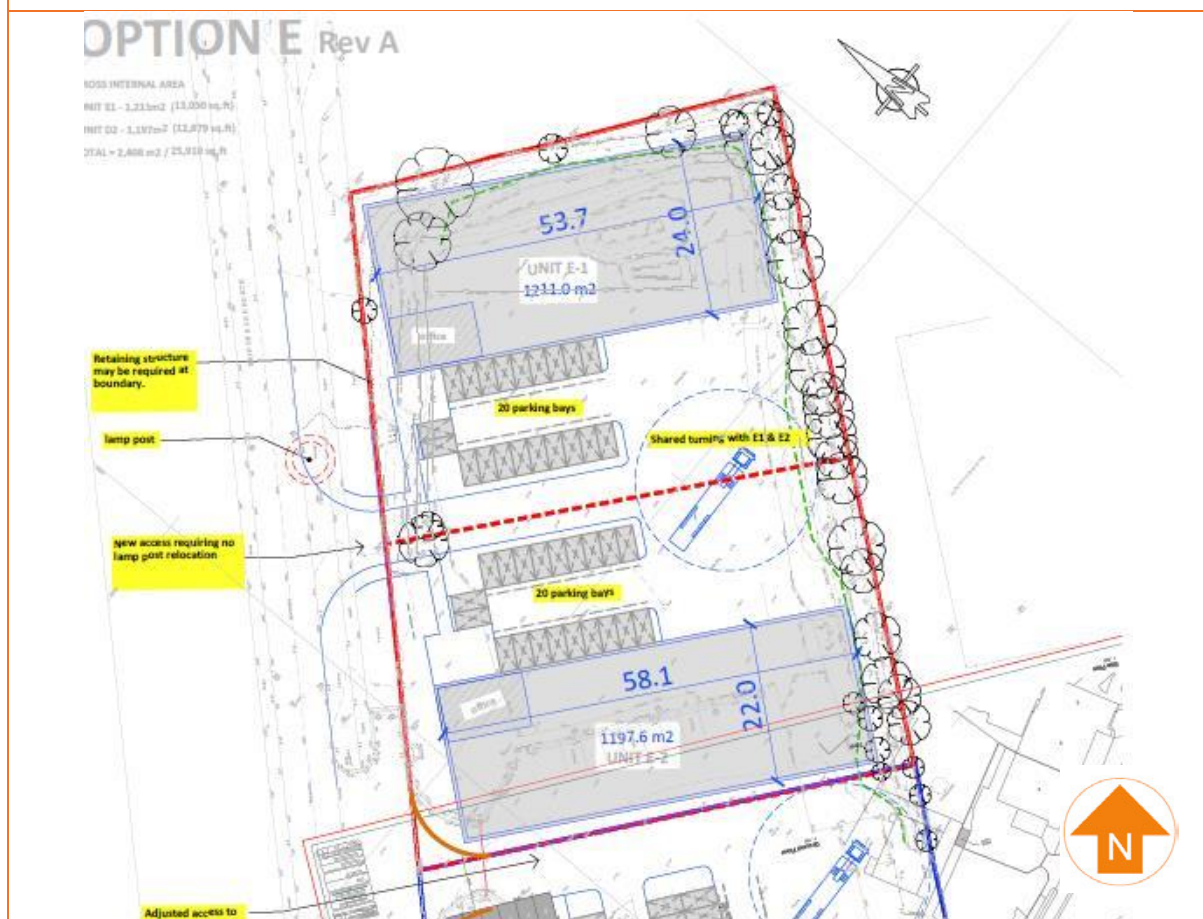
E3P were appointed by [REDACTED] as independent Geo-Environmental Consultant for the site remediation, preparation / enabling and validation works and the subsequent production of a suitably detailed report to ensure the satisfaction of the relevant planning conditions and geotechnical engineering requirements for Building Control, warranty providers and the future adoption of infrastructure by the Highways Authority and statutory service providers.

### 1.2. PROPOSED DEVELOPMENT

E3P understands that the proposed development will comprise of two industrial units with associated adopted estate roads and utility infrastructure.

Drawing 14-255-002 (Appendix III) and Figure 1.1 identifies the proposed development layout.

FIGURE 1.1 SNAPSHOT OF PROPOSED DEVELOPMENT



### 1.3. SUMMARY OF PARTIES INVOLVED

| Function/interest                     | Name of Party                  |
|---------------------------------------|--------------------------------|
| Local Planning Authority              | Wrexham County Borough Council |
| Developer                             | [REDACTED]                     |
| Geoenvironmental Consultant           | E3P                            |
| Main Contractor                       | Portal Construction NW Ltd     |
| Remediation/Enabling Works Contractor | Portal Construction NW Ltd     |
| Human Health Regulator                | Wrexham County Borough Council |
| Controlled Waters and Waste Regulator | Environment Agency             |
| Highways Adoption Authority           | Wrexham County Borough Council |

### 1.4. PREVIOUS WORKS

The following previous phases of site investigation and assessment have been completed at the subject site:

- ✚ E3P – Phase I Geoenvironmental Site Assessment - Pacific Park, Wrexham. (Ref: 14-255-R1-1; June 2020).
- ✚ Phase II Geoenvironmental Site Assessment - Pacific Park, Wrexham. (Ref: 14-255-R2-1; May 2021).

These documents were utilised to develop the following Remediation and Enabling Works Strategy:

- ✚ E3P – Remediation and Enabling Works Strategy - Pacific Park, Wrexham. (Ref: 14-255-R4-REVA; July 2021).

The above documents should be read in conjunction with this Validation Report.

### 1.5. REGULATORY CORRESPONDENCE

[REDACTED] have received planning permission from the local planning authority for the proposed redevelopment of the site for a commercial / industrial development with associated adopted estate roads and infrastructure.



## 2. SUMMARY OF REMEDIATION AND ENABLING WORKS OBJECTIVES

The proposed remediation activities were detailed within the E3P Remediation and Enabling Works Strategy (14-255-R4-1; dated July 2021) and supplementary supporting documents provided by E3P.

This report has been prepared to document the completion of all necessary land remediation and enabling works and to record the presence of any variation in ground conditions or previously unidentified sources of potential contamination, environmental impact or potential nuisance to the wider environ.

The Remediation and Enabling Works elements are summarised below:

- ✳ RE-1 – Pre-commencement Supplementary Site Investigation
- ✳ RE-2 – Pre-commencement Regulatory Compliance
- ✳ RE-3 – Service Infrastructure
- ✳ RE-4 – Unexploded Ordnance
- ✳ RE-5 – Environment and Nuisance Control
- ✳ RE-6 – Risk to Infrastructure
- ✳ RE-7 – Identification, Isolation and Treatment of Invasive Plants
- ✳ RE-8 – Site Clearance Operations
- ✳ RE-9 – Delineation, Excavation and Treatment of Identified Asbestos Impact
- ✳ RE-10 – Excavation, Breaking and Processing of All Above- and Below-Ground Structures
- ✳ RE-11 – Delineation, Excavation, Treatment of Infilled Historical Ponds
- ✳ RE-12 – Removal of Deleterious Material
- ✳ RE-13 – Cut-And-Filling of MADE GROUND to Development Levels
- ✳ RE-14 – Replacement of Materials, Geotechnical Engineering Requirements
- ✳ RE-15 – Importation of Bulk Fill
- ✳ RE-16 – Independent Validation: Watching Brief
- ✳ RE-17 – Waste Soils Surplus to Requirements
- ✳ RE-18 – Validation of Materials for Potable Water Supply Infrastructure
- ✳ RE-19 – Remedial Verification Report

## 3. SECOND PHASE MITIGATION AND MANAGEMENT – BUILD PHASE

A second post demolition phase of works will be required to ensure the proposed development is constructed in a manner that incorporates the required mitigation measures to ensure the development is compliant with UK Building Regulations and the Local Authority Planning requirements.

These obligations are specified in more detail within Section 5.



## 4. DETAILED REMEDIATION AND ENABLING WORKS ACTIVITIES

The focus of the remediation and enabling works are to address the contaminant issues previously identified within the site investigations that presented an unacceptable risk to human health following the redevelopment of the site.

For completeness, each of these activities has been discussed below within the context of the actual remediation works that were undertaken on site.

**The Remediation & Site Enabling works commenced in September 2021 and were completed by July 2023.**

### RE-1 – PRE-COMMENCEMENT SUPPLEMENTARY SITE INVESTIGATION

|                                 |
|---------------------------------|
| <b>DATE OF WORKS UNDERTAKEN</b> |
|---------------------------------|

|                 |
|-----------------|
| Sepotember 2021 |
|-----------------|

|                    |
|--------------------|
| <b>PHOTOGRAPHS</b> |
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|             |
|-------------|
| Plate 1 – 2 |
|-------------|

|                          |
|--------------------------|
| <b>CHEMICAL ANALYSIS</b> |
|--------------------------|

|                                                  |
|--------------------------------------------------|
| I2 Analytical Report – 21-10521; September 2021. |
|--------------------------------------------------|

|                          |
|--------------------------|
| <b>OVERVIEW OF WORKS</b> |
|--------------------------|

|                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The area of the concrete slab in the south of the subject site was not previously investigated due to its use as car parking for the adjacent industrial property. |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------|
| Additionally, investigation of the former infilled pond was restricted due to the presence of gas infrastructure and underlying services. |
|-------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Further investigation was undertaken in September 2021 to determine ground conditions and confirm no unidentified contamination was present. The results of the supplementary site investigation were submitted to the planning department in a letter report (Ref: 14-255-L2; dated December 2021). |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Additional PCB testing was also undertaken within the area of supplementary investigation and the excess materials chemical analysis. The materials left in-situ indicated that PCBs were not detected above the screening values for the site. Within the excess Made Ground materials (discussed in RE-17), elevated levels of PCBs were detected above the screening value for a commercial end use. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### RE-2 – PRE-COMMENCEMENT REGULATORY COMPLIANCE

|                          |
|--------------------------|
| <b>OVERVIEW OF WORKS</b> |
|--------------------------|

|                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prior to the commencement of works on-site, all reports relating to the assessment of risk to contaminated land were submitted to the regulatory authorities. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                              |
|----------------------------------------------------------------------------------------------|
| A U1 and T5 Standard Rules Permit were registered by Portal Construction NW Ltd with the EA. |
|----------------------------------------------------------------------------------------------|

|                                                                                                           |
|-----------------------------------------------------------------------------------------------------------|
| The documentation and permits referred to above are available on request from Portal Construction NW Ltd. |
|-----------------------------------------------------------------------------------------------------------|



### **RE-3 – SERVICE INFRASTRUCTURE**

#### **OVERVIEW OF WORKS**

During remediation, the electricity infrastructure and the sewage treatment system tank and pipe works were diverted as part of the proposed development.

All records regarding the diversion are available on request from Portal Construction NW Ltd.

### **RE-4 – UNEXPLODED ORDNANCE**

#### **OVERVIEW OF WORKS**

The subject site was in the wider area of works associated with ROF Wrexham, but no historical buildings have been identified on the subject site which may be associated with the manufacture of explosives.

The responsibility for UXO clearance during the remediation and construction works was of that of the contractor and therefore all records are available from Portal Construction NW Ltd upon request.

### **RE-5 – ENVIRONMENT AND NUISANCE CONTROL**

#### **DATE OF WORKS UNDERTAKEN**

Throughout works

#### **OVERVIEW OF WORKS**

Dust monitoring was completed during the start of the remediation and enabling works.

A power washer and bowser were present to dampen down materials throughout the works and during the excavation and delineation of asbestos hotspots.

All records are available on request from Portal Construction NW Ltd.

### **RE-6 – RISK TO INFRASTRUCTURE**

#### **DATE OF WORKS UNDERTAKEN**

Throughout works

#### **OVERVIEW OF WORKS**

During remediation, works were restricted to between 8.00am and 5.30pm. A road sweeper was present to keep the access and Bridge Road North clean and clear of debris during the importation of materials to site.

A 15m easement was adhered to along the western boundary of the site as a medium pressure and intermediate pressure gas main were present along Bridge Road North.



## **RE-7 – IDENTIFICATION, ISOLATION AND TREATMENT OF INVASIVE PLANTS**

### **OVERVIEW OF WORKS**

No invasive plant species were identified during the remediation phase, therefore no further work was required.

## **RE-8 – SITE CLEARANCE OPERATIONS**

### **DATE OF WORKS UNDERTAKEN**

Throughout works.

### **OVERVIEW OF WORKS**

No buildings were present on-site prior to the remediation works, however concrete slabs and asphalt hardstanding were present beneath a layer of shallow Made Ground.

Trees were removed by a specialist contractor, shredded and subsequently removed off-site. A vegetation strip was completed across the whole site.

Throughout the enabling works scrap metal and general waste was separated from demolition materials, and placed into allocated skips for subsequent disposal off-site.

## **RE-9 – DELINEATION, EXCAVATION AND TREATMENT OF IDENTIFIED ASBESTOS IMPACT**

### **DATE OF WORKS UNDERTAKEN**

Throughout works.

### **OVERVIEW OF WORKS**

Detectable asbestos fibres were identified in discreet locations; however, due to the nature and age of the filled material, it must be assumed that trace fibres are present throughout the Made Ground. However, the supplementary ground investigation did not identify any further areas of asbestos impact within the Made Ground.

The E3P Developed Conceptual Site Model demonstrates a suitable method for management of soils to negate any future risk.

It was determined that no further hotspot delineation was required as the materials containing the elevated asbestos levels was placed at c. 1.00m below the proposed final development levels and therefore was placed in an area of low sensitivity, as per the E3P Asbestos CSM in Figure 2.2 within the agreed E3P Remediation Strategy (Ref: 14-255-R4-REVA; July 2021).



## RE-10 – EXCAVATION, BREAKING AND PROCESSING OF ALL ABOVE- AND BELOW-GROUND STRUCTURES

|                                 |
|---------------------------------|
| <b>DATE OF WORKS UNDERTAKEN</b> |
|---------------------------------|

|                   |
|-------------------|
| Throughout works. |
|-------------------|

|                          |
|--------------------------|
| <b>OVERVIEW OF WORKS</b> |
|--------------------------|

|                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Obstructions, relict foundations and infrastructure, including live services were diverted or removed from the areas of proposed development, adopted highway and utilities infrastructure (road box) in their entirety. |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## RE-11 – DELINEATION, EXCAVATION, TREATMENT OF INFILLED HISTORICAL PONDS

|                                 |
|---------------------------------|
| <b>DATE OF WORKS UNDERTAKEN</b> |
|---------------------------------|

|                |
|----------------|
| September 2021 |
|----------------|

|                    |
|--------------------|
| <b>PHOTOGRAPHS</b> |
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|         |
|---------|
| Plate 3 |
|---------|

|                          |
|--------------------------|
| <b>OVERVIEW OF WORKS</b> |
|--------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pad foundation excavations had been advanced in the vicinity of the former pond prior to E3P's attendance to site, however the excavations were still open which allowed a visual inspection to be completed to confirm no organic or deleterious materials were present. Shallow Made Ground was identified to overlie natural CLAY drift deposits. No further works were deemed necessary. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## RE-12 – REMOVAL OF DELETERIOUS MATERIAL

|                                 |
|---------------------------------|
| <b>DATE OF WORKS UNDERTAKEN</b> |
|---------------------------------|

|                   |
|-------------------|
| Throughout works. |
|-------------------|

|                          |
|--------------------------|
| <b>OVERVIEW OF WORKS</b> |
|--------------------------|

|                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------|
| No deleterious materials were encountered during the remediation and enabling works. Further works were therefore not required. |
|---------------------------------------------------------------------------------------------------------------------------------|

## RE-13 – CUT-AND-FILLING OF MADE GROUND TO DEVELOPMENT LEVELS

|                                 |
|---------------------------------|
| <b>DATE OF WORKS UNDERTAKEN</b> |
|---------------------------------|

|                   |
|-------------------|
| Throughout works. |
|-------------------|

|                    |
|--------------------|
| <b>PHOTOGRAPHS</b> |
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|-------------|
| Plate 4 – 5 |
|-------------|

|                          |
|--------------------------|
| <b>OVERVIEW OF WORKS</b> |
|--------------------------|

|                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Portal Construction NW Ltd has undertaken limited cut and filling of the Made Ground to development levels at the site, given the original ground level is similar to the prosoioded formation levels. A pad foundation was then utilised for the development. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## RE-14 – REPLACEMENT OF MATERIALS, GEOTECHNICAL ENGINEERING REQUIREMENTS

### DATE OF WORKS UNDERTAKEN

Throughout works.

### OVERVIEW OF WORKS

To achieve the proposed Enabling Works Levels (EWLs), Portal Construction NW Ltd undertook a process of minor cut/fill works including the careful selection of materials from within areas of reduced level excavation (cut) prior to placement in a manner that accords with the geotechnical engineering specification & contamination compliance criteria. Arisings from the foundations were re-used on site to build up levels.

Portal Construction NW Ltd has had full supervision with E3P providing part time supervision of the following:

-  General cut/fill of natural and anthropogenic soils in accordance with the E3P geotechnical & contamination performance criteria;
-  Management of all materials to maximise the retention of soils on site to ensure suitable development.

## RE-15 – IMPORTATION OF BULK FILL

### OVERVIEW OF WORKS

Due to the limited nature of any cut/fill earthworks there was an excess in bulkfill materials on site and therefore there was no requirement to import bulkfill materials to the site.

## RE-16 – INDEPENDENT VALIDATION: WATCHING BRIEF

### OVERVIEW OF WORKS

E3P implemented a part-time watching brief from September 2021, however by this point the majority of the works were undertaken. The overall aim was to investigate any potential sources of previously unidentified contamination. The Portal Construction NW Ltd site manager confirmed that prior to E3P's site attendance, no previously unidentified contamination was identified.

## RE-17 – WASTE SOILS SURPLUS TO REQUIREMENTS

### DATE OF WORKS UNDERTAKEN

Throughout works.

### PHOTOGRAPHS

Plate 6 – 7

### CHEMICAL TESTING

I2 Analytical Report 21-10252-2A (EXS101 to 103).  
RJT Classification Report 7U6H8-EKLQ4-0ZT6Q.



#### **OVERVIEW OF WORKS**

Excess Made Ground deposits stockpiled across the site, were removed from site by DNT Group Ltd (Permit no. EPR/HB3031AZ, Reg no. CBDU82444). WAC analysis undertaken on three samples of the excess Made Ground from across the site determined that these soils were inert non-hazardous waste.

With the exception of mixed general waste and timber/vegetation chippings which were removed to a licensed waste facility, no other materials were deemed unsuitable for retention on site.

Waste Transfer Notes are available in Appendix IV of this report.

### **RE-18 – VALIDATION OF MATERIALS FOR POTABLE WATER SUPPLY INFRASTRUCTURE**

#### **OVERVIEW OF WORKS**

The site has been identified as suitable for barrier pipework. The materials imported to the site for the purpose of potable pipework installation meet the criteria of barrier pipework as presented within UKWIR guidelines.



## 5. POST REMEDIATION BUILD PHASE REQUIREMENTS

This document details the construction works that are required to ensure full compliance with the remediation Strategy, Regulatory Authorities, Building Control & Warranty Providers.

The following should be implemented during the build phase of the development:

-  Installation and validation of ground gas protection measures.

The validation protocols are presented within the E3P Remediation and Enabling Works Strategy and are presented below.

### 5.1. GROUND GAS PROTECTION MEASURES

Ground gas monitoring to date suggests that the site will fall into the bracket for Characteristic Situation 2 / Amber which will require specialist mitigation measures to be constructed in accordance with BS8485 (2015)+A1(2019).

The validation inspection was completed by MEC Environmental Ltd on 19<sup>th</sup> May 2022. The validation certificate report is available in Appendix VII of this report.



## **6. CONCLUSION**

The remediation elements identified within the approved Remediation and Enabling Works Strategy have been completed with validation testing confirming that the works have been completed to the required standard.

**END OF REPORT**



# APPENDIX I

## LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the Client as indicated in Section 1.2.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.



# **APPENDIX II**

## **GLOSSARY**

## TERMS

|              |                                                            |                |                                                      |
|--------------|------------------------------------------------------------|----------------|------------------------------------------------------|
| <b>ACM</b>   | Asbestos-containing material                               | <b>MMP</b>     | Materials management plan                            |
| <b>ADS</b>   | Acoustic design statement                                  | <b>ND</b>      | Not detected                                         |
| <b>AST</b>   | Above-ground storage tank                                  | <b>NDP</b>     | Nuclear density probe                                |
| <b>BGS</b>   | British Geological Survey                                  | <b>NMP</b>     | Noise management plan                                |
| <b>BSI</b>   | British Standards Institute                                | <b>NPSE</b>    | Noise policy statement for England                   |
| <b>BTEX</b>  | Benzene, toluene, ethylbenzene, xylenes                    | <b>NR</b>      | Not recorded                                         |
| <b>CA</b>    | Coal Authority                                             | <b>PAH</b>     | Polycyclic aromatic hydrocarbon                      |
| <b>CBR</b>   | California bearing ratio                                   | <b>PCB</b>     | Polychlorinated biphenyl                             |
| <b>CIEH</b>  | Chartered Institute of Environmental Health                | <b>PI</b>      | Plasticity index                                     |
| <b>CIRIA</b> | Construction Industry Research Association                 | <b>PID</b>     | Photo ionisation detector                            |
| <b>CLEA</b>  | Contaminated land exposure assessment                      | <b>POS</b>     | Public open space                                    |
| <b>CML</b>   | Council of Mortgage Lenders                                | <b>PPE</b>     | Personnel protective equipment                       |
| <b>CoC</b>   | Contaminants of concern                                    | <b>ProPG</b>   | Professional practice guidance                       |
| <b>CSM</b>   | Conceptual site model                                      | <b>QA</b>      | Quality assurance                                    |
| <b>DNAPL</b> | Dense non-aqueous phase liquid (chlorinated solvents, PCB) | <b>SGV</b>     | Soil guideline value                                 |
| <b>DWS</b>   | Drinking water standard                                    | <b>SPH</b>     | Separate-phase hydrocarbon                           |
| <b>EA</b>    | Environment Agency                                         | <b>SPT</b>     | Standard penetration test                            |
| <b>EQS</b>   | Environmental quality standard                             | <b>SVOC</b>    | Semi-volatile organic compound                       |
| <b>FFL</b>   | Finished floor level                                       | <b>TPH</b>     | Total and speciated petroleum hydrocarbon            |
| <b>GAC</b>   | General assessment criteria                                | <b>TPH CWG</b> | Total Petroleum Hydrocarbon (Criteria Working Group) |
| <b>GL</b>    | Ground level                                               | <b>UKWIR</b>   | United Kingdom Water Infrastructure Risk             |
| <b>GSV</b>   | Gas screening value                                        | <b>UST</b>     | Underground storage tank                             |
| <b>HCV</b>   | Health criteria value                                      | <b>VCC</b>     | Vibro-concrete column                                |
| <b>ICSM</b>  | Initial conceptual site model                              | <b>VOC</b>     | Volatile organic compound                            |
| <b>LEL</b>   | Lower explosive limit                                      | <b>VRSC</b>    | Vibro-replacement stone columns                      |
| <b>LMRL</b>  | Lower method reporting limit                               | <b>VSC</b>     | Vibro-stone columns                                  |
| <b>LNAPL</b> | Light non-aqueous phase liquid (petrol, diesel, kerosene)  | <b>WHO</b>     | World Health Organisation                            |
| <b>MCV</b>   | Moisture condition value                                   | <b>WRAP</b>    | Waste and Resources Action Programme                 |
| <b>MIBK</b>  | Methyl isobutyl ketone                                     | <b>WTE</b>     | Water table elevation                                |
| <b>m</b>     | Metres                                                     | <b>ppm</b>     | Parts per million                                    |



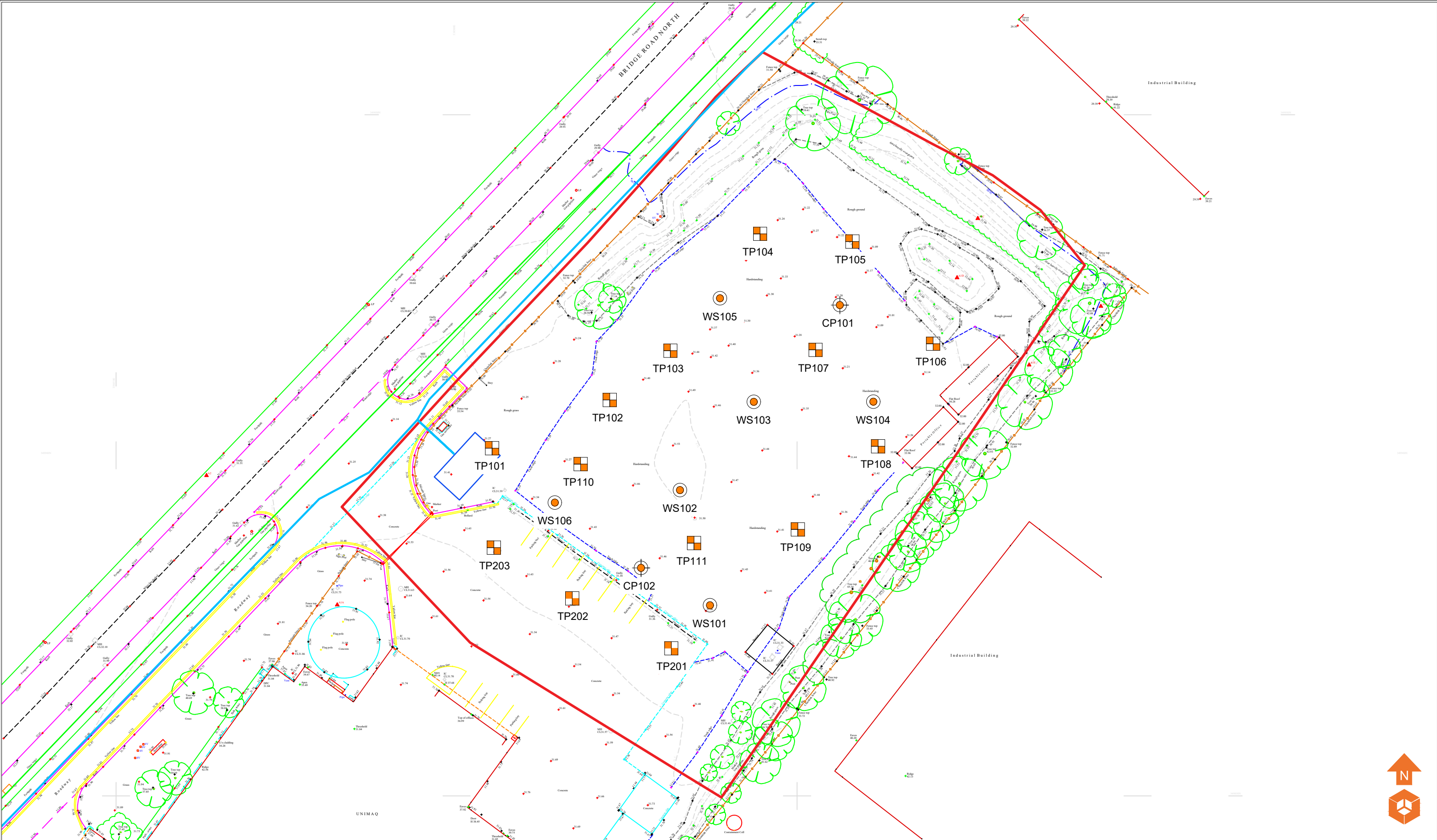
**Pacific Park, Wrexham**  
Remediation and Enabling Works Validation  
August 2023

|                |                                                            |                         |                                         |
|----------------|------------------------------------------------------------|-------------------------|-----------------------------------------|
| <b>km</b>      | Kilometres                                                 | <b>mg/m<sup>3</sup></b> | Milligram per metre cubed               |
| <b>% v/v</b>   | Percent volume in air                                      | <b>m bgl bgl</b>        | Metres below ground level               |
| <b>mb</b>      | Millibars (atmospheric pressure)                           | <b>m bcl</b>            | Metre below cover level                 |
| <b>l/hr</b>    | Litres per hour                                            | <b>mAOD</b>             | Metres above ordnance datum (sea level) |
| <b>µg/l</b>    | Micrograms per litre (parts per billion)                   | <b>kN/m<sup>2</sup></b> | Kilonewtons per metre squared           |
| <b>ppb</b>     | Parts per billion                                          | <b>µm</b>               | Micrometre                              |
| <b>mg/kg</b>   | Milligrams per kilogram (parts per million)                | <b>SSRT</b>             | Site Specific Remediation Target        |
| <b>PSD</b>     | Particle Size Distribution                                 | <b>DD</b>               | Dry Density                             |
| <b>CL:AIRE</b> | Contaminated Land: Applications in Real Environments       | <b>Mc</b>               | Moisture Content                        |
| <b>ρ</b>       | Bulk Density                                               | <b>GPR</b>              | Ground Penetrating Radar                |
| <b>NDP</b>     | Nuclear Density Probe                                      | <b>FFL</b>              | Finished Floor Level                    |
| <b>LEL</b>     | Lower Explosive Limit                                      | <b>UKWIR</b>            | UK Water Industry Research              |
| <b>CIRIA</b>   | Construction Industry Research and Information Association | <b>LOD</b>              | Limit of Detection                      |



# **APPENDIX III**

## **DRAWINGS**



|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |  |  |                                                                                                                                                                                                                                                                                     |  |  |  |  |                                                                     |  |                                       |                                        |                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|---------------------------------------------------------------------|--|---------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <div>Location Symbols</div> <div><div> Approximate Window Sample Probehole Location</div><div> Approximate Trial Pit Location</div><div> Approximate Cable Percussive Borehole Location</div></div> |  |  |  |  | <div>Notes:</div>                                                                                                                                                                                                                                                                   |  |  |  |  | <div>Client:</div> <div>Portal Construction</div>                   |  | <div>Job No:</div> <div>14-255</div>  | <div>Date:</div> <div>08.12.2021</div> | <div> <b>e3p</b></div> <div>Environmental Engineering Partnership Ltd<br/>Taylor Road, Trafford Park<br/>Urmston, Manchester, M41 7JQ<br/>Tel: 0161 707 9612<br/>E-mail: <a href="mailto:info@e3p.co.uk">info@e3p.co.uk</a><br/>Website: <a href="http://www.e3p.co.uk">www.e3p.co.uk</a></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |  |  | <div><div><div>P1</div><div>REVB</div><div>08.12.2021</div><div>LM</div><div>RH</div></div><div><div>P1</div><div>REVA</div><div>26.02.2021</div><div>EB</div><div>MJ</div></div><div><div>Phase</div><div>Issue</div><div>Date</div><div>Drawn</div><div>Checked</div></div></div> |  |  |  |  | <div>Job Title:</div> <div>Pacific Park, Wrexham</div>              |  | <div>Drawing No:</div> <div>005</div> |                                        | <div>Scale:</div> <div>NTS@ A3</div>                                                                                                                                                                                                                                                                                                                                                 | <div>The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.</div> |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |  |  |                                                                                                                                                                                                                                                                                     |  |  |  |  | <div>Drawing Title:</div> <div>Exploratory Hole Location Plan</div> |  |                                       |                                        |                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |

# **APPENDIX IV CHEMICAL TESTING RESULTS**



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e: ██████████

## **Analytical Report Number : 21-10251**

|                             |                                      |                                                        |            |
|-----------------------------|--------------------------------------|--------------------------------------------------------|------------|
| <b>Project / Site name:</b> | Pacific Park Wrexham                 | <b>Samples received on:</b>                            | 15/09/2021 |
| <b>Your job number:</b>     | 14 255                               | <b>Samples instructed on/<br/>Analysis started on:</b> | 15/09/2021 |
| <b>Your order number:</b>   | 14255 BH N                           | <b>Analysis completed by:</b>                          | 23/09/2021 |
| <b>Report Issue Number:</b> | 1                                    | <b>Report issued on:</b>                               | 23/09/2021 |
| <b>Samples Analysed:</b>    | 2 leachate samples - 10 soil samples |                                                        |            |

Signed ██████████

Karolina Marek  
PL Head of Reporting Team  
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting  
leachates - 2 weeks from reporting  
waters - 2 weeks from reporting  
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.  
Application of uncertainty of measurement would provide a range within which the true result lies.  
An estimate of measurement uncertainty can be provided on request.

**Analytical Report Number: 21-10251**  
**Project / Site name: Pacific Park Wrexham**  
**Your Order No: 14255 BH N**

| Lab Sample Number                       |       |                    |                      | 2012757       | 2012758       | 2012759       | 2012760       | 2012761       |
|-----------------------------------------|-------|--------------------|----------------------|---------------|---------------|---------------|---------------|---------------|
| Sample Reference                        |       |                    |                      | TP201         | TP201         | TP202         | TP202         | TP202         |
| Sample Number                           |       |                    |                      | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                    |                      | 1.00          | 1.30          | 0.10          | 0.40          | 0.85          |
| Date Sampled                            |       |                    |                      | 15/09/2021    | 15/09/2021    | 15/09/2021    | 15/09/2021    | 15/09/2021    |
| Time Taken                              |       |                    |                      | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of detection | Accreditation Status |               |               |               |               |               |
| Stone Content                           | %     | 0.1                | NONE                 | < 0.1         | < 0.1         | < 0.1         | < 0.1         | < 0.1         |
| Moisture Content                        | %     | 0.01               | NONE                 | 20            | 17            | 6.4           | 20            | 10            |
| Total mass of sample received           | kg    | 0.001              | NONE                 | 0.50          | 0.50          | 0.50          | 0.50          | 0.50          |

| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected | Not-detected | Not-detected |
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|--------------|
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|--------------|

#### General Inorganics

| pH - Automated                                                   | pH Units | N/A     | MCERTS | 8.7   | 8.9   | 9.3   | 8.2   | 8.5   |
|------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|-------|
| Total Cyanide                                                    | mg/kg    | 1       | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Total Sulphate as SO <sub>4</sub>                                | mg/kg    | 50      | MCERTS | 770   | 320   | 960   | 1000  | 2100  |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | g/l      | 0.00125 | MCERTS | 0.041 | 0.019 | 0.065 | 0.11  | 0.062 |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | mg/kg    | 2.5     | MCERTS | 82    | 37    | 130   | 220   | 120   |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | mg/l     | 1.25    | MCERTS | 41.0  | 18.6  | 65.1  | 110   | 62.0  |
| Sulphide                                                         | mg/kg    | 1       | MCERTS | 20    | 4.0   | 50    | 40    | 6.2   |
| Total Sulphur                                                    | mg/kg    | 50      | MCERTS | 690   | 200   | 4100  | 1200  | 1400  |
| Total Organic Carbon (TOC)                                       | %        | 0.1     | MCERTS | 0.8   | 0.4   | 0.6   | 2.4   | 1.1   |

#### Total Phenols

| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|

#### Speciated PAHs

|                        |       |      |        |        |        |        |        |        |
|------------------------|-------|------|--------|--------|--------|--------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 0.86   | < 0.05 | < 0.05 | 1.8    | 0.53   |
| Anthracene             | mg/kg | 0.05 | MCERTS | 0.21   | < 0.05 | < 0.05 | 0.54   | < 0.05 |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 1.4    | < 0.05 | < 0.05 | 4.2    | 0.54   |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 1.2    | < 0.05 | < 0.05 | 3.7    | 0.47   |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 0.81   | < 0.05 | < 0.05 | 2.5    | 0.32   |
| Chrysene               | mg/kg | 0.05 | MCERTS | 0.65   | < 0.05 | < 0.05 | 2.1    | 0.30   |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.76   | < 0.05 | < 0.05 | 2.7    | 0.34   |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.38   | < 0.05 | < 0.05 | 0.93   | 0.22   |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 0.72   | < 0.05 | < 0.05 | 2.3    | 0.33   |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 0.30   | < 0.05 | < 0.05 | 0.81   | < 0.05 |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | 0.23   | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | 0.39   | < 0.05 | < 0.05 | 0.92   | < 0.05 |

#### Total PAH

| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 7.74 | < 0.80 | < 0.80 | 22.6 | 3.05 |
|-----------------------------|-------|-----|--------|------|--------|--------|------|------|
|-----------------------------|-------|-----|--------|------|--------|--------|------|------|

#### Heavy Metals / Metalloids

|                                   |       |     |        |       |       |       |       |       |
|-----------------------------------|-------|-----|--------|-------|-------|-------|-------|-------|
| Arsenic (aqua regia extractable)  | mg/kg | 1   | MCERTS | 14    | 13    | 5.6   | 12    | 19    |
| Cadmium (aqua regia extractable)  | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | 0.2   | 0.4   | < 0.2 |
| Chromium (hexavalent)             | mg/kg | 4   | MCERTS | < 4.0 | < 4.0 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1   | MCERTS | 35    | 35    | 7.3   | 31    | 27    |
| Copper (aqua regia extractable)   | mg/kg | 1   | MCERTS | 30    | 22    | 7.7   | 25    | 32    |
| Lead (aqua regia extractable)     | mg/kg | 1   | MCERTS | 47    | 17    | 15    | 41    | 51    |
| Mercury (aqua regia extractable)  | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable)   | mg/kg | 1   | MCERTS | 39    | 37    | 15    | 30    | 30    |
| Selenium (aqua regia extractable) | mg/kg | 1   | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Zinc (aqua regia extractable)     | mg/kg | 1   | MCERTS | 92    | 65    | 20    | 130   | 63    |

**Analytical Report Number: 21-10251**  
**Project / Site name: Pacific Park Wrexham**  
**Your Order No: 14255 BH N**

| Lab Sample Number                       |       |                    |                         | 2012757       | 2012758       | 2012759       | 2012760       | 2012761       |
|-----------------------------------------|-------|--------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| Sample Reference                        |       |                    |                         | TP201         | TP201         | TP202         | TP202         | TP202         |
| Sample Number                           |       |                    |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                    |                         | 1.00          | 1.30          | 0.10          | 0.40          | 0.85          |
| Date Sampled                            |       |                    |                         | 15/09/2021    | 15/09/2021    | 15/09/2021    | 15/09/2021    | 15/09/2021    |
| Time Taken                              |       |                    |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of detection | Accreditation<br>Status |               |               |               |               |               |

#### Petroleum Hydrocarbons

|                    |       |     |        |       |       |       |       |       |
|--------------------|-------|-----|--------|-------|-------|-------|-------|-------|
| TPH (C5 - C6)      | mg/kg | 1   | NONE   | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH (C6 - C8)      | mg/kg | 0.1 | MCERTS | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| TPH (C8 - C10)     | mg/kg | 0.1 | MCERTS | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| TPH (C10 - C12)    | mg/kg | 2   | MCERTS | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| TPH (C12 - C16)    | mg/kg | 4   | MCERTS | < 4.0 | < 4.0 | < 4.0 | 4.6   | 6.0   |
| TPH (C16 - C21)    | mg/kg | 1   | MCERTS | 21    | < 1.0 | < 1.0 | 24    | 32    |
| TPH (C21 - C35)    | mg/kg | 1   | MCERTS | 43    | < 1.0 | < 1.0 | 51    | 54    |
| TPH (C35 - C40)    | mg/kg | 10  | MCERTS | < 10  | < 10  | < 10  | 17    | < 10  |
| TPH Total C5 - C40 | mg/kg | 10  | MCERTS | 65    | < 10  | < 10  | 96    | 92    |

#### PCBs by GC-MS

|                  |       |       |        |       |         |         |         |         |
|------------------|-------|-------|--------|-------|---------|---------|---------|---------|
| PCB Congener 28  | mg/kg | 0.001 | MCERTS | 0.004 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| PCB Congener 52  | mg/kg | 0.001 | MCERTS | 0.013 | < 0.001 | 0.006   | 0.022   | 0.005   |
| PCB Congener 101 | mg/kg | 0.001 | MCERTS | 0.031 | < 0.001 | 0.014   | 0.061   | 0.015   |
| PCB Congener 118 | mg/kg | 0.001 | MCERTS | 0.023 | < 0.001 | 0.012   | 0.057   | 0.009   |
| PCB Congener 138 | mg/kg | 0.001 | MCERTS | 0.024 | < 0.001 | 0.014   | 0.068   | 0.019   |
| PCB Congener 153 | mg/kg | 0.001 | MCERTS | 0.023 | < 0.001 | 0.011   | 0.052   | 0.018   |
| PCB Congener 180 | mg/kg | 0.001 | MCERTS | 0.005 | < 0.001 | < 0.001 | 0.011   | 0.016   |

#### Total PCBs by GC-MS

|            |       |       |        |      |         |       |      |       |
|------------|-------|-------|--------|------|---------|-------|------|-------|
| Total PCBs | mg/kg | 0.007 | MCERTS | 0.12 | < 0.007 | 0.057 | 0.27 | 0.082 |
|------------|-------|-------|--------|------|---------|-------|------|-------|

U/S = Unsuitable Sample I/S = Insufficient Sample

**Analytical Report Number: 21-10251**  
**Project / Site name: Pacific Park Wrexham**  
**Your Order No: 14255 BH N**

| Lab Sample Number                       |       |                    |                         | 2012762       | 2012763       | 2012764       | 2012765       | 2012766       |
|-----------------------------------------|-------|--------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| Sample Reference                        |       |                    |                         | TP203         | TP203         | EXS101        | EXS102        | EXS103        |
| Sample Number                           |       |                    |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                    |                         | 0.35          | 0.90          | None Supplied | None Supplied | None Supplied |
| Date Sampled                            |       |                    |                         | 15/09/2021    | 15/09/2021    | 15/09/2021    | 15/09/2021    | 15/09/2021    |
| Time Taken                              |       |                    |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of detection | Accreditation<br>Status |               |               |               |               |               |
| Stone Content                           | %     | 0.1                | NONE                    | < 0.1         | < 0.1         | < 0.1         | < 0.1         | < 0.1         |
| Moisture Content                        | %     | 0.01               | NONE                    | 12            | 17            | 12            | 12            | 9.5           |
| Total mass of sample received           | kg    | 0.001              | NONE                    | 0.50          | 0.50          | 0.50          | 0.50          | 0.50          |

| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected | Not-detected | Not-detected |
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|--------------|
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|--------------|

#### General Inorganics

| pH - Automated                                                   | pH Units | N/A     | MCERTS | 8.2   | 8.3   | 8.5   | 8.9   | 8.5   |
|------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|-------|
| Total Cyanide                                                    | mg/kg    | 1       | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Total Sulphate as SO <sub>4</sub>                                | mg/kg    | 50      | MCERTS | 7500  | 1500  | 6000  | 1500  | 670   |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | g/l      | 0.00125 | MCERTS | 0.11  | 0.69  | 0.078 | 0.30  | 0.060 |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | mg/kg    | 2.5     | MCERTS | 230   | 1400  | 160   | 590   | 120   |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | mg/l     | 1.25    | MCERTS | 113   | 687   | 78.1  | 295   | 60.4  |
| Sulphide                                                         | mg/kg    | 1       | MCERTS | 3.9   | < 1.0 | 5.1   | 28    | 2.9   |
| Total Sulphur                                                    | mg/kg    | 50      | MCERTS | 4900  | 550   | 2500  | 1100  | 380   |
| Total Organic Carbon (TOC)                                       | %        | 0.1     | MCERTS | 0.8   | 0.5   | 1.4   | 1.2   | 1.0   |

#### Total Phenols

| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|

#### Speciated PAHs

|                        |       |      |        |        |        |        |        |        |
|------------------------|-------|------|--------|--------|--------|--------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 0.58   | < 0.05 | < 0.05 |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 0.54   | < 0.05 | < 0.05 |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 3.7    | < 0.05 | 6.5    | 0.80   | < 0.05 |
| Anthracene             | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 2.7    | 0.25   | < 0.05 |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 0.62   | < 0.05 | 19     | 2.1    | 0.35   |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 0.38   | < 0.05 | 18     | 2.3    | 0.33   |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 11     | 2.0    | < 0.05 |
| Chrysene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 8.1    | 1.2    | < 0.05 |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 8.3    | 2.5    | < 0.05 |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 5.8    | 1.2    | < 0.05 |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 9.0    | 2.2    | < 0.05 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 4.4    | 1.3    | < 0.05 |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 1.3    | 0.40   | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 4.8    | 1.5    | < 0.05 |

#### Total PAH

| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 4.67 | < 0.80 | 100 | 17.7 | < 0.80 |
|-----------------------------|-------|-----|--------|------|--------|-----|------|--------|
|-----------------------------|-------|-----|--------|------|--------|-----|------|--------|

#### Heavy Metals / Metalloids

|                                   |       |     |        |       |       |       |       |       |
|-----------------------------------|-------|-----|--------|-------|-------|-------|-------|-------|
| Arsenic (aqua regia extractable)  | mg/kg | 1   | MCERTS | 29    | 14    | 18    | 5.5   | 8.6   |
| Cadmium (aqua regia extractable)  | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | < 0.2 | 0.5   | 0.3   |
| Chromium (hexavalent)             | mg/kg | 4   | MCERTS | < 4.0 | < 4.0 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1   | MCERTS | 30    | 51    | 23    | 17    | 29    |
| Copper (aqua regia extractable)   | mg/kg | 1   | MCERTS | 42    | 25    | 27    | 19    | 24    |
| Lead (aqua regia extractable)     | mg/kg | 1   | MCERTS | 52    | 21    | 54    | 42    | 36    |
| Mercury (aqua regia extractable)  | mg/kg | 0.3 | MCERTS | 0.9   | < 0.3 | 0.4   | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable)   | mg/kg | 1   | MCERTS | 26    | 49    | 23    | 14    | 26    |
| Selenium (aqua regia extractable) | mg/kg | 1   | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Zinc (aqua regia extractable)     | mg/kg | 1   | MCERTS | 38    | 84    | 75    | 67    | 80    |

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**Your Order No: 14255 BH N**

| Lab Sample Number                       |       |                    |                         | 2012762       | 2012763       | 2012764       | 2012765       | 2012766       |
|-----------------------------------------|-------|--------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| Sample Reference                        |       |                    |                         | TP203         | TP203         | EXS101        | EXS102        | EXS103        |
| Sample Number                           |       |                    |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                    |                         | 0.35          | 0.90          | None Supplied | None Supplied | None Supplied |
| Date Sampled                            |       |                    |                         | 15/09/2021    | 15/09/2021    | 15/09/2021    | 15/09/2021    | 15/09/2021    |
| Time Taken                              |       |                    |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of detection | Accreditation<br>Status |               |               |               |               |               |
| <b>Petroleum Hydrocarbons</b>           |       |                    |                         |               |               |               |               |               |
| TPH (C5 - C6)                           | mg/kg | 1                  | NONE                    | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         |
| TPH (C6 - C8)                           | mg/kg | 0.1                | MCERTS                  | < 0.1         | < 0.1         | < 0.1         | < 0.1         | < 0.1         |
| TPH (C8 - C10)                          | mg/kg | 0.1                | MCERTS                  | < 0.1         | < 0.1         | < 0.1         | < 0.1         | < 0.1         |
| TPH (C10 - C12)                         | mg/kg | 2                  | MCERTS                  | < 2.0         | < 2.0         | < 2.0         | < 2.0         | < 2.0         |
| TPH (C12 - C16)                         | mg/kg | 4                  | MCERTS                  | < 4.0         | < 4.0         | 11            | 19            | < 4.0         |
| TPH (C16 - C21)                         | mg/kg | 1                  | MCERTS                  | < 1.0         | < 1.0         | 81            | 70            | < 1.0         |
| TPH (C21 - C35)                         | mg/kg | 1                  | MCERTS                  | < 1.0         | < 1.0         | 250           | 370           | < 1.0         |
| TPH (C35 - C40)                         | mg/kg | 10                 | MCERTS                  | < 10          | < 10          | 61            | 130           | < 10          |
| TPH Total C5 - C40                      | mg/kg | 10                 | MCERTS                  | < 10          | < 10          | 400           | 580           | < 10          |

#### PCBs by GC-MS

|                  |       |       |        |         |         |       |         |       |
|------------------|-------|-------|--------|---------|---------|-------|---------|-------|
| PCB Congener 28  | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | 0.47  | < 0.001 | 0.007 |
| PCB Congener 52  | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | 0.24  | 0.020   | 0.10  |
| PCB Congener 101 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | 0.098 | 0.043   | 0.21  |
| PCB Congener 118 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | 0.11  | 0.034   | 0.15  |
| PCB Congener 138 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | 0.081 | 0.036   | 0.14  |
| PCB Congener 153 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | 0.073 | 0.031   | 0.12  |
| PCB Congener 180 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | 0.097 | < 0.001 | 0.025 |

#### Total PCBs by GC-MS

|            |       |       |        |         |         |     |      |      |
|------------|-------|-------|--------|---------|---------|-----|------|------|
| Total PCBs | mg/kg | 0.007 | MCERTS | < 0.007 | < 0.007 | 1.2 | 0.17 | 0.76 |
|------------|-------|-------|--------|---------|---------|-----|------|------|

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number: 21-10251  
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Your Order No: 14255 BH N

|                                             |       |                    |                      |               |               |
|---------------------------------------------|-------|--------------------|----------------------|---------------|---------------|
| Lab Sample Number                           |       |                    |                      | 2012767       | 2012768       |
| Sample Reference                            |       |                    |                      | TP202         | TP203         |
| Sample Number                               |       |                    |                      | None Supplied | None Supplied |
| Depth (m)                                   |       |                    |                      | 0.85          | 0.35          |
| Date Sampled                                |       |                    |                      | 15/09/2021    | 15/09/2021    |
| Time Taken                                  |       |                    |                      | None Supplied | None Supplied |
| Analytical Parameter<br>(Leachate Analysis) | Units | Limit of detection | Accreditation Status |               |               |

#### General Inorganics

|                                  |          |     |           |       |       |
|----------------------------------|----------|-----|-----------|-------|-------|
| pH                               | pH Units | N/A | ISO 17025 | 7.9   | 7.4   |
| Total Cyanide (Low Level 1 µg/l) | µg/l     | 1   | ISO 17025 | < 1.0 | < 1.0 |

#### Total Phenols

|                            |      |   |           |     |     |
|----------------------------|------|---|-----------|-----|-----|
| Total Phenols (monohydric) | µg/l | 1 | ISO 17025 | 1.6 | 1.9 |
|----------------------------|------|---|-----------|-----|-----|

#### Speciated PAHs

|                        |      |      |           |        |        |
|------------------------|------|------|-----------|--------|--------|
| Naphthalene            | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Acenaphthylene         | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Acenaphthene           | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Fluorene               | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Phenanthrene           | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Anthracene             | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Fluoranthene           | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Pyrene                 | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Benzo(a)anthracene     | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Chrysene               | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Benzo(b)fluoranthene   | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Benzo(k)fluoranthene   | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Benzo(a)pyrene         | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Indeno(1,2,3-cd)pyrene | µg/l | 0.01 | NONE      | < 0.01 | < 0.01 |
| Dibenz(a,h)anthracene  | µg/l | 0.01 | NONE      | < 0.01 | < 0.01 |
| Benzo(ghi)perylene     | µg/l | 0.01 | NONE      | < 0.01 | < 0.01 |

#### Total PAH

|                   |      |     |      |       |       |
|-------------------|------|-----|------|-------|-------|
| Total EPA-16 PAHs | µg/l | 0.2 | NONE | < 0.2 | < 0.2 |
|-------------------|------|-----|------|-------|-------|

#### Heavy Metals / Metalloids

|                       |      |      |           |        |        |
|-----------------------|------|------|-----------|--------|--------|
| Arsenic (dissolved)   | µg/l | 1    | ISO 17025 | 3.2    | < 1.0  |
| Cadmium (dissolved)   | µg/l | 0.08 | ISO 17025 | < 0.08 | < 0.08 |
| Chromium (hexavalent) | µg/l | 5    | ISO 17025 | < 5.0  | < 5.0  |
| Chromium (dissolved)  | µg/l | 0.4  | ISO 17025 | 1.1    | 1.3    |
| Copper (dissolved)    | µg/l | 0.7  | ISO 17025 | 14     | 12     |
| Lead (dissolved)      | µg/l | 1    | ISO 17025 | 1.8    | 3.3    |
| Mercury (dissolved)   | µg/l | 0.5  | ISO 17025 | < 0.5  | < 0.5  |
| Nickel (dissolved)    | µg/l | 0.3  | ISO 17025 | 2.6    | 3.7    |
| Selenium (dissolved)  | µg/l | 4    | ISO 17025 | < 4.0  | < 4.0  |
| Zinc (dissolved)      | µg/l | 0.4  | ISO 17025 | 8.3    | 7.2    |

#### Monoaromatics & Oxygenates

|                                    |      |    |           |       |       |
|------------------------------------|------|----|-----------|-------|-------|
| Benzene                            | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| Toluene                            | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| Ethylbenzene                       | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| p & m-xylene                       | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| o-xylene                           | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 10 | NONE      | < 10  | < 10  |



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|                                             |       |                    |                      |               |               |
|---------------------------------------------|-------|--------------------|----------------------|---------------|---------------|
| Lab Sample Number                           |       |                    |                      | 2012767       | 2012768       |
| Sample Reference                            |       |                    |                      | TP202         | TP203         |
| Sample Number                               |       |                    |                      | None Supplied | None Supplied |
| Depth (m)                                   |       |                    |                      | 0.85          | 0.35          |
| Date Sampled                                |       |                    |                      | 15/09/2021    | 15/09/2021    |
| Time Taken                                  |       |                    |                      | None Supplied | None Supplied |
| Analytical Parameter<br>(Leachate Analysis) | Units | Limit of detection | Accreditation Status |               |               |

#### Petroleum Hydrocarbons

|                  |      |    |      |      |      |
|------------------|------|----|------|------|------|
| TPH1 (C10 - C40) | µg/l | 10 | NONE | < 10 | < 10 |
|------------------|------|----|------|------|------|

|                                |      |    |           |       |       |
|--------------------------------|------|----|-----------|-------|-------|
| TPH-CWG - Aliphatic >C5 - C6   | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >C6 - C8   | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >C8 - C10  | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >C10 - C12 | µg/l | 10 | NONE      | < 10  | < 10  |
| TPH-CWG - Aliphatic >C12 - C16 | µg/l | 10 | NONE      | < 10  | < 10  |
| TPH-CWG - Aliphatic >C16 - C21 | µg/l | 10 | NONE      | < 10  | < 10  |
| TPH-CWG - Aliphatic >C21 - C35 | µg/l | 10 | NONE      | < 10  | < 10  |
| TPH-CWG - Aliphatic (C5 - C35) | µg/l | 10 | NONE      | < 10  | < 10  |

|                               |      |    |           |       |       |
|-------------------------------|------|----|-----------|-------|-------|
| TPH-CWG - Aromatic >C5 - C7   | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >C7 - C8   | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >C8 - C10  | µg/l | 1  | ISO 17025 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >C10 - C12 | µg/l | 10 | NONE      | < 10  | < 10  |
| TPH-CWG - Aromatic >C12 - C16 | µg/l | 10 | NONE      | < 10  | < 10  |
| TPH-CWG - Aromatic >C16 - C21 | µg/l | 10 | NONE      | < 10  | < 10  |
| TPH-CWG - Aromatic >C21 - C35 | µg/l | 10 | NONE      | < 10  | < 10  |
| TPH-CWG - Aromatic (C5 - C35) | µg/l | 10 | NONE      | < 10  | < 10  |

U/S = Unsuitable Sample I/S = Insufficient Sample

**Analytical Report Number : 21-10251**

**Project / Site name: Pacific Park Wrexham**

\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

| Lab Sample Number | Sample Reference | Sample Number | Depth (m)     | Sample Description *                       |
|-------------------|------------------|---------------|---------------|--------------------------------------------|
| 2012757           | TP201            | None Supplied | 1             | Brown clay and sand with rubble.           |
| 2012758           | TP201            | None Supplied | 1.3           | Brown clay with gravel.                    |
| 2012759           | TP202            | None Supplied | 0.1           | Brown clay and sand with gravel.           |
| 2012760           | TP202            | None Supplied | 0.4           | Brown clay and sand with gravel.           |
| 2012761           | TP202            | None Supplied | 0.85          | Brown clay and sand with rubble.           |
| 2012762           | TP203            | None Supplied | 0.35          | Brown clay and sand with rubble.           |
| 2012763           | TP203            | None Supplied | 0.9           | Brown clay with gravel.                    |
| 2012764           | EXS101           | None Supplied | None Supplied | Brown clay and sand with gravel.           |
| 2012765           | EXS102           | None Supplied | None Supplied | Brown clay and sand with gravel.           |
| 2012766           | EXS103           | None Supplied | None Supplied | Brown clay and sand with gravel and brick. |

**Analytical Report Number : 21-10251**  
**Project / Site name: Pacific Park Wrexham**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                                          | Analytical Method Reference                                                                                     | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).              | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                                           | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                            | L038-PL       | D                  | MCERTS               |
| BS EN 12457-1 (2:1) Leachate Prep                  | 2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.                                               | In-house method based on BSEN12457-1.                                                                           | L043-PL       | W                  | NONE                 |
| Asbestos identification in soil                    | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.                                                  | In house method based on HSG 248                                                                                | A001-PL       | D                  | ISO 17025            |
| Metals by ICP-OES in leachate                      | Determination of metals in leachate by acidification followed by ICP-OES.                                                                                              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                            | L039-PL       | W                  | ISO 17025            |
| Hexavalent chromium in leachate                    | Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.                                          | In-house method                                                                                                 | L080-PL       | W                  | ISO 17025            |
| Hexavalent chromium in soil                        | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.                  | In-house method                                                                                                 | L080-PL       | W                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                                  | In house method.                                                                                                | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in leachate - LOW LEVEL 1 ug/l  | Determination of phenols in leachate by distillation followed by colorimetry.                                                                                          | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL       | W                  | ISO 17025            |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                                 | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL       | W                  | MCERTS               |
| Speciated EPA-16 PAHs in leachate                  | Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.                        | In-house method based on USEPA 8270                                                                             | L102B-PL      | W                  | NONE                 |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.                 | In-house method based on USEPA 8270                                                                             | L064-PL       | D                  | MCERTS               |
| PCB's By GC-MS in soil                             | Determination of PCB by extraction with acetone and hexane followed by GC-MS.                                                                                          | In-house method based on USEPA 8082                                                                             | L027-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                                      | In house method.                                                                                                | L099-PL       | D                  | MCERTS               |
| pH at 20oC in leachate                             | Determination of pH in leachate by electrometric measurement.                                                                                                          | In house method.                                                                                                | L005-PL       | W                  | ISO 17025            |
| Sulphide in soil                                   | Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode. | In-house method                                                                                                 | L010-PL       | D                  | MCERTS               |
| Total sulphate (as SO4 in soil)                    | Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.                                                                                | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |

**Analytical Report Number : 21-10251**  
**Project / Site name: Pacific Park Wrexham**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)**

| Analytical Test Name                              | Analytical Method Description                                                                                                 | Analytical Method Reference                                                                                     | Method number | Wet / Dry Analysis | Accreditation Status |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Stones content of soil                            | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.   | In-house method based on British Standard Methods and MCERTS requirements.                                      | L019-UK/PL    | D                  | NONE                 |
| Total Sulphur in soil                             | Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.          | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| TPH1 (Leachates)                                  | Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.                                               | In-house method                                                                                                 | L070-PL       | W                  | NONE                 |
| TPHCWG (Leachates)                                | Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.                                               | In-house method                                                                                                 | L070-PL       | W                  | NONE                 |
| Total cyanide in soil                             | Determination of total cyanide by distillation followed by colorimetry.                                                       | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar) | L080-PL       | W                  | MCERTS               |
| Total organic carbon (Automated) in soil          | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate. | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| BTEX and MTBE in leachates (Monoaromatics)        | Determination of BTEX and MTBE in leachates by headspace GC-MS.                                                               | In-house method based on USEPA8260                                                                              | L073B-PL      | W                  | ISO 17025            |
| TPH in (Soil)                                     | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                 | In-house method, TPH with carbon banding and silica gel split/cleanup.                                          | L076-PL       | D                  | MCERTS               |
| Total cyanide in leachate - 1µg/l                 | Determination of total cyanide by distillation followed by colorimetry.                                                       | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton          | L080-PL       | W                  | ISO 17025            |
| D.O. for Gravimetric Quant if Screen/ID positive  | Dependent option for Gravimetric Quant if Screen/ID positive scheduled.                                                       | In house asbestos methods A001 & A006.                                                                          | A006-PL       | D                  | NONE                 |
| Sulphate, water soluble, in soil (1hr extraction) | Sulphate, water soluble, in soil (1hr extraction)                                                                             | In-house method                                                                                                 | L038-PL       | D                  | MCERTS               |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**

**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**

**Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.**



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## **Analytical Report Number : 21-10251-2A**

Replaces Analytical Report Number: 21-10251, issue no. 1  
Report format change.

|                             |                      |                                                        |            |
|-----------------------------|----------------------|--------------------------------------------------------|------------|
| <b>Project / Site name:</b> | Pacific Park Wrexham | <b>Samples received on:</b>                            | 15/09/2021 |
| <b>Your job number:</b>     | 14 255               | <b>Samples instructed on/<br/>Analysis started on:</b> | 15/09/2021 |
| <b>Your order number:</b>   | 14255 BH N           | <b>Analysis completed by:</b>                          | 23/09/2021 |
| <b>Report Issue Number:</b> | 2A                   | <b>Report issued on:</b>                               | 24/09/2021 |
| <b>Samples Analysed:</b>    | 3 soil samples       |                                                        |            |

**Signed:** ██████████

Karolina Marek  
PL Head of Reporting Team  
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting  
leachates - 2 weeks from reporting  
waters - 2 weeks from reporting  
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.  
Application of uncertainty of measurement would provide a range within which the true result lies.  
An estimate of measurement uncertainty can be provided on request.

**Analytical Report Number: 21-10251**  
**Project / Site name: Pacific Park Wrexham**  
**Your Order No: 14255 BH N**

| Lab Sample Number                       |       |                    |                      | 2012764       | 2012765       | 2012766       |
|-----------------------------------------|-------|--------------------|----------------------|---------------|---------------|---------------|
| Sample Reference                        |       |                    |                      | EXS101        | EXS102        | EXS103        |
| Sample Number                           |       |                    |                      | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                    |                      | None Supplied | None Supplied | None Supplied |
| Date Sampled                            |       |                    |                      | 15/09/2021    | 15/09/2021    | 15/09/2021    |
| Time Taken                              |       |                    |                      | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of detection | Accreditation Status |               |               |               |
| Stone Content                           | %     | 0.1                | NONE                 | < 0.1         | < 0.1         | < 0.1         |
| Moisture Content                        | %     | 0.01               | NONE                 | 12            | 12            | 9.5           |
| Total mass of sample received           | kg    | 0.001              | NONE                 | 0.50          | 0.50          | 0.50          |

| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected |
|------------------|------|-----|-----------|--------------|--------------|--------------|
|------------------|------|-----|-----------|--------------|--------------|--------------|

#### General Inorganics

| pH - Automated                                                   | pH Units | N/A     | MCERTS | 8.5   | 8.9   | 8.5   |
|------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|
| Total Cyanide                                                    | mg/kg    | 1       | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| Total Sulphate as SO <sub>4</sub>                                | mg/kg    | 50      | MCERTS | 6000  | 1500  | 670   |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | g/l      | 0.00125 | MCERTS | 0.078 | 0.30  | 0.060 |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | mg/kg    | 2.5     | MCERTS | 160   | 590   | 120   |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | mg/l     | 1.25    | MCERTS | 78.1  | 295   | 60.4  |
| Sulphide                                                         | mg/kg    | 1       | MCERTS | 5.1   | 28    | 2.9   |
| Total Sulphur                                                    | mg/kg    | 50      | MCERTS | 2500  | 1100  | 380   |
| Total Organic Carbon (TOC)                                       | %        | 0.1     | MCERTS | 1.4   | 1.2   | 1.0   |

#### Total Phenols

| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |
|----------------------------|-------|---|--------|-------|-------|-------|
|----------------------------|-------|---|--------|-------|-------|-------|

#### Speciated PAHs

|                        |       |      |        |        |        |        |
|------------------------|-------|------|--------|--------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | 0.58   | < 0.05 | < 0.05 |
| Fluorene               | mg/kg | 0.05 | MCERTS | 0.54   | < 0.05 | < 0.05 |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 6.5    | 0.80   | < 0.05 |
| Anthracene             | mg/kg | 0.05 | MCERTS | 2.7    | 0.25   | < 0.05 |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 19     | 2.1    | 0.35   |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 18     | 2.3    | 0.33   |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 11     | 2.0    | < 0.05 |
| Chrysene               | mg/kg | 0.05 | MCERTS | 8.1    | 1.2    | < 0.05 |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 8.3    | 2.5    | < 0.05 |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 5.8    | 1.2    | < 0.05 |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 9.0    | 2.2    | < 0.05 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 4.4    | 1.3    | < 0.05 |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | 1.3    | 0.40   | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | 4.8    | 1.5    | < 0.05 |

#### Total PAH

| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 100 | 17.7 | < 0.80 |
|-----------------------------|-------|-----|--------|-----|------|--------|
|-----------------------------|-------|-----|--------|-----|------|--------|

#### Heavy Metals / Metalloids

|                                   |       |     |        |       |       |       |
|-----------------------------------|-------|-----|--------|-------|-------|-------|
| Arsenic (aqua regia extractable)  | mg/kg | 1   | MCERTS | 18    | 5.5   | 8.6   |
| Cadmium (aqua regia extractable)  | mg/kg | 0.2 | MCERTS | < 0.2 | 0.5   | 0.3   |
| Chromium (hexavalent)             | mg/kg | 4   | MCERTS | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1   | MCERTS | 23    | 17    | 29    |
| Copper (aqua regia extractable)   | mg/kg | 1   | MCERTS | 27    | 19    | 24    |
| Lead (aqua regia extractable)     | mg/kg | 1   | MCERTS | 54    | 42    | 36    |
| Mercury (aqua regia extractable)  | mg/kg | 0.3 | MCERTS | 0.4   | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable)   | mg/kg | 1   | MCERTS | 23    | 14    | 26    |
| Selenium (aqua regia extractable) | mg/kg | 1   | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| Zinc (aqua regia extractable)     | mg/kg | 1   | MCERTS | 75    | 67    | 80    |

**Analytical Report Number: 21-10251**  
**Project / Site name: Pacific Park Wrexham**  
**Your Order No: 14255 BH N**

|                                                 |              |                           |                                 |               |               |               |
|-------------------------------------------------|--------------|---------------------------|---------------------------------|---------------|---------------|---------------|
| <b>Lab Sample Number</b>                        |              |                           |                                 | 2012764       | 2012765       | 2012766       |
| <b>Sample Reference</b>                         |              |                           |                                 | EXS101        | EXS102        | EXS103        |
| <b>Sample Number</b>                            |              |                           |                                 | None Supplied | None Supplied | None Supplied |
| <b>Depth (m)</b>                                |              |                           |                                 | None Supplied | None Supplied | None Supplied |
| <b>Date Sampled</b>                             |              |                           |                                 | 15/09/2021    | 15/09/2021    | 15/09/2021    |
| <b>Time Taken</b>                               |              |                           |                                 | None Supplied | None Supplied | None Supplied |
| <b>Analytical Parameter<br/>(Soil Analysis)</b> | <b>Units</b> | <b>Limit of detection</b> | <b>Accreditation<br/>Status</b> |               |               |               |

#### Petroleum Hydrocarbons

|                    |       |     |        |       |       |       |
|--------------------|-------|-----|--------|-------|-------|-------|
| TPH (C5 - C6)      | mg/kg | 1   | NONE   | < 1.0 | < 1.0 | < 1.0 |
| TPH (C6 - C8)      | mg/kg | 0.1 | MCERTS | < 0.1 | < 0.1 | < 0.1 |
| TPH (C8 - C10)     | mg/kg | 0.1 | MCERTS | < 0.1 | < 0.1 | < 0.1 |
| TPH (C10 - C12)    | mg/kg | 2   | MCERTS | < 2.0 | < 2.0 | < 2.0 |
| TPH (C12 - C16)    | mg/kg | 4   | MCERTS | 11    | 19    | < 4.0 |
| TPH (C16 - C21)    | mg/kg | 1   | MCERTS | 81    | 70    | < 1.0 |
| TPH (C21 - C35)    | mg/kg | 1   | MCERTS | 250   | 370   | < 1.0 |
| TPH (C35 - C40)    | mg/kg | 10  | MCERTS | 61    | 130   | < 10  |
| TPH Total C5 - C40 | mg/kg | 10  | MCERTS | 400   | 580   | < 10  |

#### PCBs by GC-MS

|                  |       |       |        |       |         |       |
|------------------|-------|-------|--------|-------|---------|-------|
| PCB Congener 28  | mg/kg | 0.001 | MCERTS | 0.47  | < 0.001 | 0.007 |
| PCB Congener 52  | mg/kg | 0.001 | MCERTS | 0.24  | 0.020   | 0.10  |
| PCB Congener 101 | mg/kg | 0.001 | MCERTS | 0.098 | 0.043   | 0.21  |
| PCB Congener 118 | mg/kg | 0.001 | MCERTS | 0.11  | 0.034   | 0.15  |
| PCB Congener 138 | mg/kg | 0.001 | MCERTS | 0.081 | 0.036   | 0.14  |
| PCB Congener 153 | mg/kg | 0.001 | MCERTS | 0.073 | 0.031   | 0.12  |
| PCB Congener 180 | mg/kg | 0.001 | MCERTS | 0.097 | < 0.001 | 0.025 |

#### Total PCBs by GC-MS

|            |       |       |        |     |      |      |
|------------|-------|-------|--------|-----|------|------|
| Total PCBs | mg/kg | 0.007 | MCERTS | 1.2 | 0.17 | 0.76 |
|------------|-------|-------|--------|-----|------|------|

U/S = Unsuitable Sample I/S = Insufficient Sample

**Analytical Report Number : 21-10251**

**Project / Site name: Pacific Park Wrexham**

\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

| Lab Sample Number | Sample Reference | Sample Number | Depth (m)     | Sample Description *                       |
|-------------------|------------------|---------------|---------------|--------------------------------------------|
| 2012764           | EXS101           | None Supplied | None Supplied | Brown clay and sand with gravel.           |
| 2012765           | EXS102           | None Supplied | None Supplied | Brown clay and sand with gravel.           |
| 2012766           | EXS103           | None Supplied | None Supplied | Brown clay and sand with gravel and brick. |

**Analytical Report Number : 21-10251**  
**Project / Site name: Pacific Park Wrexham**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                                          | Analytical Method Reference                                                                                     | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                                           | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                            | L038-PL       | D                  | MCERTS               |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).              | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Asbestos identification in soil                    | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.                                                  | In house method based on HSG 248                                                                                | A001-PL       | D                  | ISO 17025            |
| Hexavalent chromium in soil                        | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.                  | In-house method                                                                                                 | L080-PL       | W                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                                  | In house method.                                                                                                | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                                 | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL       | W                  | MCERTS               |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.                 | In-house method based on USEPA 8270                                                                             | L064-PL       | D                  | MCERTS               |
| PCB's By GC-MS in soil                             | Determination of PCB by extraction with acetone and hexane followed by GC-MS.                                                                                          | In-house method based on USEPA 8082                                                                             | L027-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                                      | In house method.                                                                                                | L099-PL       | D                  | MCERTS               |
| Sulphide in soil                                   | Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode. | In-house method                                                                                                 | L010-PL       | D                  | MCERTS               |
| Total sulphate (as SO <sub>4</sub> in soil)        | Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.                                                                                | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                                            | In-house method based on British Standard Methods and MCERTS requirements.                                      | L019-UK/PL    | D                  | NONE                 |
| Total Sulphur in soil                              | Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.                                                   | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Total cyanide in soil                              | Determination of total cyanide by distillation followed by colorimetry.                                                                                                | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar) | L080-PL       | W                  | MCERTS               |
| Total organic carbon (Automated) in soil           | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                                          | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| TPH in (Soil)                                      | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                                          | In-house method, TPH with carbon banding and silica gel split/cleanup.                                          | L076-PL       | D                  | MCERTS               |
| D.O. for Gravimetric Quant if Screen/ID positive   | Dependent option for Gravimetric Quant if Screen/ID positive scheduled.                                                                                                | In house asbestos methods A001 & A006.                                                                          | A006-PL       | D                  | NONE                 |

**Analytical Report Number : 21-10251**  
**Project / Site name: Pacific Park Wrexham**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)**

| Analytical Test Name                              | Analytical Method Description                     | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---------------------------------------------------|---------------------------------------------------|-----------------------------|---------------|--------------------|----------------------|
| Sulphate, water soluble, in soil (1hr extraction) | Sulphate, water soluble, in soil (1hr extraction) | In-house method             | L038-PL       | D                  | MCERTS               |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**

**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**

**Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.**



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## **Analytical Report Number : 21-10253**

|                             |                      |                                                        |            |
|-----------------------------|----------------------|--------------------------------------------------------|------------|
| <b>Project / Site name:</b> | Pacific Park Wrexham | <b>Samples received on:</b>                            | 15/09/2021 |
| <b>Your job number:</b>     | 14 255               | <b>Samples instructed on/<br/>Analysis started on:</b> | 15/09/2021 |
| <b>Your order number:</b>   | 14255 BH N           | <b>Analysis completed by:</b>                          | 22/09/2021 |
| <b>Report Issue Number:</b> | 1                    | <b>Report issued on:</b>                               | 22/09/2021 |
| <b>Samples Analysed:</b>    | 3 wac multi samples  |                                                        |            |

**Signed:** ██████████

Joanna Wawrzeczko  
Technical Reviewer (Reporting Team)  
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting  
leachates - 2 weeks from reporting  
waters - 2 weeks from reporting  
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.  
Application of uncertainty of measurement would provide a range within which the true result lies.  
An estimate of measurement uncertainty can be provided on request.

## i2 Analytical

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| Waste Acceptance Criteria Analytical Results                                                                         |                      |          |  |                 |                                                   |                                                               |                          |
|----------------------------------------------------------------------------------------------------------------------|----------------------|----------|--|-----------------|---------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Report No:                                                                                                           | 21-10253             |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 | Client: E3P                                       |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Location                                                                                                             | Pacific Park Wrexham |          |  |                 |                                                   |                                                               |                          |
| Lab Reference (Sample Number)                                                                                        | 2012772              |          |  |                 | Landfill Waste Acceptance Criteria                |                                                               |                          |
|                                                                                                                      |                      |          |  |                 | Limits                                            |                                                               |                          |
| Sampling Date                                                                                                        | 15/09/2021           |          |  |                 | Inert Waste Landfill                              | Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill | Hazardous Waste Landfill |
| Sample ID                                                                                                            | EXS101               |          |  |                 |                                                   |                                                               |                          |
| Depth (m)                                                                                                            |                      |          |  |                 |                                                   |                                                               |                          |
| Solid Waste Analysis                                                                                                 |                      |          |  |                 |                                                   |                                                               |                          |
| TOC (%)**                                                                                                            | 1.0                  |          |  |                 | 3%                                                | 5%                                                            | 6%                       |
| Loss on Ignition (%) **                                                                                              | 3.2                  |          |  |                 | --                                                | --                                                            | 10%                      |
| BTEX (µg/kg) **                                                                                                      | < 10                 |          |  |                 | 6000                                              | --                                                            | --                       |
| Sum of PCBs (mg/kg) **                                                                                               | 0.71                 |          |  |                 | 1                                                 | --                                                            | --                       |
| Mineral Oil (mg/kg) #                                                                                                | 240                  |          |  |                 | 500                                               | --                                                            | --                       |
| Total PAH (WAC-17) (mg/kg)                                                                                           | 93.2                 |          |  |                 | 100                                               | --                                                            | --                       |
| pH (units)**                                                                                                         | 8.4                  |          |  |                 | --                                                | >6                                                            | --                       |
| Acid Neutralisation Capacity (mol / kg)                                                                              | 4.0                  |          |  |                 | --                                                | To be evaluated                                               | To be evaluated          |
| Eluate Analysis                                                                                                      | 2:1                  | 8:1      |  | Cumulative 10:1 | Limit values for compliance leaching test         |                                                               |                          |
| (BS EN 12457 - 3 preparation utilising end over end leaching procedure)                                              | mg/l                 | mg/l     |  | mg/kg           | using BS EN 12457-3 at L/S 10 l/kg (mg/kg)        |                                                               |                          |
| Arsenic *                                                                                                            | < 0.010              | < 0.010  |  | < 0.050         | 0.5                                               | 2                                                             | 25                       |
| Barium *                                                                                                             | 0.022                | 0.017    |  | 0.17            | 20                                                | 100                                                           | 300                      |
| Cadmium *                                                                                                            | < 0.0005             | < 0.0005 |  | < 0.0020        | 0.04                                              | 1                                                             | 5                        |
| Chromium *                                                                                                           | 0.0016               | < 0.0010 |  | 0.010           | 0.5                                               | 10                                                            | 70                       |
| Copper *                                                                                                             | 0.0049               | < 0.0030 |  | 0.028           | 2                                                 | 50                                                            | 100                      |
| Mercury *                                                                                                            | < 0.0015             | < 0.0015 |  | < 0.010         | 0.01                                              | 0.2                                                           | 2                        |
| Molybdenum *                                                                                                         | < 0.0030             | < 0.0030 |  | < 0.020         | 0.5                                               | 10                                                            | 30                       |
| Nickel *                                                                                                             | 0.0032               | 0.0032   |  | 0.032           | 0.4                                               | 10                                                            | 40                       |
| Lead *                                                                                                               | < 0.0050             | < 0.0050 |  | 0.028           | 0.5                                               | 10                                                            | 50                       |
| Antimony *                                                                                                           | < 0.0050             | < 0.0050 |  | < 0.020         | 0.06                                              | 0.7                                                           | 5                        |
| Selenium *                                                                                                           | < 0.010              | < 0.010  |  | 0.065           | 0.1                                               | 0.5                                                           | 7                        |
| Zinc *                                                                                                               | 0.0085               | 0.0044   |  | 0.050           | 4                                                 | 50                                                            | 200                      |
| Chloride *                                                                                                           | < 4.0                | < 4.0    |  | 23              | 800                                               | 15000                                                         | 25000                    |
| Fluoride                                                                                                             | 0.81                 | 0.38     |  | 4.4             | 10                                                | 150                                                           | 500                      |
| Sulphate *                                                                                                           | 11                   | 4.4      |  | 53              | 1000                                              | 20000                                                         | 50000                    |
| TDS*                                                                                                                 | 74                   | 50       |  | 530             | 4000                                              | 60000                                                         | 100000                   |
| Phenol Index (Monohydric Phenols) *                                                                                  | < 0.13               | < 0.13   |  | < 0.50          | 1                                                 | -                                                             | -                        |
| DOC                                                                                                                  | 6.2                  | 8.8      |  | 84              | 500                                               | 800                                                           | 1000                     |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Leach Test Information                                                                                               |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Stone Content (%)                                                                                                    | < 0.1                |          |  |                 |                                                   |                                                               |                          |
| Sample Mass (kg)                                                                                                     | 0.50                 |          |  |                 |                                                   |                                                               |                          |
| Dry Matter (%)                                                                                                       | 88                   |          |  |                 |                                                   |                                                               |                          |
| Moisture (%)                                                                                                         | 12                   |          |  |                 |                                                   |                                                               |                          |
| Stage 1                                                                                                              |                      |          |  |                 |                                                   |                                                               |                          |
| Volume Eluate L2 (litres)                                                                                            | 0.33                 |          |  |                 |                                                   |                                                               |                          |
| Filtered Eluate VE1 (litres)                                                                                         | 0.25                 |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Results are expressed on a dry weight basis, after correction for moisture content where applicable.                 |                      |          |  |                 | * = UKAS accredited (liquid eluate analysis only) |                                                               |                          |
| Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation |                      |          |  |                 | ** = MCERTS accredited                            |                                                               |                          |

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.  
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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| Waste Acceptance Criteria Analytical Results                                                                         |                      |          |  |                 |                                                   |                                                               |                          |
|----------------------------------------------------------------------------------------------------------------------|----------------------|----------|--|-----------------|---------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Report No:                                                                                                           | 21-10253             |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 | Client: E3P                                       |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Location                                                                                                             | Pacific Park Wrexham |          |  |                 |                                                   |                                                               |                          |
| Lab Reference (Sample Number)                                                                                        | 2012773              |          |  |                 | Landfill Waste Acceptance Criteria                |                                                               |                          |
| Sampling Date                                                                                                        | 15/09/2021           |          |  |                 | Inert Waste Landfill                              | Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill | Hazardous Waste Landfill |
| Sample ID                                                                                                            | EXS102               |          |  |                 |                                                   |                                                               |                          |
| Depth (m)                                                                                                            |                      |          |  |                 |                                                   |                                                               |                          |
| Solid Waste Analysis                                                                                                 |                      |          |  |                 |                                                   |                                                               |                          |
| TOC (%)**                                                                                                            | 1.0                  |          |  |                 | 3%                                                | 5%                                                            | 6%                       |
| Loss on Ignition (%) **                                                                                              | 2.1                  |          |  |                 | --                                                | --                                                            | 10%                      |
| BTEX (µg/kg) **                                                                                                      | < 10                 |          |  |                 | 6000                                              | --                                                            | --                       |
| Sum of PCBs (mg/kg) **                                                                                               | 0.34                 |          |  |                 | 1                                                 | --                                                            | --                       |
| Mineral Oil (mg/kg) #                                                                                                | 190                  |          |  |                 | 500                                               | --                                                            | --                       |
| Total PAH (WAC-17) (mg/kg)                                                                                           | 15.9                 |          |  |                 | 100                                               | --                                                            | --                       |
| pH (units)**                                                                                                         | 8.5                  |          |  |                 | --                                                | >6                                                            | --                       |
| Acid Neutralisation Capacity (mol / kg)                                                                              | 12                   |          |  |                 | --                                                | To be evaluated                                               | To be evaluated          |
| Eluate Analysis                                                                                                      | 2:1                  | 8:1      |  | Cumulative 10:1 | Limit values for compliance leaching test         |                                                               |                          |
| (BS EN 12457 - 3 preparation utilising end over end leaching procedure)                                              | mg/l                 | mg/l     |  | mg/kg           | using BS EN 12457-3 at L/S 10 l/kg (mg/kg)        |                                                               |                          |
| Arsenic *                                                                                                            | < 0.010              | < 0.010  |  | < 0.050         | 0.5                                               | 2                                                             | 25                       |
| Barium *                                                                                                             | 0.021                | 0.019    |  | 0.19            | 20                                                | 100                                                           | 300                      |
| Cadmium *                                                                                                            | < 0.0005             | < 0.0005 |  | 0.0025          | 0.04                                              | 1                                                             | 5                        |
| Chromium *                                                                                                           | 0.013                | 0.0044   |  | 0.056           | 0.5                                               | 10                                                            | 70                       |
| Copper *                                                                                                             | 0.040                | 0.013    |  | 0.17            | 2                                                 | 50                                                            | 100                      |
| Mercury *                                                                                                            | < 0.0015             | < 0.0015 |  | < 0.010         | 0.01                                              | 0.2                                                           | 2                        |
| Molybdenum *                                                                                                         | 0.021                | < 0.0030 |  | 0.042           | 0.5                                               | 10                                                            | 30                       |
| Nickel *                                                                                                             | 0.0099               | 0.0043   |  | 0.051           | 0.4                                               | 10                                                            | 40                       |
| Lead *                                                                                                               | < 0.0050             | < 0.0050 |  | < 0.020         | 0.5                                               | 10                                                            | 50                       |
| Antimony *                                                                                                           | < 0.0050             | < 0.0050 |  | < 0.020         | 0.06                                              | 0.7                                                           | 5                        |
| Selenium *                                                                                                           | < 0.010              | < 0.010  |  | < 0.040         | 0.1                                               | 0.5                                                           | 7                        |
| Zinc *                                                                                                               | 0.0036               | 0.0028   |  | 0.029           | 4                                                 | 50                                                            | 200                      |
| Chloride *                                                                                                           | < 4.0                | < 4.0    |  | 17              | 800                                               | 15000                                                         | 25000                    |
| Fluoride                                                                                                             | 1.1                  | 0.35     |  | 4.5             | 10                                                | 150                                                           | 500                      |
| Sulphate *                                                                                                           | 31                   | 8.5      |  | 120             | 1000                                              | 20000                                                         | 50000                    |
| TDS*                                                                                                                 | 190                  | 120      |  | 1300            | 4000                                              | 60000                                                         | 100000                   |
| Phenol Index (Monohydric Phenols) *                                                                                  | < 0.13               | < 0.13   |  | < 0.50          | 1                                                 | -                                                             | -                        |
| DOC                                                                                                                  | 14                   | 9.0      |  | 97              | 500                                               | 800                                                           | 1000                     |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Leach Test Information                                                                                               |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Stone Content (%)                                                                                                    | < 0.1                |          |  |                 |                                                   |                                                               |                          |
| Sample Mass (kg)                                                                                                     | 0.50                 |          |  |                 |                                                   |                                                               |                          |
| Dry Matter (%)                                                                                                       | 91                   |          |  |                 |                                                   |                                                               |                          |
| Moisture (%)                                                                                                         | 9.5                  |          |  |                 |                                                   |                                                               |                          |
| Stage 1                                                                                                              |                      |          |  |                 |                                                   |                                                               |                          |
| Volume Eluate L2 (litres)                                                                                            | 0.33                 |          |  |                 |                                                   |                                                               |                          |
| Filtered Eluate VE1 (litres)                                                                                         | 0.24                 |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Results are expressed on a dry weight basis, after correction for moisture content where applicable.                 |                      |          |  |                 | * = UKAS accredited (liquid eluate analysis only) |                                                               |                          |
| Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation |                      |          |  |                 | ** = MCERTS accredited                            |                                                               |                          |

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.  
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

## i2 Analytical

7 Woodshots Meadow  
Croxley Green Business Park  
Watford, WD18 8YS

Telephone: 01923 225404  
Fax: 01923 237404  
email:reception@i2analytical.com

| Waste Acceptance Criteria Analytical Results                                                                         |                      |          |  |                 |                                                   |                                                               |                          |
|----------------------------------------------------------------------------------------------------------------------|----------------------|----------|--|-----------------|---------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Report No:                                                                                                           | 21-10253             |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 | Client: E3P                                       |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Location                                                                                                             | Pacific Park Wrexham |          |  |                 |                                                   |                                                               |                          |
| Lab Reference (Sample Number)                                                                                        | 2012774              |          |  |                 | Landfill Waste Acceptance Criteria                |                                                               |                          |
| Sampling Date                                                                                                        | 15/09/2021           |          |  |                 | Inert Waste Landfill                              | Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill | Hazardous Waste Landfill |
| Sample ID                                                                                                            | EXS103               |          |  |                 |                                                   |                                                               |                          |
| Depth (m)                                                                                                            |                      |          |  |                 |                                                   |                                                               |                          |
| Solid Waste Analysis                                                                                                 |                      |          |  |                 |                                                   |                                                               |                          |
| TOC (%)**                                                                                                            | 0.8                  |          |  |                 | 3%                                                | 5%                                                            | 6%                       |
| Loss on Ignition (%) **                                                                                              | 2.7                  |          |  |                 | --                                                | --                                                            | 10%                      |
| BTEX (µg/kg) **                                                                                                      | < 10                 |          |  |                 | 6000                                              | --                                                            | --                       |
| Sum of PCBs (mg/kg) **                                                                                               | 0.93                 |          |  |                 | 1                                                 | --                                                            | --                       |
| Mineral Oil (mg/kg) #                                                                                                | < 10                 |          |  |                 | 500                                               | --                                                            | --                       |
| Total PAH (WAC-17) (mg/kg)                                                                                           | 3.45                 |          |  |                 | 100                                               | --                                                            | --                       |
| pH (units)**                                                                                                         | 8.4                  |          |  |                 | --                                                | >6                                                            | --                       |
| Acid Neutralisation Capacity (mol / kg)                                                                              | 7.4                  |          |  |                 | --                                                | To be evaluated                                               | To be evaluated          |
| Eluate Analysis                                                                                                      | 2:1                  | 8:1      |  | Cumulative 10:1 | Limit values for compliance leaching test         |                                                               |                          |
| (BS EN 12457 - 3 preparation utilising end over end leaching procedure)                                              | mg/l                 | mg/l     |  | mg/kg           | using BS EN 12457-3 at L/S 10 l/kg (mg/kg)        |                                                               |                          |
| Arsenic *                                                                                                            | < 0.010              | < 0.010  |  | < 0.050         | 0.5                                               | 2                                                             | 25                       |
| Barium *                                                                                                             | 0.017                | 0.014    |  | 0.14            | 20                                                | 100                                                           | 300                      |
| Cadmium *                                                                                                            | < 0.0005             | < 0.0005 |  | < 0.0020        | 0.04                                              | 1                                                             | 5                        |
| Chromium *                                                                                                           | 0.0068               | 0.0014   |  | 0.021           | 0.5                                               | 10                                                            | 70                       |
| Copper *                                                                                                             | 0.024                | < 0.0030 |  | 0.048           | 2                                                 | 50                                                            | 100                      |
| Mercury *                                                                                                            | < 0.0015             | < 0.0015 |  | < 0.010         | 0.01                                              | 0.2                                                           | 2                        |
| Molybdenum *                                                                                                         | 0.0088               | < 0.0030 |  | < 0.020         | 0.5                                               | 10                                                            | 30                       |
| Nickel *                                                                                                             | 0.0055               | 0.0023   |  | 0.027           | 0.4                                               | 10                                                            | 40                       |
| Lead *                                                                                                               | < 0.0050             | < 0.0050 |  | < 0.020         | 0.5                                               | 10                                                            | 50                       |
| Antimony *                                                                                                           | < 0.0050             | < 0.0050 |  | 0.033           | 0.06                                              | 0.7                                                           | 5                        |
| Selenium *                                                                                                           | < 0.010              | < 0.010  |  | < 0.040         | 0.1                                               | 0.5                                                           | 7                        |
| Zinc *                                                                                                               | 0.0049               | 0.0030   |  | 0.033           | 4                                                 | 50                                                            | 200                      |
| Chloride *                                                                                                           | < 4.0                | < 4.0    |  | 23              | 800                                               | 15000                                                         | 25000                    |
| Fluoride                                                                                                             | 1.1                  | 0.23     |  | 3.6             | 10                                                | 150                                                           | 500                      |
| Sulphate *                                                                                                           | 19                   | 5.0      |  | 69              | 1000                                              | 20000                                                         | 50000                    |
| TDS*                                                                                                                 | 99                   | 71       |  | 750             | 4000                                              | 60000                                                         | 100000                   |
| Phenol Index (Monohydric Phenols) *                                                                                  | < 0.13               | < 0.13   |  | < 0.50          | 1                                                 | -                                                             | -                        |
| DOC                                                                                                                  | 16                   | 8.6      |  | 97              | 500                                               | 800                                                           | 1000                     |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Leach Test Information                                                                                               |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Stone Content (%)                                                                                                    | < 0.1                |          |  |                 |                                                   |                                                               |                          |
| Sample Mass (kg)                                                                                                     | 0.50                 |          |  |                 |                                                   |                                                               |                          |
| Dry Matter (%)                                                                                                       | 89                   |          |  |                 |                                                   |                                                               |                          |
| Moisture (%)                                                                                                         | 11                   |          |  |                 |                                                   |                                                               |                          |
| Stage 1                                                                                                              |                      |          |  |                 |                                                   |                                                               |                          |
| Volume Eluate L2 (litres)                                                                                            | 0.32                 |          |  |                 |                                                   |                                                               |                          |
| Filtered Eluate VE1 (litres)                                                                                         | 0.24                 |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
|                                                                                                                      |                      |          |  |                 |                                                   |                                                               |                          |
| Results are expressed on a dry weight basis, after correction for moisture content where applicable.                 |                      |          |  |                 | * = UKAS accredited (liquid eluate analysis only) |                                                               |                          |
| Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation |                      |          |  |                 | ** = MCERTS accredited                            |                                                               |                          |

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.  
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.



**Analytical Report Number : 21-10253**  
**Project / Site name: Pacific Park Wrexham**

\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

| Lab Sample Number | Sample Reference | Sample Number | Depth (m)     | Sample Description *                            |
|-------------------|------------------|---------------|---------------|-------------------------------------------------|
| 2012772           | EXS101           | None Supplied | None Supplied | Brown clay and sand with gravel.                |
| 2012773           | EXS102           | None Supplied | None Supplied | Brown clay and sand with gravel and brick.      |
| 2012774           | EXS103           | None Supplied | None Supplied | Brown clay and loam with gravel and vegetation. |

**Analytical Report Number : 21-10253**  
**Project / Site name: Pacific Park Wrexham**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)**

| Analytical Test Name                              | Analytical Method Description                                                                                                                          | Analytical Method Reference                                                                                     | Method number | Wet / Dry Analysis | Accreditation Status |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Moisture Content                                  | Moisture content, determined gravimetrically. (30 oC)                                                                                                  | In house method.                                                                                                | L019-UK/PL    | W                  | NONE                 |
| Stones content of soil                            | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                            | In-house method based on British Standard Methods and MCERTS requirements.                                      | L019-UK/PL    | D                  | NONE                 |
| Preparation WAC leachate                          |                                                                                                                                                        | In-house method                                                                                                 | L043-PL       | W                  | NONE                 |
| Speciated WAC-17 PAHs in soil                     | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. | In-house method based on USEPA 8270. MCERTS accredited except Coronene.                                         | L064-PL       | D                  | MCERTS               |
| Chloride in WAC leachate (BS EN 12457-3 Prep)     | Determination of Chloride colorimetrically by discrete analyser.                                                                                       | In house based on MEWAM Method ISBN 0117516260.                                                                 | L082-PL       | W                  | ISO 17025            |
| Fluoride in WAC leachate (BS EN 12457-3 Prep)     | Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.                                          | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.                | L033-PL       | W                  | ISO 17025            |
| Phenol Index in WAC leachate (BS EN 12457-3 Prep) | Determination of monohydric phenols in leachate by continuous flow analyser.                                                                           | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL       | W                  | ISO 17025            |
| Sulphate in WAC leachate (BS EN 12457-3 Prep)     | Determination of sulphate in leachate by acidification followed by ICP-OES.                                                                            | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.                | L039-PL       | W                  | ISO 17025            |
| TDS in WAC leachate (BS EN 12457-3 Prep)          | Determination of total dissolved solids in leachate by electrometric measurement.                                                                      | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.                | L031-PL       | W                  | NONE                 |
| DOC in WAC leachate (BS EN 12457-3 Prep)          | Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.                                                                        | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.                | L037-PL       | W                  | NONE                 |
| Acid neutralisation capacity of soil              | Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.                                              | In-house method based on Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance           | L046-PL       | W                  | NONE                 |
| Loss on ignition of soil @ 450oC                  | Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.                                        | In house method.                                                                                                | L047-PL       | D                  | MCERTS               |
| Mineral Oil in Soil C10 - C40                     | Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.                                                                     | In-house method based on USEPA 8270                                                                             | L076-PL       | D                  | NONE                 |
| pH in soil                                        | Determination of pH in soil by addition of water followed by electrometric measurement.                                                                | In house method.                                                                                                | L005-PL       | W                  | MCERTS               |
| Total organic carbon in soil                      | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                          | In house method.                                                                                                | L023-PL       | D                  | MCERTS               |
| Metals in WAC leachate (BS EN 12457-3 Prep)       | Determination of metals in leachate by acidification followed by ICP-OES.                                                                              | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.                | L039-PL       | W                  | ISO 17025            |
| PCB's by GC-MS in soil                            | Determination of PCB by extraction with acetone and hexane followed by GC-MS.                                                                          | In-house method based on USEPA 8082                                                                             | L027-PL       | D                  | MCERTS               |

**Analytical Report Number : 21-10253**  
**Project / Site name: Pacific Park Wrexham**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)**

| Analytical Test Name                 | Analytical Method Description                                                                | Analytical Method Reference        | Method number | Wet / Dry Analysis | Accreditation Status |
|--------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------|---------------|--------------------|----------------------|
| BTEX (Sum of BTEX compounds) in soil | Determination of BTEX in soil by headspace GC-MS.<br>Individual components MCERTS accredited | In-house method based on USEPA8260 | L073B-PL      | W                  | MCERTS               |

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

# **APPENDIX V**

# **PHOTOGRAPHS**

PLATE 1      SUPPLEMENTARY GROUND INVESTIGATION - TP201



PLATE 2      SUPPLEMENTARY GROUND INVESTIGATION - TP203



PLATE 3      PAD FOUNDATIONS INSTALLED ACROSS AREA OF HISTORIC POND



PLATE 4      DEVELOPMENT LEVEL ACROSS SITE



PLATE 5      PAD FOUNDATION EXCAVATION



PLATE 6      STOCKPILE OF EXCESS MADE GROUND MATERIALS



PLATE 7 STOCKPILE OF EXCESS MADE GROUND MATERIALS



# **APPENDIX VI**

# **WASTE TRANSFER NOTES**

# Duty of care: waste transfer note

Keep this page and copy it for future use. Please write as clearly as possible.

## Section A – Description of waste

A1 Description of the waste being transferred  
INERT SOIL

List of Waste Regulations code(s)  
17-05-04

A2 How is the waste contained?

Loose ☒ Sacks ☐ Skip ☐ Drum ☐  
Other ☐

A3 How much waste? For example, number of sacks, weight  
80 LOADS

## Section B – Current holder of the waste – Transferor

By signing in Section D below I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011 Yes ☐

B1 Full name

PORTAL CONSTRUCTION LTD

Company name and address

PORTAL CONSTRUCTION LTD

CALVELEY MILL

NANTWICH ROAD

TARPORLEY

Postcode CW6 9GT

SIC code (2007)

B2 Name of your unitary authority or council

B3 Are you:

The producer of the waste? ☒

The importer of the waste? ☐

The local authority? ☐

The holder of an environmental permit? ☐

Permit number

Issued by

Registered waste exemption? ☐

Details, including registration number

A registered waste carrier, broker or dealer? ☐

Registration number

Details (are you a carrier, broker or dealer?)

## Section C – Person collecting the waste – Transferee

Company name and address

THE OAKS

BABBINSWOOD

OSWESTRY

Postcode SY11 4LW

C2 Are you:

The local authority? ☐

C3 Are you:

The holder of an environmental permit? ☒

Permit number EPR/HB3031AZ

Issued by ENVIRONMENT AGENCY

Registered waste exemption? ☐

Details, including registration number

A registered waste carrier, broker or dealer? ☒

Registration number CBDU82444

Details (are you a carrier, broker or dealer?)

UPPER TIER WASTE CARRIER AND DEALER

## Section D – The transfer

D1 Address of transfer or collection point

UNIMAQ, WREXHAM INDUSTRIAL ESTATE

WREXHAM

Postcode LL13 9PN

Date of transfer (DD/MM/YYYY) 18/08/2021

D2 Broker or dealer who arranged this transfer (if applicable)

Postcode

Registration number

Time(s)

Transferor's signature

Name

Representing

Transferee's signature

Name

Representing

GWYNFOR DAVIES

DNT GROUP LTD

*Copies*



Environment  
Agency

## Permit

The Environmental Permitting (England & Wales) Regulations 2010

---



Permit number  
EPR/HB3031AZ

**Permit**

**The Environmental Permitting (England and Wales) Regulations 2010**

## Permit

Permit number  
**EPR/HB3031AZ**

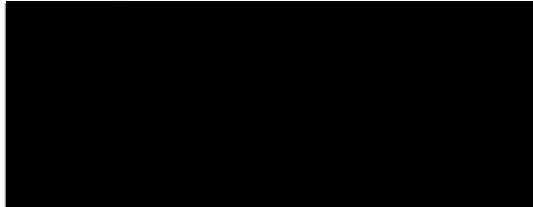
The Environment Agency hereby authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2010

**[REDACTED]** ("the operator"),

whose registered office is



to operate waste operations described in standard rules **SR2010No12** at



to the extent authorised by and subject to the conditions of this permit.

Under regulation 27(2) of the Regulations, standard rules **SR2010No12** are conditions of this permit.

| Name              | Date              |
|-------------------|-------------------|
| <b>[REDACTED]</b> | <b>23/05/2012</b> |

Authorised on behalf of the Environment Agency

# **APPENDIX VII GAS MEMBRANE VALIDATION CERTIFICATE**



Gas Membrane Installation  
Validation Report  
Portal Construction  
Pacific Park  
Bridge Road  
North Wrexham  
LL13 9PN



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## 1. INTRODUCTION

### 1.1 Purpose

ACS Linings are installing a gas protection membrane to the aforementioned site. MEC Environmental Ltd (MEC) has been appointed by ACS Linings to carry out independent validation of the installation of the membrane on the site as per our terms of engagement. The frequency of independent inspections has been determined by the client, comprehensive CQA should be forwarded by the installer to cover any data gaps for areas that have not been subjected to independent inspections.

The **SOLE** purpose of the works undertaken by MEC Environmental is to provide independent inspections and a factual report as and when requested to assist the client in gaining regulatory approval with regards to the gas membrane installation. This is as per the scope of work section within our term's engagement.

### 1.2 Limitations

This report is limited to providing lines of evidence to the regulatory authority for the areas components inspected by MEC only in support of the discharging of the relevant planning conditions only and cannot be used or relied upon for any other purpose. No professional liability shall be extended to any other parties by MEC, the report should explicitly not be relied on by any future vendor or tenant as proof that the gas protection measures are sufficient for the site and functioning at the time of purchase or start of any tenancy. Gas protection systems are not solely reliant on the gas membrane as points are scored under BS8485 for the floor slab, membrane and venting, these components work collaboratively to provide a gas protection system. This is as per the conditions within our term's engagement.

The report has been provided on the assumption that no damage or works that may have compromised the components and integrity of the gas membrane have been made after our inspections, failure to report any such occurrences will invalidate any liability and render the report and contents invalid. This is as per the conditions within our term's engagement.

This report has been prepared in accordance with the best available practice and the relevant guidance documents listed below of which the author of the report was a contributor and member of the steering committees:

**Mallett H, Wilson S, Corban M (2014)** "Good practice on the testing and verification of protection systems for buildings against hazardous ground gases". CIRIA Report C735

### 1.3 Compliance with Regulation 7 of Building Regulations

Regulation 7 of the building regulations requires that building work shall be carried out in a workmanlike manner. Approved document 7 suggests installation can comply with the regulation if workmanship is such that, where relevant, materials are adequately mixed or prepared and applied, used or fixed so as to perform adequately the functions for which they are intended.

A reasonable standard may be demonstrated by:

Compliance with a standard and independent certification - The relevant standard for gas protection measures is BS8485:2015 +A1:2019, Table 7 of the standard requires that gas membranes are verified as per CIRIA C735.

Past experience – The installers qualifications are checked by MEC Environmental to ensure that the installation supervisor holds the NVQ Level 2 in gas membrane installations.

Integrity Testing methods. – are carried out as prescribed in CIRIA C735, unless stated elsewhere

Frequency of Visits – MEC have not been employed to prepare a validation plan for this project, the frequency of visits is as per the instructions of the client, in essence MEC inspected the available membrane that could be inspected each time an inspection visit was requested. The area inspected on each visit is noted on the survey sheets in appendix 1. This report should be read in conjunction with the installers CQA report.

### 1.4 Method of Inspection (Per Visit)

All seams and non-seam areas of the available gas membrane were inspected/tested by the Validation Surveyor for identification of defects, protruding and penetrating objects, lack of subgrade support, overheating, holes, blisters, undispersed raw materials, scratches and gouges, and any sign of contamination by foreign matter.

Any portion of the gas membrane exhibiting a flaw or failing a visual inspection/testing was repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure was agreed upon between the Validation Consultant and the Installer at the time of the repair and is noted in the survey sheets.

Major repairs are visually inspected/tested, repairs passing the inspection/testing were considered acceptable. In some cases minor repairs maybe carried out under contractor CQA and photographic evidence supplied to the verifier for inclusion in the report.

### 1.5 MEC Staff Competency

All site inspections have been carried out by suitably qualified staff as defined in CIRIA C735, the qualification held by all MEC inspection surveyors is either the NVQ Level 4 in gas protection verification or the NVQ Level 2 in gas membrane installation

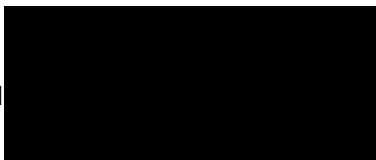
The author of this report is also a CL:AIRE accredited Specialist in Gas Protection Verification (SGPV) and holds both the NVQ Level 2 in gas membrane installation and the NVQ Level 4 in gas protection verification.

### 1.6 Conclusion

During our inspections to the areas denoted in Appendix 1 (Site Surveys Sheets) we witnessed the installer carrying out the installation in a workmanlike manner, the materials were adequately prepared and applied, used and fixed so as to perform adequately the functions for which they are intended as per Regulation 7 of the building regulations. In instances where 100% of the installation has not been independently inspected/tested then this report should be read in conjunction with the gas membrane installers CQA records.

The installers all hold the NVQ Level 2 "Gas membrane Installations" qualification and as such are classed as a qualified and experienced installer. MEC Environmental have checked the CSCS Trade Cards of the installers, which confirms the holder has attained the qualification.

Signed



Date: 10/06/2022

Michael Corban S.G.P.V.

Director

MEC Environmental Ltd

## Appendix 1 – Site Survey Sheets

| Site name: Portal Construction. Pacific Park. Bridge Road North. Wrexham |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Units/ plots checked: Unit 2 full line out laser screed installation |                                                                            |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|
| Postcode: LL13 9PN                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                      |                                                                            |
| Installers Name: [REDACTED]                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                      |                                                                            |
| Date: 19/05/2022                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                      |                                                                            |
| Inspection [REDACTED]                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Weather: 17°C Dry                                                    |                                                                            |
| Item                                                                     | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                      |                                                                            |
| Sub-floor void                                                           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                      |                                                                            |
| Ventilation Inlets and Outlets                                           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                      |                                                                            |
| Number Of Vents                                                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                      |                                                                            |
| Materials used:                                                          | Membrane – ACS Gas Membrane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                      |                                                                            |
|                                                                          | Self-Adhesive Membrane <input checked="" type="checkbox"/> Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Preformed Top hats <input type="checkbox"/> Yes                      |                                                                            |
|                                                                          | Double Sided Butyl Tape <input checked="" type="checkbox"/> Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Preformed Corners <input type="checkbox"/> Yes                       |                                                                            |
|                                                                          | Others Please List: N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                      |                                                                            |
| Installation Notes                                                       | <p><b><u>(brief description of area/plots and list of defects/repairs identified to the main membrane sheet, excluding detailing and joints)</u></b></p> <p>MEC Environmental carried out a thorough visual inspection of the membrane that was laid on a just in time basis in front of a laser pour, during our inspection we witnessed the installer carrying out their own CQA repairs as the pour progressed. The membrane is lined across the main floor and sealed to the perimeter steel using Double sided butyl tape. All pipe penetrations, stanchions and patches sealed using SAGM.</p> |                                                                      |                                                                            |
| Type of Joint                                                            | Tape Joint <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Auto Weld <input type="checkbox"/>                                   | Hand Weld <input type="checkbox"/> Extrusion Weld <input type="checkbox"/> |
| Jointing/Detailing Testing                                               | <input type="checkbox"/> Air Lance (ASTM D4437)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                      | <input checked="" type="checkbox"/> Probe Test (ASTM D4437)                |
| Laps, welds and detailing<br>Ventilation Inlets & Outlets                | Have all joints passed testing prior to surveyor leaving site?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <input checked="" type="checkbox"/> Yes                              | <input type="checkbox"/> No <input type="checkbox"/> N/A                   |
|                                                                          | Have all pipes passed testing prior to surveyor leaving site?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <input checked="" type="checkbox"/> Yes                              | <input type="checkbox"/> No <input type="checkbox"/> N/A                   |
|                                                                          | Have all stanchions/wind braces/columns passed testing prior to surveyor leaving site?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <input checked="" type="checkbox"/> Yes                              | <input type="checkbox"/> No <input type="checkbox"/> N/A                   |
|                                                                          | Have all piles and pile caps passed testing prior to surveyor leaving site?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <input type="checkbox"/> Yes                                         | <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A        |
|                                                                          | Has all other detailing work passed inspection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <input type="checkbox"/> Yes                                         | <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A        |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b><u>(List any defects to detailing work and joints):</u></b></p> <p>During our inspection the following defects and repairs were carried out: 22no patch repairs made using SAGM.</p> <p>During the inspection we witnessed that the sub grade was not sufficient to lay membrane on. We then saw steel mesh and tools being dropped on the membrane creating holes which were patched up using SAGM.</p> <p>We also witnessed not only concrete wagons but the laser screed itself driving / turning wheels and sitting on the steel mesh which sits above the membrane. Due to this MEC are unable to confirm the integrity of the membrane underneath concrete which was poured in these areas. Site was informed and a corrective action sheet sent to the customer.</p> <p>marked up drawing key:</p> <p>Area in yellow = full pour area<br/> Area in red = membrane inspected<br/> Area in green is how far the pour had progressed during our inspection. The area in green is also the areas of concern with the vehicles on the membrane.</p> <p>Have any defects identified above been satisfactorily rectified <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p>The Area has passed inspection <input type="checkbox"/></p> <p>The Area has failed inspection and a corrective action sheet has been left with the contractor <input checked="" type="checkbox"/></p> <p>The Area is incomplete as detailed above <input type="checkbox"/></p> <p>Signed: <span style="background-color: black; color: black;">[REDACTED]</span> Date: <b>19/05/2022</b></p> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Area Inspected