



Tier Environmental Ltd

Birchwood Park,  
Chadwick House,  
Warrington Rd,  
Risley,  
Warrington  
WA3 6AE

Mr Siôr Hayward  
The Watkin Jones & Son Limited Directors Pension Scheme  
Llandegai Industrial Estate  
Bangor  
Gwynedd  
LL57 4YH

**BY EMAIL**

14 March 2019

Ref: TE1085VRL03

Dear Siôr,

## **RE: VERIFICATION OF SHALLOW SOILS REMEDIATION FOR THE CONVERSION OF NEW FOUNDRY BUILDING, JOHNSTOWN, WREXHAM**

We are pleased to present the verification information for the above development at New Foundry Building, Johnstown, Wrexham. This letter report provides lines of evidence which shows that the development has complied with the agreed revised remediation strategy for the Site and to provide certification that the development is suitable for the proposed residential without home grown produce end use.

### **Revised Remediation Strategy**

Tier Environmental Ltd (Tier) was commissioned by Watkin Jones & Son Directors Pension Scheme to undertake a Preliminary Risk Assessment report for or an area of land referred to as New Foundry Buildings, Gutter Hill, Johnstown, Wrexham, LL14 1LT (the "Site") (Ref: TE1085PRA1.0 dated 31<sup>st</sup> May 2018). Further to this a Soil Investigation Letter Report was produced (Ref: TE1085GIRL02 dated 4<sup>th</sup> September 2018).

It was the aim of the investigation to determine the shallow ground conditions on Site and to allow samples of Made Ground soils to be analysed in order to determine the potential risk to human health with regard to the proposed end land use of residential without home grown produce.

The investigation reported maximum concentrations of lead (1,720mg/kg), benzo(a)pyrene (4.22mg/kg), dibenzo(ah)anthracene (0.56mg/kg) and benzo(b)fluoranthene (5.44mg/kg) in exceedance of the applicable GAC critical concentration within the soil sample from location TP4 at 0.45m bgl. This soil sample also possessed an asbestos concentration of <0.001% (mass %) of amosite. The sample of potential ACM also obtained from TP4 at 0.45m bgl was identified as cement asbestos and possessed 50 (mass %) of amosite and chrysotile.

As such the identified 'ashy/granular' type Made Ground soils encountered within TP4 to TP6 in the west and south of the site were considered to represent a potentially unacceptable risk to human health in proposed communal garden areas with regard to lead, PAHs and asbestos. It was therefore proposed that mitigation measures would be required to break the potential pollutant linkage between the 'ashy/granular' Made Ground material and the end users of the site.

|                                                                                                             |                     |                        |                        |
|-------------------------------------------------------------------------------------------------------------|---------------------|------------------------|------------------------|
| • Structural Engineering                                                                                    | • Civil Engineering | • Project Management   | • Planning Supervision |
| Telephone 01244 333080                                                                                      |                     | Fax 01244 333081       |                        |
| Website: www.tieruk.com                                                                                     |                     | Email: info@tieruk.com |                        |
| Tier Environmental is a trading name of Tier Environmental Ltd. Registered in England and Wales no 05441804 |                     |                        |                        |



Due to topographical constraints at the Site, it was considered likely that a reduced dig would be required to accommodate the 600mm of clean cover soils. The proximity of the trees along the western Site boundary and likely roots beneath the Site would make it difficult to either undertake a reduced dig to accommodate the clean cover or raise site levels above the root system without damage to third party property.

Therefore other mitigation measures were assessed that could provide adequate protection to the future residents from the 'ashy/granular' Made Ground and prevent damage to off-site property.

The preferred solution, which was agreed with the Local Authority Contaminated Land Officer, was the installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil. Furthermore this area is proposed for use as a fenced off ecological area, as shown on the enclosed picture, with no access for residents.

### **Hazardous Gas Protection Measures**

Tier Environmental determined that the site should be classified as Characteristic Situation 2 (low risk); as such basic ground gas measures were required.

The installation and verification, demonstrating the effective mitigation of any ground gas risk, is detailed in Gas Protection Measures Verification Report for the Conversion of New Foundry Building, Johnstown, Wrexham (Ref: TE1085GPMVR dated 20<sup>th</sup> February 2019).

### **Clean Cover Verification**

The Revised Remediation Strategy stated that a clean cover system would be required where Made Ground soils remain at the surface, comprising a minimum of 150mm of clean topsoil.

Prior to importation to Site, a test certificate, to the BS3882:2015 Topsoil Specification was provided (Enclosure 3).

During the site inspection on 20<sup>th</sup> February 2019, 9 No. trial pits were hand excavated within the western and southern soft landscaping area to confirm the presence and depth of the clean cover system. The completed verification proforma with associated photographs (Enclosure 2) and a location plan (Enclosure 1) are attached.

The Topsoil clean cover was verified to depths of between 200mm and 420mm and generally comprised brown, slightly gravelly, slightly clayey fine to coarse SAND with occasional rootlets. Gravel was angular to subrounded, fine to coarse of brick and quartzite.

Turf was to be installed to top up levels at the time of the visit.

To provide additional confidence that no residual risks to human health remain within the footprint of the soft landscaping area, representative shallow soil samples were taken from the imported topsoil materials.

A total of 4 No. representative soil samples were submitted to Jones Environmental Ltd (a UKAS and, where appropriate, MCerts accredited laboratory) for the following potential contaminants of concern based on the conceptual site model understanding of the Site:

- Metals;
- Speciated PAH;
- Total Phenols;
- TPHCWG;
- Water soluble sulphate;
- Total Organic Carbon;
- pH; and,
- Asbestos screen.



The full testing certificates are enclosed. No visual or olfactory evidence of hydrocarbon contamination was observed in the hand excavated trial pits.

#### *Selection of Generic Assessment Criteria (GAC)*

The approach for the selection of the GACs used as screening criteria for this assessment is enclosed with this report. In short, for the majority of the contaminants of concern, LQM/CIEH Suitable 4 Use Levels (S4ULs) published in 2015 have been adopted as GACs.

#### *Results*

All of the recorded concentrations within the imported Topsoil were below the laboratory limits of detection and/or the relevant GACs for a residential without home grown produce land use.

No asbestos was detected in any of the 4 No. soil samples.

#### *Summary*

It is considered that the measured concentrations of metals, PAHs, hydrocarbons or phenols in shallow soils within the soft landscaping area do not represent a potential risk to human health.

### **Site Certification**

It has been demonstrated in this report that remediation works within the soft landscaping area have been undertaken at the site in accordance with the agreed revised remediation strategy. Supplementary risk assessment works have demonstrated that the shallow soils do not present a risk for the proposed residential without home grown produce land use. **It is therefore recommended that the soft landscaping area is considered to be safe and suitable for a residential without home grown produce land use.**

The details of the protection measures will be included within the site's Health and Safety File to ensure maintenance workers understand the need to maintain the integrity of the clean cover system and the gas protection measures.

We hope this is suitable for your needs; however, should you require any further information, please do not hesitate to contact us.

Yours sincerely,

A handwritten signature in black ink that reads 'Rhys Pyke'.

Rhys Pyke, BSc (Hons), FGS

**Geoenvironmental Consultant**

Tier Environmental Ltd

Encs.

1. Figures & Drawings
2. Photographs & Verification Proformas
3. Topsoil Test Certificate
4. Laboratory Chemical Testing Results
5. Human Health Risk Assessment Criteria



Enclosure 1 –Figures & Drawings



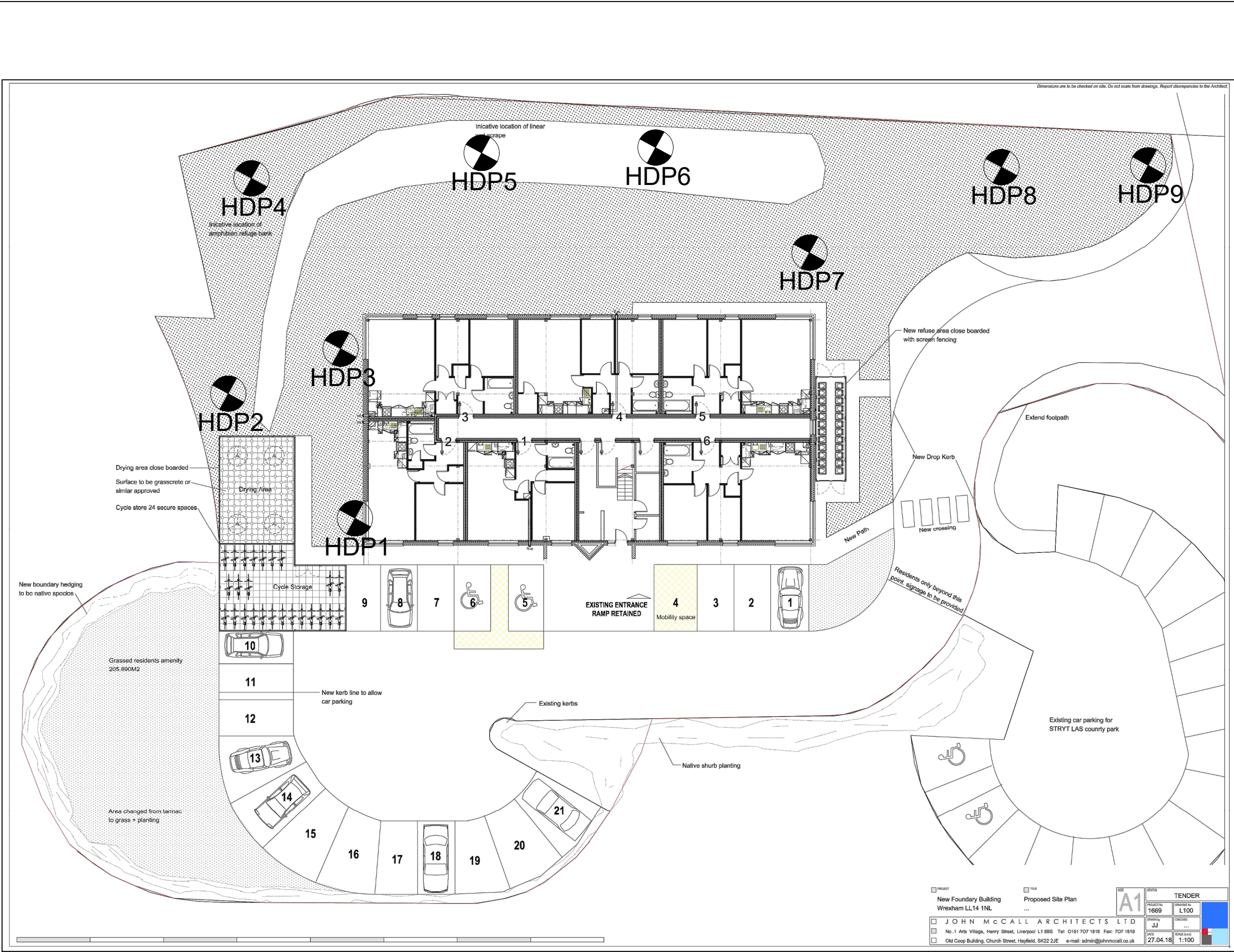
## Site Location Plan

|                 |                                |
|-----------------|--------------------------------|
| Contract Number | TE1085                         |
| Contract        | New foundry Buildings, Wrexham |
| Client          | Watkin Jones & Son             |



Reproduced from the Ordnance Survey 1:25,000 scale map with the permission of The Controller of Her Majesty's Stationary Office, © Crown Copyright. All rights reserved.

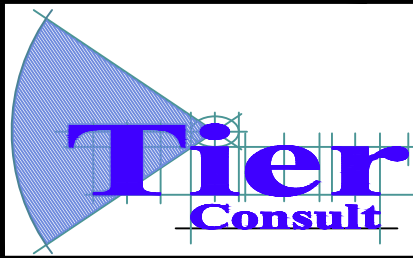
|                            |              |
|----------------------------|--------------|
| Scale                      | NTS          |
| Drawn by: NG               | Approved: SL |
| Drawing Number: TE1085PRA1 |              |



DO NOT SCALE

 Exploratory Hole Location

| REV                   | DATE | BY | DESCRIPTION | CHK | APD |
|-----------------------|------|----|-------------|-----|-----|
| DRAWING STATUS: FINAL |      |    |             |     |     |



Tier Consult Ltd.  
Richmond House  
Sandpiper Court  
Chester Business Park  
Chester  
CH4 9QZ  
Telephone: 01244 684900  
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Mobile: 07966 687066  
Email: info@tieruk.com

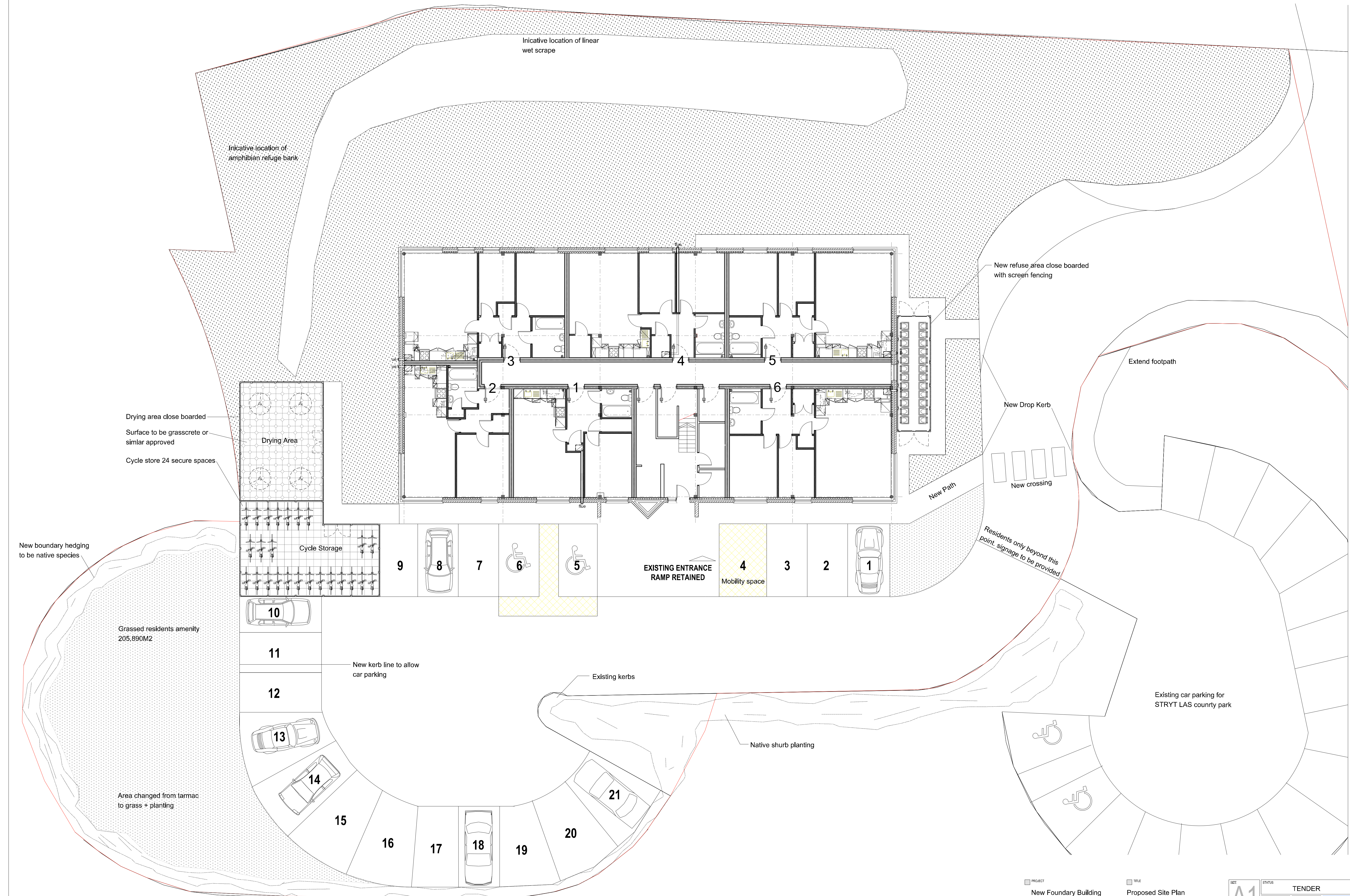
CLIENT: Watkin Jones

ARCHITECT: NA

PROJECT: New Foundry Buildings, Wrexham

TITLE: Verification Pit Location Plan

|                                |                          |                  |
|--------------------------------|--------------------------|------------------|
| SCALE • SIZE:<br>As shown @ A3 | CHECKED: SD              | APPROVED: SL     |
| CAD FILE:                      | DESIGN/DRAWN: JB         | DATE: 28.02.2019 |
| PROJECT No:<br>TE1085          | DRAWING No:<br>TE1085VR2 | REV:<br>A        |





Enclosure 2 - Photographs & Verification Proformas

### Site Photographs

| No. | Description         |
|-----|---------------------|
| 1   | The fenced off area |

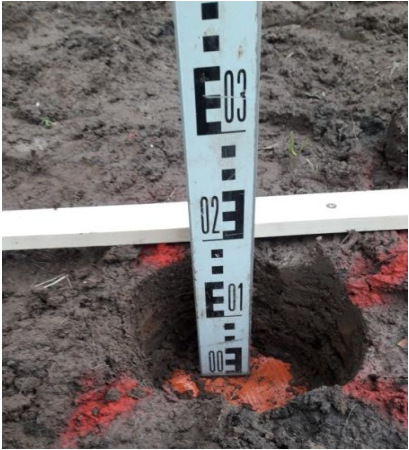
Photo 1

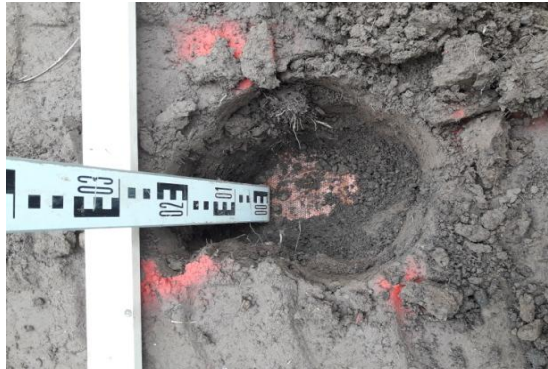


| <b>Ground Remediation Verification Proforma</b>                                                                                                                                                                                                                                                                                                                                   |                                                         |                                                                                                                                                                                                                 |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Site Name/ Location</b>                                                                                                                                                                                                                                                                                                                                                        | New Foundry Building, Johnstown, Wrexham                |                                                                                                                                                                                                                 |  |
| <b>Pit ID</b>                                                                                                                                                                                                                                                                                                                                                                     | HDP1                                                    |                                                                                                                                                                                                                 |                                                                                     |
| <b>Developer</b>                                                                                                                                                                                                                                                                                                                                                                  | The Watkin Jones & Son Limited Directors Pension Scheme |                                                                                                                                                                                                                 |                                                                                     |
| <b>Development Use</b>                                                                                                                                                                                                                                                                                                                                                            | Residential without plant uptake                        |                                                                                                                                                                                                                 |                                                                                     |
| <b>Remediation undertaken to the specified Plot (and as per agreed Remediation Strategy.)</b><br><b>(ie detail removal of any contaminated, detailed specification for soil capping system etc...)</b><br>The installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil. |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Supervising Environmental Consultant</b>                                                                                                                                                                                                                                                                                                                                       |                                                         | Tier Environmental                                                                                                                                                                                              |                                                                                     |
| <b>Engineer's Name</b>                                                                                                                                                                                                                                                                                                                                                            | Stephanie Dodd                                          | <b>Inspection Visit Date</b>                                                                                                                                                                                    | 20/02/2019                                                                          |
| <b>Associated soil chemical analysis (Sample Reference No, strata tested etc)</b><br>Exova Jones Environmental Test Report 19/2762, dated 26th February 2019. Representative samples taken.                                                                                                                                                                                       |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Photograph Reference No.</b>                                                                                                                                                                                                                                                                                                                                                   |                                                         | <b>Verification photograph details/ additional remarks</b>                                                                                                                                                      |                                                                                     |
|                                                                                                                                                                                                                                                                                                 |                                                         | <ul style="list-style-type: none"> <li>• 200mm of Top Soil.</li> <li>• Geotextile membrane proven at 200mm bgl.</li> </ul>  |                                                                                     |
| <b>This plot has PASSED verification</b><br><b>(Any proposed remedial works will be noted in the 'Remarks' column on this form)</b><br><b>An additional inspection IS NOT required for this plot</b>                                                                                                                                                                              |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Qualified Engineer</b><br>Stephanie Dodd                                                                                                                                                                                                                                                                                                                                       |                                                         | <b>Signature</b><br>                                                                                                        |                                                                                     |

| <b>Ground Remediation Verification Proforma</b>                                                                                                                                                                                                                                                                                                                                   |                                                         |                                                                                                                                                                                                                 |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Site Name/ Location</b>                                                                                                                                                                                                                                                                                                                                                        | New Foundry Building, Johnstown, Wrexham                |                                                                                                                                                                                                                 |  |
| <b>Pit ID</b>                                                                                                                                                                                                                                                                                                                                                                     | HDP2                                                    |                                                                                                                                                                                                                 |                                                                                     |
| <b>Developer</b>                                                                                                                                                                                                                                                                                                                                                                  | The Watkin Jones & Son Limited Directors Pension Scheme |                                                                                                                                                                                                                 |                                                                                     |
| <b>Development Use</b>                                                                                                                                                                                                                                                                                                                                                            | Residential without plant uptake                        |                                                                                                                                                                                                                 |                                                                                     |
| <b>Remediation undertaken to the specified Plot (and as per agreed Remediation Strategy.)</b><br><b>(ie detail removal of any contaminated, detailed specification for soil capping system etc...)</b><br>The installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil. |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Supervising Environmental Consultant</b>                                                                                                                                                                                                                                                                                                                                       |                                                         | Tier Environmental                                                                                                                                                                                              |                                                                                     |
| <b>Engineer's Name</b>                                                                                                                                                                                                                                                                                                                                                            | Stephanie Dodd                                          | <b>Inspection Visit Date</b>                                                                                                                                                                                    | 20/02/2019                                                                          |
| <b>Associated soil chemical analysis (Sample Reference No, strata tested etc)</b><br>Exova Jones Environmental Test Report 19/2762, dated 26th February 2019. Representative samples taken.                                                                                                                                                                                       |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Photograph Reference No.</b>                                                                                                                                                                                                                                                                                                                                                   |                                                         | <b>Verification photograph details/ additional remarks</b>                                                                                                                                                      |                                                                                     |
|                                                                                                                                                                                                                                                                                                 |                                                         | <ul style="list-style-type: none"> <li>• 220mm of Top Soil.</li> <li>• Geotextile membrane proven at 220mm bgl.</li> </ul>  |                                                                                     |
| <b>This plot has PASSED verification</b>                                                                                                                                                                                                                                                                                                                                          |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>(Any proposed remedial works will be noted in the 'Remarks' column on this form)</b>                                                                                                                                                                                                                                                                                           |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>An additional inspection IS NOT required for this plot</b>                                                                                                                                                                                                                                                                                                                     |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Qualified Engineer</b><br>Stephanie Dodd                                                                                                                                                                                                                                                                                                                                       |                                                         | <b>Signature</b><br>                                                                                                        |                                                                                     |

| <b>Ground Remediation Verification Proforma</b>                                                                                                                                                                                                                                                                                                                                   |                                                         |                                                                                                                                                                                                                 |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Site Name/ Location</b>                                                                                                                                                                                                                                                                                                                                                        | New Foundry Building, Johnstown, Wrexham                |                                                                                                                                                                                                                 |  |
| <b>Pit ID</b>                                                                                                                                                                                                                                                                                                                                                                     | HDP3                                                    |                                                                                                                                                                                                                 |                                                                                     |
| <b>Developer</b>                                                                                                                                                                                                                                                                                                                                                                  | The Watkin Jones & Son Limited Directors Pension Scheme |                                                                                                                                                                                                                 |                                                                                     |
| <b>Development Use</b>                                                                                                                                                                                                                                                                                                                                                            | Residential without plant uptake                        |                                                                                                                                                                                                                 |                                                                                     |
| <b>Remediation undertaken to the specified Plot (and as per agreed Remediation Strategy.)</b><br><b>(ie detail removal of any contaminated, detailed specification for soil capping system etc...)</b><br>The installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil. |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Supervising Environmental Consultant</b>                                                                                                                                                                                                                                                                                                                                       |                                                         | Tier Environmental                                                                                                                                                                                              |                                                                                     |
| <b>Engineer's Name</b>                                                                                                                                                                                                                                                                                                                                                            | Stephanie Dodd                                          | <b>Inspection Visit Date</b>                                                                                                                                                                                    | 20/02/2019                                                                          |
| <b>Associated soil chemical analysis (Sample Reference No, strata tested etc)</b><br>Exova Jones Environmental Test Report 19/2762, dated 26th February 2019. Representative samples taken.                                                                                                                                                                                       |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Photograph Reference No.</b>                                                                                                                                                                                                                                                                                                                                                   |                                                         | <b>Verification photograph details/ additional remarks</b>                                                                                                                                                      |                                                                                     |
|                                                                                                                                                                                                                                                                                                 |                                                         | <ul style="list-style-type: none"> <li>• 300mm of Top Soil.</li> <li>• Geotextile membrane proven at 300mm bgl.</li> </ul>  |                                                                                     |
| <b>This plot has PASSED verification</b>                                                                                                                                                                                                                                                                                                                                          |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>(Any proposed remedial works will be noted in the 'Remarks' column on this form)</b>                                                                                                                                                                                                                                                                                           |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>An additional inspection IS NOT required for this plot</b>                                                                                                                                                                                                                                                                                                                     |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Qualified Engineer</b><br>Stephanie Dodd                                                                                                                                                                                                                                                                                                                                       |                                                         | <b>Signature</b><br>                                                                                                        |                                                                                     |

| <b>Ground Remediation Verification Proforma</b>                                                                                                                                                                                                                                                                                                                                   |                                                         |                                                                                                                                                                                                                 |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Site Name/ Location</b>                                                                                                                                                                                                                                                                                                                                                        | New Foundry Building, Johnstown, Wrexham                |                                                                                                                                                                                                                 |  |
| <b>Pit ID</b>                                                                                                                                                                                                                                                                                                                                                                     | HDP4                                                    |                                                                                                                                                                                                                 |                                                                                     |
| <b>Developer</b>                                                                                                                                                                                                                                                                                                                                                                  | The Watkin Jones & Son Limited Directors Pension Scheme |                                                                                                                                                                                                                 |                                                                                     |
| <b>Development Use</b>                                                                                                                                                                                                                                                                                                                                                            | Residential without plant uptake                        |                                                                                                                                                                                                                 |                                                                                     |
| <b>Remediation undertaken to the specified Plot (and as per agreed Remediation Strategy.)</b><br><b>(ie detail removal of any contaminated, detailed specification for soil capping system etc...)</b><br>The installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil. |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Supervising Environmental Consultant</b>                                                                                                                                                                                                                                                                                                                                       |                                                         | Tier Environmental                                                                                                                                                                                              |                                                                                     |
| <b>Engineer's Name</b>                                                                                                                                                                                                                                                                                                                                                            | Stephanie Dodd                                          | <b>Inspection Visit Date</b>                                                                                                                                                                                    | 20/02/2019                                                                          |
| <b>Associated soil chemical analysis (Sample Reference No, strata tested etc)</b><br>Exova Jones Environmental Test Report 19/2762, dated 26th February 2019. Representative samples taken.                                                                                                                                                                                       |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Photograph Reference No.</b>                                                                                                                                                                                                                                                                                                                                                   |                                                         | <b>Verification photograph details/ additional remarks</b>                                                                                                                                                      |                                                                                     |
|                                                                                                                                                                                                                                                                                                 |                                                         | <ul style="list-style-type: none"> <li>• 200mm of Top Soil.</li> <li>• Geotextile membrane proven at 200mm bgl.</li> </ul>  |                                                                                     |
| <b>This plot has PASSED verification</b><br><b>(Any proposed remedial works will be noted in the 'Remarks' column on this form)</b><br><b>An additional inspection IS NOT required for this plot</b>                                                                                                                                                                              |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Qualified Engineer</b><br>Stephanie Dodd                                                                                                                                                                                                                                                                                                                                       |                                                         | <b>Signature</b><br>                                                                                                        |                                                                                     |

| <b>Ground Remediation Verification Proforma</b>                                                                                                                                                                                                                                                                                                                                   |                                                         |                                                                                                                                                                                                                 |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Site Name/ Location</b>                                                                                                                                                                                                                                                                                                                                                        | New Foundry Building, Johnstown, Wrexham                |                                                                                                                                                                                                                 |  |
| <b>Pit ID</b>                                                                                                                                                                                                                                                                                                                                                                     | HDP5                                                    |                                                                                                                                                                                                                 |                                                                                     |
| <b>Developer</b>                                                                                                                                                                                                                                                                                                                                                                  | The Watkin Jones & Son Limited Directors Pension Scheme |                                                                                                                                                                                                                 |                                                                                     |
| <b>Development Use</b>                                                                                                                                                                                                                                                                                                                                                            | Residential without plant uptake                        |                                                                                                                                                                                                                 |                                                                                     |
| <b>Remediation undertaken to the specified Plot (and as per agreed Remediation Strategy.)</b><br><b>(ie detail removal of any contaminated, detailed specification for soil capping system etc...)</b><br>The installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil. |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Supervising Environmental Consultant</b>                                                                                                                                                                                                                                                                                                                                       |                                                         | Tier Environmental                                                                                                                                                                                              |                                                                                     |
| <b>Engineer's Name</b>                                                                                                                                                                                                                                                                                                                                                            | Stephanie Dodd                                          | <b>Inspection Visit Date</b>                                                                                                                                                                                    | 20/02/2019                                                                          |
| <b>Associated soil chemical analysis (Sample Reference No, strata tested etc)</b><br>Exova Jones Environmental Test Report 19/2762, dated 26th February 2019. Representative samples taken.                                                                                                                                                                                       |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Photograph Reference No.</b>                                                                                                                                                                                                                                                                                                                                                   |                                                         | <b>Verification photograph details/ additional remarks</b>                                                                                                                                                      |                                                                                     |
|                                                                                                                                                                                                                                                                                                 |                                                         | <ul style="list-style-type: none"> <li>• 250mm of Top Soil.</li> <li>• Geotextile membrane proven at 250mm bgl.</li> </ul>  |                                                                                     |
| <b>This plot has PASSED verification</b><br><b>(Any proposed remedial works will be noted in the 'Remarks' column on this form)</b><br><b>An additional inspection IS NOT required for this plot</b>                                                                                                                                                                              |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Qualified Engineer</b><br>Stephanie Dodd                                                                                                                                                                                                                                                                                                                                       |                                                         | <b>Signature</b><br>                                                                                                        |                                                                                     |

## Ground Remediation Verification Proforma

|                                                                                                                                                                                                                                                                                                                                                                                   |                                                         |                                                                                                                        |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Site Name/ Location</b>                                                                                                                                                                                                                                                                                                                                                        | New Foundry Building, Johnstown, Wrexham                |                                     |            |
| <b>Pit ID</b>                                                                                                                                                                                                                                                                                                                                                                     | HDP6                                                    |                                                                                                                        |            |
| <b>Developer</b>                                                                                                                                                                                                                                                                                                                                                                  | The Watkin Jones & Son Limited Directors Pension Scheme |                                                                                                                        |            |
| <b>Development Use</b>                                                                                                                                                                                                                                                                                                                                                            | Residential without plant uptake                        |                                                                                                                        |            |
| <b>Remediation undertaken to the specified Plot (and as per agreed Remediation Strategy.)</b><br><b>(ie detail removal of any contaminated, detailed specification for soil capping system etc...)</b><br>The installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil. |                                                         |                                                                                                                        |            |
| <b>Supervising Environmental Consultant</b>                                                                                                                                                                                                                                                                                                                                       |                                                         | Tier Environmental                                                                                                     |            |
| <b>Engineer's Name</b>                                                                                                                                                                                                                                                                                                                                                            | Stephanie Dodd                                          | <b>Inspection Visit Date</b>                                                                                           | 20/02/2019 |
| <b>Associated soil chemical analysis (Sample Reference No, strata tested etc)</b><br>Exova Jones Environmental Test Report 19/2762, dated 26th February 2019. Representative samples taken.                                                                                                                                                                                       |                                                         |                                                                                                                        |            |
| <b>Photograph Reference No.</b>                                                                                                                                                                                                                                                                                                                                                   |                                                         | <b>Verification photograph details/ additional remarks</b>                                                             |            |
|                                                                                                                                                                                                                                                                                                 |                                                         | <ul style="list-style-type: none"> <li>200mm of Top Soil.</li> <li>Geotextile membrane proven at 200mm bgl.</li> </ul> |            |
|                                                                                                                                                                                                                                                                                                                                                                                   |                                                         |                                    |            |
| <b>This plot has PASSED verification</b><br><b>(Any proposed remedial works will be noted in the 'Remarks' column on this form)</b><br><b>An additional inspection IS NOT required for this plot</b>                                                                                                                                                                              |                                                         |                                                                                                                        |            |
| <b>Qualified Engineer</b><br>Stephanie Dodd                                                                                                                                                                                                                                                                                                                                       |                                                         | <b>Signature</b><br>               |            |

| <b>Ground Remediation Verification Proforma</b>                                                                                                                                                                                                                                                                                                                                   |                                                         |                                                                                                                                                                                                                 |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Site Name/ Location</b>                                                                                                                                                                                                                                                                                                                                                        | New Foundry Building, Johnstown, Wrexham                |                                                                                                                                                                                                                 |  |
| <b>Pit ID</b>                                                                                                                                                                                                                                                                                                                                                                     | HDP7                                                    |                                                                                                                                                                                                                 |                                                                                     |
| <b>Developer</b>                                                                                                                                                                                                                                                                                                                                                                  | The Watkin Jones & Son Limited Directors Pension Scheme |                                                                                                                                                                                                                 |                                                                                     |
| <b>Development Use</b>                                                                                                                                                                                                                                                                                                                                                            | Residential without plant uptake                        |                                                                                                                                                                                                                 |                                                                                     |
| <b>Remediation undertaken to the specified Plot (and as per agreed Remediation Strategy.)</b><br><b>(ie detail removal of any contaminated, detailed specification for soil capping system etc...)</b><br>The installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil. |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Supervising Environmental Consultant</b>                                                                                                                                                                                                                                                                                                                                       |                                                         | Tier Environmental                                                                                                                                                                                              |                                                                                     |
| <b>Engineer's Name</b>                                                                                                                                                                                                                                                                                                                                                            | Stephanie Dodd                                          | <b>Inspection Visit Date</b>                                                                                                                                                                                    | 20/02/2019                                                                          |
| <b>Associated soil chemical analysis (Sample Reference No, strata tested etc)</b><br>Exova Jones Environmental Test Report 19/2762, dated 26th February 2019. Representative samples taken.                                                                                                                                                                                       |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Photograph Reference No.</b>                                                                                                                                                                                                                                                                                                                                                   |                                                         | <b>Verification photograph details/ additional remarks</b>                                                                                                                                                      |                                                                                     |
|                                                                                                                                                                                                                                                                                                 |                                                         | <ul style="list-style-type: none"> <li>• 420mm of Top Soil.</li> <li>• Geotextile membrane proven at 420mm bgl.</li> </ul>  |                                                                                     |
| <b>This plot has PASSED verification</b><br><b>(Any proposed remedial works will be noted in the 'Remarks' column on this form)</b><br><b>An additional inspection IS NOT required for this plot</b>                                                                                                                                                                              |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Qualified Engineer</b><br>Stephanie Dodd                                                                                                                                                                                                                                                                                                                                       |                                                         | <b>Signature</b><br>                                                                                                        |                                                                                     |

## Ground Remediation Verification Proforma

|                                                                                                                                                                                                        |                                                         |                                                                                                                        |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Site Name/ Location</b>                                                                                                                                                                             | New Foundry Building, Johnstown, Wrexham                |                                     |            |
| <b>Pit ID</b>                                                                                                                                                                                          | HDP8                                                    |                                                                                                                        |            |
| <b>Developer</b>                                                                                                                                                                                       | The Watkin Jones & Son Limited Directors Pension Scheme |                                                                                                                        |            |
| <b>Development Use</b>                                                                                                                                                                                 | Residential without plant uptake                        |                                                                                                                        |            |
| <b>Remediation undertaken to the specified Plot (and as per agreed Remediation Strategy.)</b><br><b>(ie detail removal of any contaminated, detailed specification for soil capping system etc...)</b> |                                                         |                                                                                                                        |            |
| The installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil.                                |                                                         |                                                                                                                        |            |
| <b>Supervising Environmental Consultant</b>                                                                                                                                                            |                                                         | Tier Environmental                                                                                                     |            |
| <b>Engineer's Name</b>                                                                                                                                                                                 | Stephanie Dodd                                          | <b>Inspection Visit Date</b>                                                                                           | 20/02/2019 |
| <b>Associated soil chemical analysis (Sample Reference No, strata tested etc)</b><br>Exova Jones Environmental Test Report 19/2762, dated 26th February 2019. Representative samples taken.            |                                                         |                                                                                                                        |            |
| <b>Photograph Reference No.</b>                                                                                                                                                                        |                                                         | <b>Verification photograph details/ additional remarks</b>                                                             |            |
|                                                                                                                      |                                                         | <ul style="list-style-type: none"> <li>200mm of Top Soil.</li> <li>Geotextile membrane proven at 200mm bgl.</li> </ul> |            |
|                                                                                                                                                                                                        |                                                         |                                    |            |
| <b>This plot has PASSED verification</b><br><b>(Any proposed remedial works will be noted in the 'Remarks' column on this form)</b><br><b>An additional inspection IS NOT required for this plot</b>   |                                                         |                                                                                                                        |            |
| <b>Qualified Engineer</b><br>Stephanie Dodd                                                                                                                                                            |                                                         | <b>Signature</b><br>               |            |

| <b>Ground Remediation Verification Proforma</b>                                                                                                                                                                                                                                                                                                                                   |                                                         |                                                                                                                                                                                                                 |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Site Name/ Location</b>                                                                                                                                                                                                                                                                                                                                                        | New Foundry Building, Johnstown, Wrexham                |                                                                                                                                                                                                                 |  |
| <b>Pit ID</b>                                                                                                                                                                                                                                                                                                                                                                     | HDP9                                                    |                                                                                                                                                                                                                 |                                                                                     |
| <b>Developer</b>                                                                                                                                                                                                                                                                                                                                                                  | The Watkin Jones & Son Limited Directors Pension Scheme |                                                                                                                                                                                                                 |                                                                                     |
| <b>Development Use</b>                                                                                                                                                                                                                                                                                                                                                            | Residential without plant uptake                        |                                                                                                                                                                                                                 |                                                                                     |
| <b>Remediation undertaken to the specified Plot (and as per agreed Remediation Strategy.)</b><br><b>(ie detail removal of any contaminated, detailed specification for soil capping system etc...)</b><br>The installation of a terram/geotextile barrier fabric overlying the existing soils overlain by approximately 150mm of clean, certified and validated imported topsoil. |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Supervising Environmental Consultant</b>                                                                                                                                                                                                                                                                                                                                       |                                                         | Tier Environmental                                                                                                                                                                                              |                                                                                     |
| <b>Engineer's Name</b>                                                                                                                                                                                                                                                                                                                                                            | Stephanie Dodd                                          | <b>Inspection Visit Date</b>                                                                                                                                                                                    | 20/02/2019                                                                          |
| <b>Associated soil chemical analysis (Sample Reference No, strata tested etc)</b><br>Exova Jones Environmental Test Report 19/2762, dated 26th February 2019. Representative samples taken.                                                                                                                                                                                       |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Photograph Reference No.</b>                                                                                                                                                                                                                                                                                                                                                   |                                                         | <b>Verification photograph details/ additional remarks</b>                                                                                                                                                      |                                                                                     |
|                                                                                                                                                                                                                                                                                                 |                                                         | <ul style="list-style-type: none"> <li>• 240mm of Top Soil.</li> <li>• Geotextile membrane proven at 240mm bgl.</li> </ul>  |                                                                                     |
| <b>This plot has PASSED verification</b>                                                                                                                                                                                                                                                                                                                                          |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>(Any proposed remedial works will be noted in the 'Remarks' column on this form)</b>                                                                                                                                                                                                                                                                                           |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>An additional inspection IS NOT required for this plot</b>                                                                                                                                                                                                                                                                                                                     |                                                         |                                                                                                                                                                                                                 |                                                                                     |
| <b>Qualified Engineer</b><br>Stephanie Dodd                                                                                                                                                                                                                                                                                                                                       |                                                         | <b>Signature</b><br>                                                                                                        |                                                                                     |



Enclosure 3 – Topsoil Test Certificate



2183

# Final Report

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|                               |                                                                                    |                         |             |
|-------------------------------|------------------------------------------------------------------------------------|-------------------------|-------------|
| <b>Report No.:</b>            | 19-03172-1                                                                         |                         |             |
| <b>Initial Date of Issue:</b> | 01-Feb-2019                                                                        |                         |             |
| <b>Client</b>                 | DNT Group Ltd                                                                      |                         |             |
| <b>Client Address:</b>        | The Oaks<br>Babbinswood<br>Oswestry<br>Shropshire<br>SY11 4LW                      |                         |             |
| <b>Contact(s):</b>            | Gwynfor Davies                                                                     |                         |             |
| <b>Project</b>                | DNT Yards                                                                          |                         |             |
| <b>Quotation No.:</b>         |                                                                                    | <b>Date Received:</b>   | 28-Jan-2019 |
| <b>Order No.:</b>             |                                                                                    | <b>Date Instructed:</b> | 28-Jan-2019 |
| <b>No. of Samples:</b>        | 2                                                                                  |                         |             |
| <b>Turnaround (Wkdays):</b>   | 5                                                                                  | <b>Results Due:</b>     | 01-Feb-2019 |
| <b>Date Approved:</b>         | 01-Feb-2019                                                                        |                         |             |
| <b>Approved By:</b>           |  |                         |             |
| <b>Details:</b>               | Robert Monk, Technical Manager                                                     |                         |             |

---

**Project: DNT Yards**

|                              |                             |            |              |             |
|------------------------------|-----------------------------|------------|--------------|-------------|
| <b>Client: DNT Group Ltd</b> | <b>Chemtest Job No.:</b>    |            | 19-03172     | 19-03172    |
| Quotation No.:               | <b>Chemtest Sample ID.:</b> |            | 762983       | 762984      |
|                              | Sample Location:            |            | A            | B           |
|                              | Sample Type:                |            | SOIL         | SOIL        |
|                              | Date Sampled:               |            | 23-Jan-2019  | 23-Jan-2019 |
| <b>Determinand</b>           | <b>Accred.</b>              | <b>SOP</b> | <b>Units</b> | <b>LOD</b>  |
| Moisture                     | N                           | 2030       | %            | 0.020       |
|                              |                             |            |              | 15          |
|                              |                             |            |              | 11          |

## Results - Soil

Chemtest Job No.: 19-03172

Chemtest Sample ID.: 762983

Client Sample Ref.:

Sample Location: A

Client Sample ID.:

Top Depth (m):

Bottom Depth (m):

Date Sampled: 23-Jan-2019

Time Sampled:

| Parameter                                   | Units | Multipurpose Range | Result    | Compliant with Multipurpose Range? (Y/N) | Compliant with Specific Purpose Range? (Y/N) |       |       |
|---------------------------------------------|-------|--------------------|-----------|------------------------------------------|----------------------------------------------|-------|-------|
| <b>Texture</b>                              |       |                    |           |                                          | Acid                                         | Low F | Calc. |
| Clay content                                | %     |                    | 34        |                                          |                                              |       |       |
| Silt content                                | %     |                    | 35        |                                          |                                              |       |       |
| Sand content                                | %     |                    | 31        |                                          |                                              |       |       |
| Soil texture class                          |       | See Attached Chart | Clay Loam | YES                                      |                                              |       |       |
| <b>Mass Loss on Ignition</b>                |       |                    |           |                                          |                                              |       |       |
| Clay 5-20%                                  |       | 3.0-20             | 6.2       | YES                                      | YES                                          | YES   | YES   |
| Clay 20-35%                                 |       | 5.0-20             |           |                                          |                                              |       |       |
| <b>Stone Content</b>                        | % m/m |                    |           |                                          |                                              |       |       |
| >2mm                                        |       | 0-30               | 1.7       | YES                                      |                                              |       |       |
| >20mm                                       |       | 0-10               | < 0.020   | YES                                      |                                              |       |       |
| >50mm                                       |       | 0                  | < 0.020   | YES                                      |                                              |       |       |
| Soil pH value                               |       | 5.5-8.5            | 6.6       | YES                                      | NO                                           | YES   | NO    |
| Carbonate (Calcareous only)                 | %     |                    | < 0.10    |                                          |                                              |       | NO    |
| Electrical Conductivity                     | µS/cm | If >3300 do ESP    | 2200      | YES                                      |                                              |       |       |
| <b>Available Nutrient Content</b>           |       |                    |           |                                          |                                              |       |       |
| Nitrogen %                                  |       | >0.15              | 0.40      | YES                                      | YES                                          |       | YES   |
| Extractable phosphorus                      | mg/l  | 16-140             | 8.5       | NO                                       | NO                                           | YES   | NO    |
| Extractable potassium                       | mg/l  | 121-1500           | 120       | NO                                       | NO                                           |       | NO    |
| Extractable magnesium                       | mg/l  | 51-600             | 130       | YES                                      | YES                                          |       | YES   |
| <b>Carbon : Nitrogen Ratio</b>              |       | <20:1              | 9.0/1     | YES                                      | YES                                          | YES   | YES   |
| <b>Exchangeable sodium</b>                  | %     | <15                | 1.1       |                                          |                                              |       |       |
| Available Calcium                           | mg/l  |                    | 1400      |                                          |                                              |       |       |
| Available Sodium                            | mg/l  |                    | 22        |                                          |                                              |       |       |
| <b>Phytotoxic Contaminants (by soil pH)</b> |       | < 6.0              | 6.0-7.0   | > 7.0                                    |                                              |       |       |
| Zinc (Nitric Acid extract)                  | mg/kg | <200               | <200      | <300                                     | 56                                           | YES   |       |
| Copper (Nitric Acid extract)                | mg/kg | <100               | <135      | <200                                     | 19                                           | YES   |       |
| Nickel (Nitric Acid extract)                | mg/kg | <60                | <75       | <110                                     | 15                                           | YES   |       |
| <b>Visible Contaminants</b>                 | % mm  |                    |           |                                          |                                              |       |       |
| >2mm                                        |       | <0.5               | 0.000     | YES                                      |                                              |       |       |
| ..... of which plastics                     |       | <0.25              | 0.000     | YES                                      |                                              |       |       |
| ..... man-made sharps                       |       | zero in 1kg        | 0.000     | YES                                      |                                              |       |       |

**Chemtest Job No.: 19-03172**
**Chemtest Sample ID.: 762984**

Client Sample Ref.:

Sample Location: B

**Client Sample ID.:**

Top Depth (m):

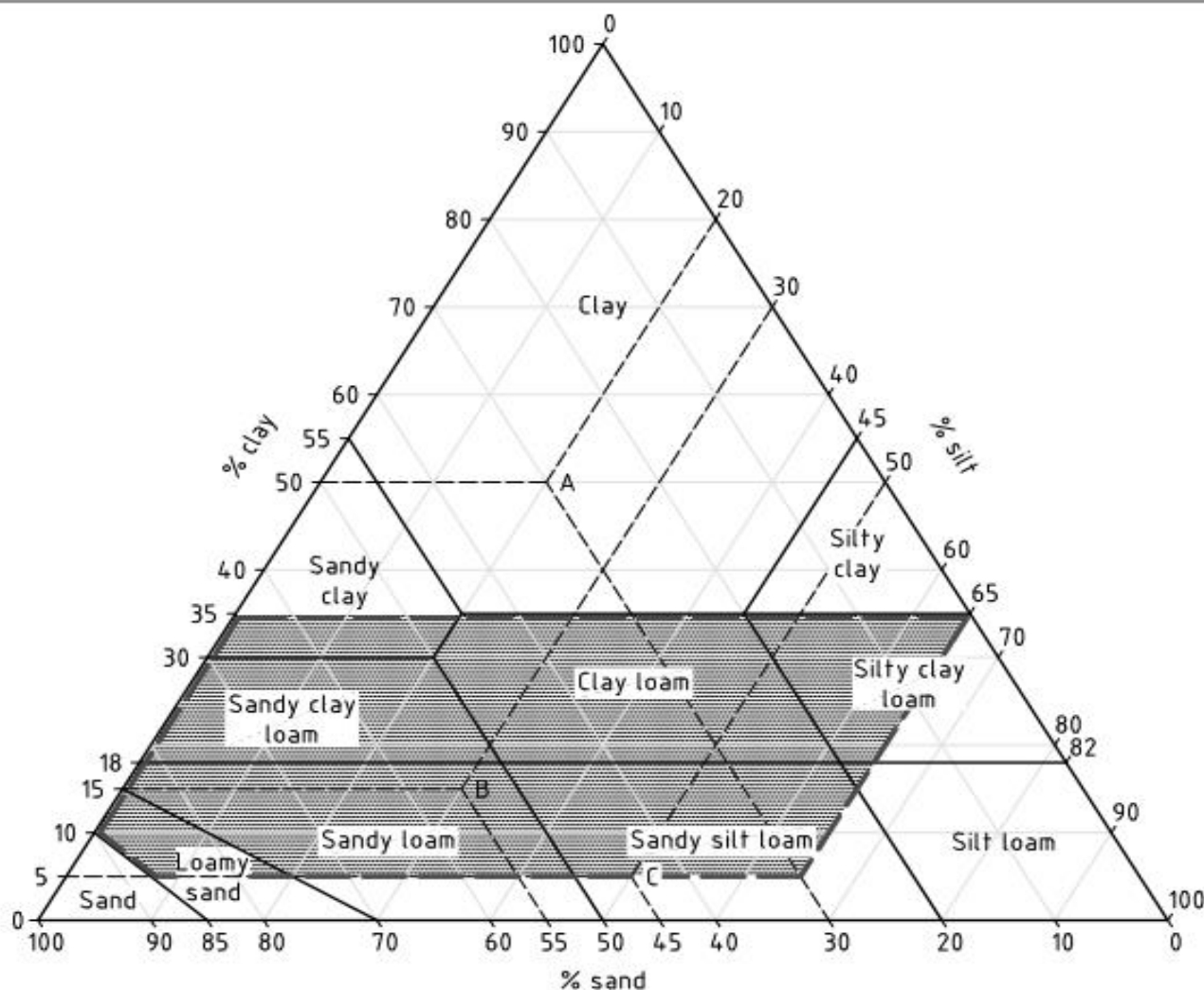
Bottom Depth (m):

Date Sampled: 23-Jan-2019

Time Sampled:

| Parameter                                   | Units | Multipurpose Range  | Result          | Compliant with Multipurpose Range? (Y/N) | Compliant with Specific Purpose Range? (Y/N) |       |       |
|---------------------------------------------|-------|---------------------|-----------------|------------------------------------------|----------------------------------------------|-------|-------|
| <b>Texture</b>                              |       |                     |                 |                                          | Acid                                         | Low F | Calc. |
| Clay content                                | %     |                     | 23              |                                          |                                              |       |       |
| Silt content                                | %     |                     | 23              |                                          |                                              |       |       |
| Sand content                                | %     |                     | 55              |                                          |                                              |       |       |
| Soil texture class                          |       | See Attached Chart  | Sandy Clay Loam | YES                                      |                                              |       |       |
| <b>Mass Loss on Ignition</b>                |       |                     |                 |                                          |                                              |       |       |
| Clay 5-20%                                  |       | 3.0-20              | 3.7             | NO                                       | NO                                           | YES   | NO    |
| Clay 20-35%                                 |       | 5.0-20              |                 |                                          |                                              |       |       |
| <b>Stone Content</b>                        | % m/m |                     |                 |                                          |                                              |       |       |
| >2mm                                        |       | 0-30                | 19              | YES                                      |                                              |       |       |
| >20mm                                       |       | 0-10                | < 0.020         | YES                                      |                                              |       |       |
| >50mm                                       |       | 0                   | < 0.020         | YES                                      |                                              |       |       |
| Soil pH value                               |       | 5.5-8.5             | 8.3             | YES                                      | NO                                           | YES   | YES   |
| Carbonate (Calcareous only)                 | %     |                     | 2.9             |                                          |                                              |       | YES   |
| Electrical Conductivity                     | µS/cm | If >3300 do ESP     | 2000            | YES                                      |                                              |       |       |
| <b>Available Nutrient Content</b>           |       |                     |                 |                                          |                                              |       |       |
| Nitrogen %                                  |       | >0.15               | 0.27            | YES                                      | YES                                          |       | YES   |
| Extractable phosphorus                      | mg/l  | 16-140              | 25              | YES                                      | YES                                          | NO    | YES   |
| Extractable potassium                       | mg/l  | 121-1500            | 90              | NO                                       | NO                                           |       | NO    |
| Extractable magnesium                       | mg/l  | 51-600              | 39              | NO                                       | NO                                           |       | NO    |
| <b>Carbon : Nitrogen Ratio</b>              |       | <20:1               | 8.0/1           | YES                                      | YES                                          | YES   | YES   |
| <b>Exchangeable sodium</b>                  | %     | <15                 | 2.1             |                                          |                                              |       |       |
| Available Calcium                           | mg/l  |                     | 1900            |                                          |                                              |       |       |
| Available Sodium                            | mg/l  |                     | 49              |                                          |                                              |       |       |
| <b>Phytotoxic Contaminants (by soil pH)</b> |       | < 6.0 6.0-7.0 > 7.0 |                 |                                          |                                              |       |       |
| Zinc (Nitric Acid extract)                  | mg/kg | <200 <200 <300      | 83              | YES                                      |                                              |       |       |
| Copper (Nitric Acid extract)                | mg/kg | <100 <135 <200      | 26              | YES                                      |                                              |       |       |
| Nickel (Nitric Acid extract)                | mg/kg | <60 <75 <110        | 20              | YES                                      |                                              |       |       |
| <b>Visible Contaminants</b>                 | % mm  |                     |                 |                                          |                                              |       |       |
| >2mm                                        |       | <0.5                | 0.000           | YES                                      |                                              |       |       |
| ..... of which plastics                     |       | <0.25               | 0.000           | YES                                      |                                              |       |       |
| ..... man-made sharps                       |       | zero in 1kg         | 0.000           | YES                                      |                                              |       |       |

**Texture Classification Chart**



**Key**



Area within which the texture of topsoil is required to fall

**NOTE** Examples of textural classification are as follows.

- Soil A with 30% sand, 20% silt and 50% clay is in the "clay" textural class.
- Soil B with 55% sand, 30% silt and 15% clay is in the "sandy loam" textural class.
- Soil C with 45% sand, 50% silt and 5% clay is in the "sandy silt loam" textural class.

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| SOP  | Title                                                      | Parameters included                                                                                                                                      | Method summary                                                                                       |
|------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 2010 | pH Value of Soils                                          | pH                                                                                                                                                       | pH Meter                                                                                             |
| 2020 | Electrical Conductivity                                    | Electrical conductivity (EC) of aqueous extract or calcium sulphate solution for topsoil                                                                 | Measurement of the electrical resistance of a 2:1 water/soil extract.                                |
| 2030 | Moisture and Stone Content of Soils(Requirement of MCERTS) | Moisture content                                                                                                                                         | Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C. |
| 2115 | Total Nitrogen in Soils                                    | Nitrogen                                                                                                                                                 | Determination by elemental analyser                                                                  |
| 2260 | Carbonate                                                  | Carbonate                                                                                                                                                | Titration                                                                                            |
| 2400 | Cations                                                    | Cations                                                                                                                                                  | ICP-MS                                                                                               |
| 2420 | Phosphate                                                  | Phosphate                                                                                                                                                | Spectrophotometry - Discrete analyser                                                                |
| 2450 | Acid Soluble Metals in Soils                               | Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc | Acid digestion followed by determination of metals in extract by ICP-MS.                             |
| 2620 | LOI 440                                                    | LOI 440                                                                                                                                                  | Determination of the proportion by mass that is lost from a soil by ignition at 440°C.               |

## **Report Information**

### **Key**

---

- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable Sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

### **Sample Deviation Codes**

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- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

### **Sample Retention and Disposal**

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All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

[customerservices@chemtest.com](mailto:customerservices@chemtest.com)



#### Enclosure 4 – Laboratory Chemical Testing Results



# Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

Unit 3 Deeside Point  
Zone 3  
Deeside Industrial Park  
Deeside  
CH5 2UA

Tier Environmental  
Suite 513, Chadwick House  
Warrington Rd  
Birchwood  
Warrington  
WA3 6AE

Tel: +44 (0) 1244 833780

Fax: +44 (0) 1244 833781



|                                |                               |
|--------------------------------|-------------------------------|
| <b>Attention :</b>             | Stephanie Dodd                |
| <b>Date :</b>                  | 26th February, 2019           |
| <b>Your reference :</b>        | TE1085                        |
| <b>Our reference :</b>         | Test Report 19/2762 Batch 1   |
| <b>Location :</b>              | New Foundry Building, Wrexham |
| <b>Date samples received :</b> | 20th February, 2019           |
| <b>Status :</b>                | Final report                  |
| <b>Issue :</b>                 | 1                             |

Nine samples were received for analysis on 20th February, 2019 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## Compiled By:

**Lucas Halliwell**  
Project Co-ordinator

# Exova Jones Environmental

**Client Name:** Tier Environmental  
**Reference:** TE1085  
**Location:** New Foundry Building, Wrexham  
**Contact:** Stephanie Dodd  
**JE Job No.:** 19/2762

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No.           | 4-6        | 10-12      | 16-18      | 22-24      |  |  |  |  |  |  | Please see attached notes for all abbreviations and acronyms |       |                        |
|--------------------------|------------|------------|------------|------------|--|--|--|--|--|--|--------------------------------------------------------------|-------|------------------------|
| Sample ID                | HDP2       | HDP4       | HDP6       | HDP8       |  |  |  |  |  |  |                                                              |       |                        |
| Depth                    | 0.20       | 0.10       | 0.10       | 0.10       |  |  |  |  |  |  |                                                              |       |                        |
| COC No / misc            |            |            |            |            |  |  |  |  |  |  |                                                              |       |                        |
| Containers               | V J T      | V J T      | V J T      | V J T      |  |  |  |  |  |  |                                                              |       |                        |
| Sample Date              | 20/02/2019 | 20/02/2019 | 20/02/2019 | 20/02/2019 |  |  |  |  |  |  |                                                              |       |                        |
| Sample Type              | Soil       | Soil       | Soil       | Soil       |  |  |  |  |  |  |                                                              |       |                        |
| Batch Number             | 1          | 1          | 1          | 1          |  |  |  |  |  |  |                                                              |       |                        |
| Date of Receipt          | 20/02/2019 | 20/02/2019 | 20/02/2019 | 20/02/2019 |  |  |  |  |  |  | LOD/LOR                                                      | Units | Method No.             |
| Arsenic #                | 8.8        | 10.4       | 9.7        | 9.8        |  |  |  |  |  |  | <0.5                                                         | mg/kg | TM30/PM15              |
| Cadmium #                | 0.1        | 0.2        | 0.4        | 0.2        |  |  |  |  |  |  | <0.1                                                         | mg/kg | TM30/PM15              |
| Chromium #               | 52.5       | 44.9       | 49.5       | 49.1       |  |  |  |  |  |  | <0.5                                                         | mg/kg | TM30/PM15              |
| Copper #                 | 17         | 14         | 28         | 16         |  |  |  |  |  |  | <1                                                           | mg/kg | TM30/PM15              |
| Lead #                   | 61         | 78         | 129        | 77         |  |  |  |  |  |  | <5                                                           | mg/kg | TM30/PM15              |
| Mercury #                | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  |  |  | <0.1                                                         | mg/kg | TM30/PM15              |
| Nickel #                 | 19.8       | 18.8       | 19.8       | 19.2       |  |  |  |  |  |  | <0.7                                                         | mg/kg | TM30/PM15              |
| Selenium #               | <1         | <1         | <1         | <1         |  |  |  |  |  |  | <1                                                           | mg/kg | TM30/PM15              |
| Total Sulphate as SO4 #  | 721        | 759        | 1498       | 776        |  |  |  |  |  |  | <50                                                          | mg/kg | TM50/PM29              |
| Zinc #                   | 82         | 92         | 204        | 94         |  |  |  |  |  |  | <5                                                           | mg/kg | TM30/PM15              |
| PAH MS                   |            |            |            |            |  |  |  |  |  |  |                                                              |       |                        |
| Naphthalene #            | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Acenaphthylene           | <0.03      | <0.03      | <0.03      | <0.03      |  |  |  |  |  |  | <0.03                                                        | mg/kg | TM4/PM8                |
| Acenaphthene #           | <0.05      | <0.05      | <0.05      | <0.05      |  |  |  |  |  |  | <0.05                                                        | mg/kg | TM4/PM8                |
| Fluorene #               | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Phenanthrene #           | <0.03      | <0.03      | <0.03      | <0.03      |  |  |  |  |  |  | <0.03                                                        | mg/kg | TM4/PM8                |
| Anthracene #             | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Fluoranthene #           | <0.03      | <0.03      | <0.03      | <0.03      |  |  |  |  |  |  | <0.03                                                        | mg/kg | TM4/PM8                |
| Pyrene #                 | <0.03      | <0.03      | <0.03      | <0.03      |  |  |  |  |  |  | <0.03                                                        | mg/kg | TM4/PM8                |
| Benzo(a)anthracene #     | <0.06      | <0.06      | <0.06      | <0.06      |  |  |  |  |  |  | <0.06                                                        | mg/kg | TM4/PM8                |
| Chrysene #               | <0.02      | <0.02      | <0.02      | <0.02      |  |  |  |  |  |  | <0.02                                                        | mg/kg | TM4/PM8                |
| Benzo(bk)fluoranthene #  | <0.07      | <0.07      | <0.07      | <0.07      |  |  |  |  |  |  | <0.07                                                        | mg/kg | TM4/PM8                |
| Benzo(a)pyrene #         | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Indeno(123cd)pyrene #    | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Dibenzo(ah)anthracene #  | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Benzo(ghi)perylene #     | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| PAH 16 Total             | <0.6       | <0.6       | <0.6       | <0.6       |  |  |  |  |  |  | <0.6                                                         | mg/kg | TM4/PM8                |
| Benzo(b)fluoranthene     | <0.05      | <0.05      | <0.05      | <0.05      |  |  |  |  |  |  | <0.05                                                        | mg/kg | TM4/PM8                |
| Benzo(k)fluoranthene     | <0.02      | <0.02      | <0.02      | <0.02      |  |  |  |  |  |  | <0.02                                                        | mg/kg | TM4/PM8                |
| PAH Surrogate % Recovery | 102        | 99         | 84         | 100        |  |  |  |  |  |  | <0                                                           | %     | TM4/PM8                |
| TPH CWG                  |            |            |            |            |  |  |  |  |  |  |                                                              |       |                        |
| Aliphatics               |            |            |            |            |  |  |  |  |  |  |                                                              |       |                        |
| >C5-C6 #                 | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  |  |  | <0.1                                                         | mg/kg | TM36/PM12              |
| >C6-C8 #                 | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  |  |  | <0.1                                                         | mg/kg | TM36/PM12              |
| >C8-C10                  | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  |  |  | <0.1                                                         | mg/kg | TM36/PM12              |
| >C10-C12 #               | <0.2       | <0.2       | <0.2       | <0.2       |  |  |  |  |  |  | <0.2                                                         | mg/kg | TM5/PM8/PM16           |
| >C12-C16 #               | <4         | <4         | <4         | <4         |  |  |  |  |  |  | <4                                                           | mg/kg | TM5/PM8/PM16           |
| >C16-C21 #               | <7         | <7         | <7         | <7         |  |  |  |  |  |  | <7                                                           | mg/kg | TM5/PM8/PM16           |
| >C21-C35 #               | <7         | <7         | <7         | <7         |  |  |  |  |  |  | <7                                                           | mg/kg | TM5/PM8/PM16           |
| Total aliphatics C5-35   | <19        | <19        | <19        | <19        |  |  |  |  |  |  | <19                                                          | mg/kg | TM4/PM8/PM16/PM12/PM15 |

# Exova Jones Environmental

**Client Name:** Tier Environmental  
**Reference:** TE1085  
**Location:** New Foundry Building, Wrexham  
**Contact:** Stephanie Dodd  
**JE Job No.:** 19/2762

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No.                        | 4-6        | 10-12      | 16-18      | 22-24      |  |  |  |  |  |  | Please see attached notes for all abbreviations and acronyms |          |                        |
|---------------------------------------|------------|------------|------------|------------|--|--|--|--|--|--|--------------------------------------------------------------|----------|------------------------|
| Sample ID                             | HDP2       | HDP4       | HDP6       | HDP8       |  |  |  |  |  |  |                                                              |          |                        |
| Depth                                 | 0.20       | 0.10       | 0.10       | 0.10       |  |  |  |  |  |  |                                                              |          |                        |
| COC No / misc                         |            |            |            |            |  |  |  |  |  |  |                                                              |          |                        |
| Containers                            | V J T      | V J T      | V J T      | V J T      |  |  |  |  |  |  |                                                              |          |                        |
| Sample Date                           | 20/02/2019 | 20/02/2019 | 20/02/2019 | 20/02/2019 |  |  |  |  |  |  |                                                              |          |                        |
| Sample Type                           | Soil       | Soil       | Soil       | Soil       |  |  |  |  |  |  |                                                              |          |                        |
| Batch Number                          | 1          | 1          | 1          | 1          |  |  |  |  |  |  |                                                              |          |                        |
| Date of Receipt                       | 20/02/2019 | 20/02/2019 | 20/02/2019 | 20/02/2019 |  |  |  |  |  |  | LOD/LOR                                                      | Units    | Method No.             |
| TPH CWG                               |            |            |            |            |  |  |  |  |  |  |                                                              |          |                        |
| <b>Aromatics</b>                      |            |            |            |            |  |  |  |  |  |  |                                                              |          |                        |
| >C5-EC7 #                             | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  |  |  | <0.1                                                         | mg/kg    | TM36/PM12              |
| >EC7-EC8 #                            | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  |  |  | <0.1                                                         | mg/kg    | TM36/PM12              |
| >EC8-EC10 #                           | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  |  |  | <0.1                                                         | mg/kg    | TM36/PM12              |
| >EC10-EC12 #                          | <0.2       | <0.2       | <0.2       | <0.2       |  |  |  |  |  |  | <0.2                                                         | mg/kg    | TM5/PM8/PM16           |
| >EC12-EC16 #                          | <4         | <4         | <4         | <4         |  |  |  |  |  |  | <4                                                           | mg/kg    | TM5/PM8/PM16           |
| >EC16-EC21 #                          | <7         | <7         | <7         | <7         |  |  |  |  |  |  | <7                                                           | mg/kg    | TM5/PM8/PM16           |
| >EC21-EC35 #                          | <7         | <7         | <7         | <7         |  |  |  |  |  |  | <7                                                           | mg/kg    | TM5/PM8/PM16           |
| Total aromatics C5-35 #               | <19        | <19        | <19        | <19        |  |  |  |  |  |  | <19                                                          | mg/kg    | TM5/TM36/PM8/PM12/PM16 |
| Total aliphatics and aromatics(C5-35) | <38        | <38        | <38        | <38        |  |  |  |  |  |  | <38                                                          | mg/kg    | TM5/TM36/PM8/PM12/PM16 |
| MTBE #                                | <5         | <5         | <5         | <5         |  |  |  |  |  |  | <5                                                           | ug/kg    | TM31/PM12              |
| Benzene #                             | <5         | <5         | <5         | <5         |  |  |  |  |  |  | <5                                                           | ug/kg    | TM31/PM12              |
| Toluene #                             | <5         | <5         | <5         | <5         |  |  |  |  |  |  | <5                                                           | ug/kg    | TM31/PM12              |
| Ethylbenzene #                        | <5         | <5         | <5         | <5         |  |  |  |  |  |  | <5                                                           | ug/kg    | TM31/PM12              |
| m/p-Xylene #                          | <5         | <5         | <5         | <5         |  |  |  |  |  |  | <5                                                           | ug/kg    | TM31/PM12              |
| o-Xylene #                            | <5         | <5         | <5         | <5         |  |  |  |  |  |  | <5                                                           | ug/kg    | TM31/PM12              |
| Total Phenols HPLC                    | <0.15      | <0.15      | <0.15      | 0.16       |  |  |  |  |  |  | <0.15                                                        | mg/kg    | TM26/PM21              |
| Natural Moisture Content              | 29.4       | 29.7       | 26.9       | 26.6       |  |  |  |  |  |  | <0.1                                                         | %        | PM4/PM0                |
| Hexavalent Chromium #                 | <0.3       | <0.3       | <0.3       | <0.3       |  |  |  |  |  |  | <0.3                                                         | mg/kg    | TM38/PM20              |
| Sulphate as SO4 (2:1 Ext) #           | 0.0225     | 0.0354     | 0.3869     | 0.0224     |  |  |  |  |  |  | <0.0015                                                      | g/l      | TM38/PM20              |
| Total Organic Carbon #                | 2.23       | 2.98       | 4.53       | 2.93       |  |  |  |  |  |  | <0.02                                                        | %        | TM21/PM24              |
| pH #                                  | 6.80       | 7.00       | 7.43       | 6.62       |  |  |  |  |  |  | <0.01                                                        | pH units | TM73/PM11              |

**Client Name:** Tier Environmental  
**Reference:** TE1085  
**Location:** New Foundry Building, Wrexham  
**Contact:** Stephanie Dodd

**Note:**

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

  
Ryan Butterworth  
Asbestos Team Leader

[illegible]

**Client Name:** Tier Environmental  
**Reference:** TE1085  
**Location:** New Foundry Building, Wrexham  
**Contact:** Stephanie Dodd

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/2762

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Please include all sections of this report if it is reproduced

**ABBREVIATIONS and ACRONYMS USED**

|         |                                                                                                            |
|---------|------------------------------------------------------------------------------------------------------------|
| #       | ISO17025 (UKAS Ref No. 4225) accredited - UK.                                                              |
| SA      | ISO17025 (SANAS Ref No.T0729) accredited - South Africa.                                                   |
| B       | Indicates analyte found in associated method blank.                                                        |
| DR      | Dilution required.                                                                                         |
| M       | MCERTS accredited.                                                                                         |
| NA      | Not applicable                                                                                             |
| NAD     | No Asbestos Detected.                                                                                      |
| ND      | None Detected (usually refers to VOC and/SVOC TICs).                                                       |
| NDP     | No Determination Possible                                                                                  |
| SS      | Calibrated against a single substance                                                                      |
| SV      | Surrogate recovery outside performance criteria. This may be due to a matrix effect.                       |
| W       | Results expressed on as received basis.                                                                    |
| +       | AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page. |
| ++      | Result outside calibration range, results should be considered as indicative only and are not accredited.  |
| *       | Analysis subcontracted to an Exova Jones Environmental approved laboratory.                                |
| AD      | Samples are dried at 35°C ±5°C                                                                             |
| CO      | Suspected carry over                                                                                       |
| LOD/LOR | Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS                                  |
| ME      | Matrix Effect                                                                                              |
| NFD     | No Fibres Detected                                                                                         |
| BS      | AQC Sample                                                                                                 |
| LB      | Blank Sample                                                                                               |
| N       | Client Sample                                                                                              |
| TB      | Trip Blank Sample                                                                                          |
| OC      | Outside Calibration Range                                                                                  |

JE Job No: 19/2762

| Test Method No. | Description                                                                                                                                                                                                                                                                                                                             | Prep Method No. (if appropriate) | Description                                                                                                                                                                                       | ISO 17025 (UKAS/ANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|-------------------------------------------------|------------------------------|
| PM4             | Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.                                                                                                                                                                                          | PM0                              | No preparation is required.                                                                                                                                                                       |                       |                        | AR                                              |                              |
| TM4             | Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.                                                                                                                                                                                                                                            | PM8                              | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.                                                                             |                       |                        | AR                                              | Yes                          |
| TM4             | Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.                                                                                                                                                                                                                                            | PM8                              | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.                                                                             | Yes                   |                        | AR                                              | Yes                          |
| TM5             | Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.                                                                                                                                                                               | PM8/PM16                         | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE. | Yes                   |                        | AR                                              | Yes                          |
| TM5/TM36        | please refer to TM5 and TM36 for method details                                                                                                                                                                                                                                                                                         | PM8/PM12/PM16                    | please refer to PM8/PM16 and PM12 for method details                                                                                                                                              |                       |                        | AR                                              | Yes                          |
| TM5/TM36        | please refer to TM5 and TM36 for method details                                                                                                                                                                                                                                                                                         | PM8/PM12/PM16                    | please refer to PM8/PM16 and PM12 for method details                                                                                                                                              | Yes                   |                        | AR                                              | Yes                          |
| TM21            | Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO <sub>2</sub> generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4. | PM24                             | Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.                                              | Yes                   |                        | AD                                              | Yes                          |
| TM26            | Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.                                                                                                                                                                                                                      | PM21                             | As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.                                                                             |                       |                        | AR                                              | Yes                          |
| TM30            | Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009                                                                                                                                                             | PM15                             | Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.                                                     | Yes                   |                        | AD                                              | Yes                          |
| TM31            | Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.                                                                                                                                                                                                              | PM12                             | Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.                                                                                                   | Yes                   |                        | AR                                              | Yes                          |

JE Job No: 19/2762

| Test Method No. | Description                                                                                                                                                                                                                                                                               | Prep Method No. (if appropriate) | Description                                                                                                                                                                                                                                                                                                           | ISO 17025 (UKAS/ANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|-------------------------------------------------|------------------------------|
| TM36            | Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS. | PM12                             | Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.                                                                                                                                                                                                                       |                       |                        | AR                                              | Yes                          |
| TM36            | Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS. | PM12                             | Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.                                                                                                                                                                                                                       | Yes                   |                        | AR                                              | Yes                          |
| TM38            | Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)                                                                    | PM20                             | Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker. | Yes                   |                        | AD                                              | Yes                          |
| TM38            | Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)                                                                    | PM20                             | Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker. | Yes                   |                        | AR                                              | Yes                          |
| TM50            | Acid soluble sulphate (Total Sulphate) analysed by ICP-OES                                                                                                                                                                                                                                | PM29                             | Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.                                                                                                                                                                                                         | Yes                   |                        | AD                                              | Yes                          |
| TM65            | Asbestos Bulk Identification method based on HSG 248.                                                                                                                                                                                                                                     | PM42                             | Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.                                                                                                                                                                                                  | Yes                   |                        | AR                                              |                              |
| TM73            | Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.                                                                                                                                                                         | PM11                             | Extraction of as received solid samples using one part solid to 2.5 parts deionised water.                                                                                                                                                                                                                            | Yes                   |                        | AR                                              | No                           |
|                 |                                                                                                                                                                                                                                                                                           |                                  |                                                                                                                                                                                                                                                                                                                       |                       |                        |                                                 |                              |
|                 |                                                                                                                                                                                                                                                                                           |                                  |                                                                                                                                                                                                                                                                                                                       |                       |                        |                                                 |                              |
|                 |                                                                                                                                                                                                                                                                                           |                                  |                                                                                                                                                                                                                                                                                                                       |                       |                        |                                                 |                              |

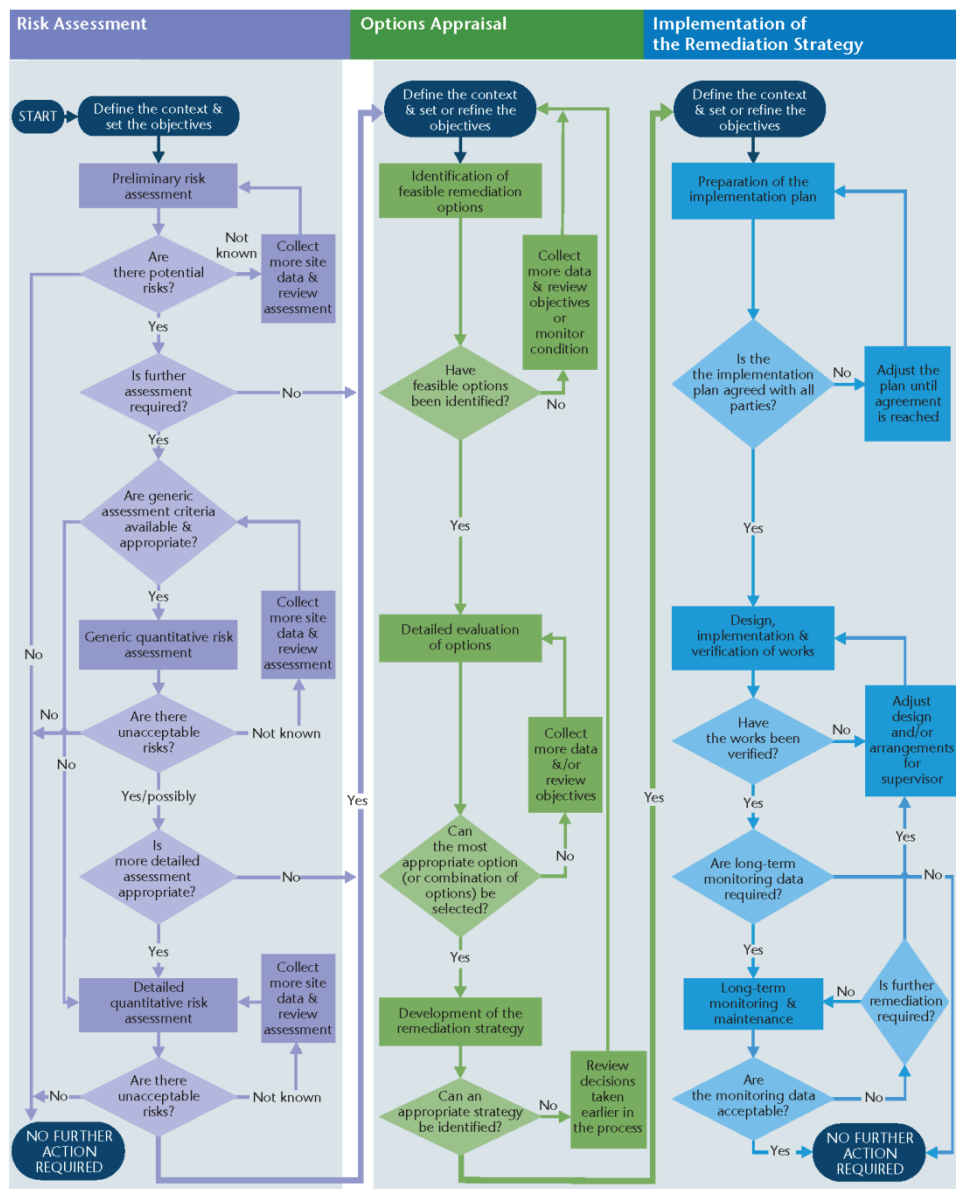


## Enclosure 5 - Human Health Risk Assessment Criteria

## Context

Contaminated Land is defined under law through Part IIA of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995 and associated guidance (“Part IIA”). These specify that a “suitable for use” approach is to be applied in the assessment of potentially contaminated land, implemented through a phased programme of site investigation and risk assessment appropriate to the site under consideration.

The assessment of potential risks posed by contaminated land is based upon the assessment of plausible contaminant source - pathway - receptor linkages (“pollutant linkages”) for the current and/or proposed future use of the site. The process for the assessment of contaminated land adopted in this report is in line with guidance issued by DEFRA and Environment Agency (EA) 2004: “Model Procedures for the Management of Contaminated Land (CLR11)”. The overall process for the management of land contamination is shown Figure 1 of CLR11 and reproduced below:



*Note: The process may apply to one or more pollutant linkages each of which may follow a different route. For some linkages, it may be possible to stop at an early stage – others will progress all the way through the process. The level of complexity of each stage may also vary and in some cases may be very simple.*

The risk assessment and subsequent investigation, remediation and verification must address all potential sources of pollutants that may be present on the site (the “hazards”), all receptors that may be harmed by these (e.g. human health, controlled waters, ecological receptors) and the pathways by which the contamination may be transported from the

contaminant source(s) to the receptor(s). This is defined within the conceptual model for the site, which represents the characteristics of the site in a form that shows the possible pollutant linkages. As further information becomes available (for example, through site investigation), so the conceptual model will be refined.

Remedial action can be specified at any phase within this assessment process to break the identified pollutant linkage. In determining whether or not to undertake further assessment or to undertake remediation, the potential cost-savings arising from a more thorough assessment of the pollutant linkages and more tightly defined remedial strategy must be considered against the direct costs involved in the work and the time that this will take to execute and gain regulatory approval.

A different approach to the statistical appraisal of data is required depending on whether the assessment is being undertaken to assess land as Contaminated Land in accordance with the regulations or whether the assessment is to assess whether the site is suitable for new development in accordance with the Planning regime. The statistical approach to assessment is discussed further in CL:AIRE:2009 "Guidance on Comparing Data with a Critical Concentration".

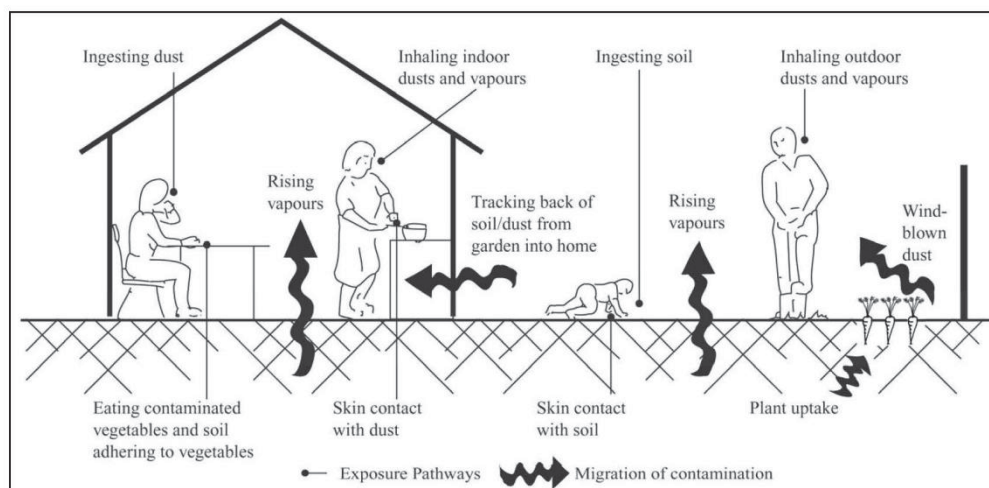
Some form of Detailed Quantitative Risk Assessment (DQRA) will be essential for those cases where appropriate GAC values cannot be established for the contaminant linkages under consideration.

## Generic Assessment Criteria for Human Health Risk Assessment

In March 2002, the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) published the Contaminated Land Exposure Assessment (CLEA) Model and a series of related reports and guidance. These were designed to provide a scientifically based framework for the assessment of chronic risks to human health from contaminated land. The initial documents (CLR7 – 10) were withdrawn and replaced with revised guidance issued by the Environment Agency including:

- “Using Soil Guideline Values”; SC050021/SGV Introductions, EA, 2009;
- “Human Health toxicology assessment of contaminants in soil”; SC050021/SR2, EA, 2009;
- “Update technical background to the CLEA model”; SC050021/SR3, EA, 2009;
- CLEA Software (Version) Handbook; SC050021/SR4; EA, 2008;
- Compilation of Data for priority Organic Contaminants for Derivation of Soil Guideline Values; Science Report SC050021/SR7, 2008; and,
- Guidance on Comparing Data with a Critical Concentration; CL:AIRE, 2009.

The CLEA model and associated guidance was developed to calculate an estimated tolerable daily intake (TDI) of contaminants for site users given a set of ‘typical’ human health exposure pathways which are detailed in “SR3: Updated technical background to the CLEA model” (Science Report SC050021/SR3, EA, 2009) and reproduced below.



- **Ingestion**
  - Outdoor soil;
  - Indoor dust;
  - Home grown produce;
  - Soil attached to home grown produce.
- **Dermal Contact**
  - Outdoor soil;
  - Indoor dust.
- **Inhalation**
  - Outdoor dust;
  - Indoor dust;
  - Outdoor vapour;
  - Indoor vapour.

It should be noted that the CLEA model does not include an exhaustive list of potential exposure pathways, e.g. certain compounds can pass through plastic water pipes into drinking water supply.

The potential significance of each of the exposure pathways is dependant upon the type of land use and the nature of the contaminant being considered. The CLEA model considers principal 'default' land use scenarios and makes a series of assumptions with regards to building type (where applicable), identification of the critical human receptor group, exposure frequency and duration. The definitions of the principal land use types given in SR3 (EA, 2009) are:

- **Residential land use;**

A typical residential property consisting of a two story terraced house built on a ground-bearing slab of 0.15m thickness with a private garden consisting of lawn, flowerbeds, and a small fruit and vegetable patch. The occupants are assumed to be parents with young children, who make regular use of the garden. The critical receptor is a 0 – 6 year old female.

Active exposure pathway are: ingestion of outdoor soil, ingestion of indoor dust, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and indoor dust and vapour.

- **Allotments**

A plot of open space commonly made available by the Local Authority to tenants to grow fruit and vegetables for their own consumption. There are usually several plots to a site and the overall site area may cover more than one hectare. The tenants are assumed to be the parents or grandparents and that young children make occasional accompanied visits to the plots. The critical receptor is a 0 – 6 year old female and there is no building present on Site.

Active exposure pathways are ingestion of outdoor soil, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil; inhalation of outdoor vapour.

- **Commercial and industrial land use.**

A typical commercial or light industrial property consisting of a three-story office building (pre-1970) with a ground bearing floor slab at which employees spend most time indoors and are involved in office based or related light physical work. The critical receptor is a working female adult aged 16 – 65 years.

Active exposure pathway are ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and inhalation of indoor dust and vapour.

## **Soil Guideline Values**

Based on the assumption of each land use type, the EA and DEFRA developed and published Soil Guideline Value (SGV) using the CLEA model for a number of principal contaminants and 'default' end-use scenarios of residential, allotments and commercial/industrial use. The primary purpose of the SGVs are as trigger value for the tolerable daily intake (TDI), below which it can be assumed that the soil does not pose an unacceptable risk to the identified receptor. Where soils contamination is present above this level further assessment may be required. SGVs were developed for the following contaminants:

- Heavy metals and other inorganic compounds: arsenic, cadmium, chromium, cyanide, lead (now withdrawn), mercury, nickel and selenium;
- Benzene, ethylbenzene, toluene and xylenes;
- Phenol;
- Dioxins and dioxin-like polychlorinated biphenyls (PCBs)
- Polycyclic aromatic hydrocarbons (PAHs) – 11 substances

## LQM/CIEH Generic Assessment Criteria of Human Health Risk Assessment

In addition, in 2009 CIEH through LQM and EIC published generic assessment criteria (GACs) for 82 substances including metals, petroleum hydrocarbons, PAHs and explosive substances for a variety of soil types and the three 'default' land uses – (residential, allotments and commercial end-uses) as described in SR3 (EA, 2009). These have been superseded as described below.

### Category 4 Screening Values

In 2013 "SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination" (CL:AIRE 2013) was issued which detailed findings of a research project undertaken by CL:AIRE to set out the framework by which potential Category 4 Screening Levels (pC4SL) may be derived. This was supplemented in 2014 by "SP1010: Development of Category 4 Screening Levels for the Assessment of Land Affected by Contamination – Policy Companion Document" (DEFRA, 2014). SP1010 proposed several updated toxicology information relating to contaminant behaviour updated assumptions relating to the modelling of human exposure to soil contaminants, derivation of separate C4SLs for residential with the consumption of home grown produce, residential without the consumption of home grown produce, and two new land uses: public open spaces near residential housing (POS resi) and public parks (POS park).

- **Public Open Space: Residential**

For public open space in close proximity to residential housing and the central green area around which houses are located, as on many housing estates from the 1930s to 1970s. It is also applicable for smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soil with planting. It is considered to be a generally grassed area up to 0.5ha with up to 50% bare soil. The land use is an important resource for children and the area is near the homes. The critical receptor is a female child age >3 - <9 years old (CLEA age class 4 – 9) as younger children are unlikely to play outdoors unsupervised.

Active exposure pathways are: ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor soil derived dust; inhalation of outdoor and indoor dust and inhalation of outdoor vapour.

- **Public Open Space: Park**

A public park is defined as an area of open space provided for recreational use and usually owned and maintained by the Local Authority. It is anticipated the park could be used for a wide range of activities, including the following:

- Family visits and picnics;
- Children's play area;
- Sporting activities such as football on an informal basis (i.e no a dedicated sports pitch); and
- Dog walking.

The park is modelled as an area >0.5 ha of predominantly grasses open space with no more than 25% of exposed soil.

The critical receptor is a female child with CLEA age classes 1 – 6.

Active exposure pathway are: ingestion of outdoor soil; direct dermal contact with outdoor soil; inhalation of outdoor dust and inhalation of outdoor vapour.

Furthermore the C4SLs are based on a different toxicological benchmark, the 'low level of toxicological concern' (LLTC). This difference in approach was adopted because the C4SLs were primarily intended for use under Part2A of the EPA 1990 to quickly screen out Category 4 sites where there is "*no risk or that the level of risk posed is low*". SGVs and LQM GACs are

based on the more conservative 'minimal or tolerable level of risk' as defined in SR2 (EA, 2009) and were derived for assessment of contamination for the Planning process.

## **Lead**

The SGV for lead was withdrawn in 2011 and is not used in this report. The C4SL for lead provides a technically robust and conservative assessment tool using significantly updated toxicological modelling than the withdrawn SGV and derived in line with current science of lead toxicology.

## **LQM/CIEH Suitable 4 Use Levels (S4ULs)**

The publication of the C4SLs resulted in considerable and inconclusive debate about the applicability of the lower level of protection of the C4SL, which are underlain by the LLTC, outside of the Part 2A context for which they were derived. In 2014 LQM/CIEH presented a Suitable 4 Use Levels (S4ULs), which incorporate the updated assumption exposure derived for the production of the C4SLs but within the context of deriving screening criteria above which further assessment of the risks or remedial action may be needed. The S4ULs replace the 82 substances, species and fractions and congeners contained in the previous LQM/CIEH GACs issued in 2009. Additionally, following changes and new land uses proposed in the C4SL research project, S4ULs have also been derived for the majority of substances for which the EA derived SGVs in 2009.

The GAC values adopted in this report are summarised in Table 1, below.

[illegible]

| Parameter              | Residential with homegrown produce (mg/kg, unless otherwise stated) |       |       | Residential <u>without</u> homegrown produce (mg/kg, unless otherwise stated) |             |            | Allotment (mg/kg, unless otherwise stated) |       |      | Commercial / Industrial (mg/kg, unless otherwise stated) |             |        | Public Open Space near Residential (mg/kg, unless otherwise stated) |       |       | Public Open Space - Park (mg/kg, unless otherwise stated) |        |        | Source     |
|------------------------|---------------------------------------------------------------------|-------|-------|-------------------------------------------------------------------------------|-------------|------------|--------------------------------------------|-------|------|----------------------------------------------------------|-------------|--------|---------------------------------------------------------------------|-------|-------|-----------------------------------------------------------|--------|--------|------------|
|                        | 1%                                                                  | 2.50% | 6%    | 1%                                                                            | 2.50%       | 6%         | 1%                                         | 2.50% | 6%   | 1%                                                       | 2.50%       | 6%     | 1%                                                                  | 2.50% | 6%    | 1%                                                        | 2.50%  | 6%     |            |
| SOM                    |                                                                     |       |       |                                                                               |             |            |                                            |       |      |                                                          |             |        |                                                                     |       |       |                                                           |        |        |            |
| PAHs                   |                                                                     |       |       |                                                                               |             |            |                                            |       |      |                                                          |             |        |                                                                     |       |       |                                                           |        |        |            |
| Acenaphthene           | 210                                                                 | 510   | 1100  | 3000 (57)                                                                     | 4700(141)   | 6000 (336) | 34                                         | 85    | 200  | 84000 (57)                                               | 97000 (141) | 100000 | 15000                                                               | 15000 | 15000 | 29000                                                     | 30000  | 30000  | LQM (2014) |
| Acenaphthylene         | 170                                                                 | 420   | 920   | 2900 (86.1)                                                                   | 4600 (212)  | 6000 (506) | 28                                         | 69    | 160  | 8300 (86.1)                                              | 97000 (212) | 100000 | 15000                                                               | 15000 | 15000 | 29000                                                     | 30000  | 30000  | LQM (2014) |
| Anthracene             | 2400                                                                | 5400  | 11000 | 31000 (1.17)                                                                  | 35000       | 37000      | 380                                        | 950   | 2200 | 520000                                                   | 540000      | 540000 | 74000                                                               | 74000 | 74000 | 150000                                                    | 150000 | 150000 | LQM (2014) |
| Benzo(a)anthracene     | 7.2                                                                 | 11    | 13    | 11                                                                            | 14          | 15         | 2.9                                        | 6.5   | 13   | 170                                                      | 170         | 180    | 29                                                                  | 29    | 29    | 49                                                        | 56     | 62     | LQM (2014) |
| Benzo(a)pyrene         | 2.2                                                                 | 2.7   | 3     | 3.2                                                                           | 3.2         | 3.2        | 0.97                                       | 2     | 3.5  | 35                                                       | 35          | 36     | 5.7                                                                 | 5.7   | 5.7   | 11                                                        | 12     | 13     | LQM (2014) |
| Benzo(b)fluoranthene   | 2.6                                                                 | 3.3   | 3.7   | 3.9                                                                           | 4           | 4          | 0.99                                       | 2.1   | 3.9  | 44                                                       | 44          | 45     | 7.1                                                                 | 7.1   | 7.1   | 13                                                        | 15     | 16     | LQM (2014) |
| Benzo(g,h,i)perylene   | 320                                                                 | 340   | 350   | 360                                                                           | 360         | 360        | 290                                        | 470   | 640  | 3900                                                     | 4000        | 4000   | 640                                                                 | 640   | 640   | 1400                                                      | 1500   | 1600   | LQM (2014) |
| Benzo(k)fluoranthene   | 77                                                                  | 93    | 100   | 110                                                                           | 110         | 110        | 37                                         | 75    | 130  | 1200                                                     | 1200        | 1200   | 190                                                                 | 190   | 190   | 370                                                       | 410    | 440    | LQM (2014) |
| Chrysene               | 15                                                                  | 22    | 27    | 30                                                                            | 31          | 32         | 4.1                                        | 9.4   | 19   | 350                                                      | 350         | 350    | 57                                                                  | 57    | 57    | 93                                                        | 110    | 120    | LQM (2014) |
| Dibenz(a,h)anthracene  | 0.24                                                                | 0.28  | 0.3   | 0.31                                                                          | 0.32        | 0.32       | 0.14                                       | 0.27  | 0.61 | 3.5                                                      | 3.6         | 3.6    | 0.57                                                                | 0.57  | 0.58  | 1.1                                                       | 1.3    | 1.4    | LQM (2014) |
| Fluoranthene           | 280                                                                 | 560   | 890   | 1500                                                                          | 1600        | 1600       | 52                                         | 130   | 290  | 23000                                                    | 23000       | 23000  | 3100                                                                | 3100  | 3100  | 63                                                        | 6300   | 6400   | LQM (2014) |
| Fluorene               | 170                                                                 | 400   | 860   | 2800 (30.9)                                                                   | 3800 (76.5) | 4500 (183) | 27                                         | 67    | 160  | 63000 (30.9)                                             | 68000       | 71000  | 9900                                                                | 9900  | 9900  | 20000                                                     | 20000  | 20000  | LQM (2014) |
| Indeno(1,2,3-cd)pyrene | 27                                                                  | 36    | 41    | 45                                                                            | 46          | 46         | 9.5                                        | 21    | 39   | 500                                                      | 510         | 510    | 82                                                                  | 82    | 82    | 150                                                       | 170    | 180    | LQM (2014) |

| Parameter                          | Residential with homegrown produce (mg/kg, unless otherwise stated) |       |      | Residential without homegrown produce (mg/kg, unless otherwise stated) |       |      | Allotment (mg/kg, unless otherwise stated) |       |       | Commercial / Industrial (mg/kg, unless otherwise stated) |                   |                   | Public Open Space near Residential (mg/kg, unless otherwise stated) |        |        | Public Open Space - Park (mg/kg, unless otherwise stated) |                  |                   | Source     |
|------------------------------------|---------------------------------------------------------------------|-------|------|------------------------------------------------------------------------|-------|------|--------------------------------------------|-------|-------|----------------------------------------------------------|-------------------|-------------------|---------------------------------------------------------------------|--------|--------|-----------------------------------------------------------|------------------|-------------------|------------|
|                                    | 1%                                                                  | 2.50% | 6%   | 1%                                                                     | 2.50% | 6%   | 1%                                         | 2.50% | 6%    | 1%                                                       | 2.50%             | 6%                | 1%                                                                  | 2.50%  | 6%     | 1%                                                        | 2.50%            | 6%                |            |
| Naphthalene                        | 2.3                                                                 | 5.6   | 13   | 2.3                                                                    | 5.6   | 13   | 4.1                                        | 10    | 24    | 190 (76.4)                                               | 460 (183)         | 1100 (432)        | 4900                                                                | 4900   | 4900   | 1200 (76.4)                                               | 1900 (183)       | 3000              | LQM (2014) |
| Phenanthrene                       | 95                                                                  | 220   | 440  | 1300 (36)                                                              | 1500  | 1500 | 15                                         | 38    | 90    | 22000                                                    | 22000             | 23000             | 3100                                                                | 3100   | 3100   | 6200                                                      | 6200             | 6300              | LQM (2014) |
| Pyrene                             | 620                                                                 | 1200  | 2000 | 3700                                                                   | 3800  | 3800 | 110                                        | 270   | 620   | 54000                                                    | 54000             | 54000             | 7400                                                                | 7400   | 7400   | 15000                                                     | 15000            | 15000             | LQM (2014) |
| Coal Tar (BaP as surrogate marker) | 0.79                                                                | 0.98  | 1.1  | 1.2                                                                    | 1.2   | 1.2  | 0.32                                       | 0.67  | 1.2   | 15                                                       | 15                | 15                | 2.2                                                                 | 2.2    | 2.2    | 4.4                                                       | 4.7              | 4.8               | LQM (2014) |
| BTEX and TPH                       |                                                                     |       |      |                                                                        |       |      |                                            |       |       |                                                          |                   |                   |                                                                     |        |        |                                                           |                  |                   |            |
| Benzene                            | 0.087                                                               | 0.17  | 0.37 | 0.38                                                                   | 0.7   | 1.4  | 0.017                                      | 0.034 | 0.075 | 27                                                       | 47                | 90                | 72                                                                  | 72     | 73     | 90                                                        | 100              | 110               | LQM (2014) |
| Toluene                            | 130                                                                 | 290   | 660  | 880 vap (869)                                                          | 1900  | 3900 | 22                                         | 51    | 120   | 56000 vap (869)                                          | 110000 vap (1920) | 180000 vap (4360) | 56000                                                               | 56000  | 56000  | 87000 vap (869)                                           | 95000 vap (1920) | 100000 vap (4360) | LQM (2014) |
| Ethylbenzene                       | 47                                                                  | 110   | 260  | 83                                                                     | 190   | 440  | 16                                         | 39    | 91    | 5700 vap (518)                                           | 13000 vap (1220)  | 27000 vap (2840)  | 24000                                                               | 24000  | 25000  | 17000 vap (518)                                           | 22000 vap (1220) | 27000 vap (2840)  | LQM (2014) |
| Xylene - o                         | 60                                                                  | 140   | 330  | 88                                                                     | 210   | 480  | 28                                         | 67    | 160   | 6600 (478)                                               | 15000 (1120)      | 33000 (2620)      | 41000                                                               | 42000  | 43000  | 17000 (478)                                               | 24000 (1120)     | 33000 (2620)      | LQM (2014) |
| Xylene - m                         | 59                                                                  | 140   | 320  | 82                                                                     | 190   | 450  | 31                                         | 74    | 170   | 6200 (625)                                               | 14000 (1470)      | 31000 (3460)      | 41000                                                               | 42000  | 43000  | 17000 (625)                                               | 24000 (1470)     | 32000 (3460)      | LQM (2014) |
| Xylene - p                         | 56                                                                  | 130   | 310  | 79                                                                     | 180   | 430  | 29                                         | 69    | 160   | 5900 (576)                                               | 14000 (1350)      | 30000 (3170)      | 41000                                                               | 42000  | 43000  | 17000 (576)                                               | 23000 (1350)     | 31000 (3170)      | LQM (2014) |
| Aliphatic EC 5-6                   | 42                                                                  | 78    | 160  | 42                                                                     | 78    | 160  | 730                                        | 1700  | 3900  | 3200 (304)                                               | 5900 (558)        | 12000 (1150)      | 570000 (304)                                                        | 590000 | 600000 | 95000 (304)                                               | 130000 (558)     | 180000 (1150)     | LQM (2014) |
| Aliphatic EC >6-8                  | 100                                                                 | 230   | 530  | 100                                                                    | 230   | 530  | 2300                                       | 5600  | 13000 | 7800 (144)                                               | 17000 (322)       | 40000 (736)       | 600000                                                              | 610000 | 620000 | 150000 (144)                                              | 220000 (322)     | 320000 (736)      | LQM (2014) |

| Parameter           | Residential with homegrown produce (mg/kg, unless otherwise stated) |            |            | Residential <u>without</u> homegrown produce (mg/kg, unless otherwise stated) |            |            | Allotment (mg/kg, unless otherwise stated) |        |        | Commercial / Industrial (mg/kg, unless otherwise stated) |               |               | Public Open Space near Residential (mg/kg, unless otherwise stated) |        |               | Public Open Space - Park (mg/kg, unless otherwise stated) |              |               | Source     |
|---------------------|---------------------------------------------------------------------|------------|------------|-------------------------------------------------------------------------------|------------|------------|--------------------------------------------|--------|--------|----------------------------------------------------------|---------------|---------------|---------------------------------------------------------------------|--------|---------------|-----------------------------------------------------------|--------------|---------------|------------|
|                     | 1%                                                                  | 2.50%      | 6%         | 1%                                                                            | 2.50%      | 6%         | 1%                                         | 2.50%  | 6%     | 1%                                                       | 2.50%         | 6%            | 1%                                                                  | 2.50%  | 6%            | 1%                                                        | 2.50%        | 6%            |            |
| SOM                 | 27                                                                  | 65         | 150        | 27                                                                            | 65         | 150        | 320                                        | 770    | 1700   | 2000 (78)                                                | 4800 (190)    | 11000 (451)   | 13000                                                               | 13000  | 13000         | 14000 (78)                                                | 18000 (190)  | 21000 (451)   | LQM (2014) |
| Aliphatic EC >8-10  |                                                                     |            |            |                                                                               |            |            |                                            |        |        |                                                          |               |               |                                                                     |        |               |                                                           |              |               |            |
| Aliphatic EC >10-12 | 130 (48)                                                            | 330 (118)  | 760 (283)  | 130 (48)                                                                      | 330 (118)  | 760 (283)  | 2200                                       | 4400   | 7300   | 9700 (48)                                                | 23000 (118)   | 47000 (283)   | 13000                                                               | 13000  | 24000(283)    | 21000 (48)                                                | 23000 (118)  | 24000(283)    | LQM (2014) |
| Aliphatic EC >12-16 | 1100 (24)                                                           | 2400 (59)  | 4300 (142) | 1100 (24)                                                                     | 2400 (59)  | 4300 (142) | 11000                                      | 13000  | 13000  | 59000 (24)                                               | 82000 (59)    | 90000 (142)   | 13000                                                               | 13000  | 25000 (142)   | 25000 (24)                                                | 25000 (59)   | 26000 (142)   | LQM (2014) |
| Aliphatic EC >16-35 | 65000 (8.48)                                                        | 92000 (21) | 110000     | 65000 (8.48)                                                                  | 92000 (21) | 110000     | 260000                                     | 270000 | 270000 | 1600000                                                  | 1700000       | 1800000       | 250000                                                              | 250000 | 480000        | 450000                                                    | 480000       | 490000        | LQM (2014) |
| Aliphatic EC >35-44 | 65000 (8.48)                                                        | 92000 (21) | 110000     | 65000 (8.48)                                                                  | 92000 (21) | 110000     | 260000                                     | 270000 | 270000 | 1600000                                                  | 1700000       | 1800000       | 250000                                                              | 250000 | 480000        | 450000                                                    | 480000       | 490000        | LQM (2014) |
| Aromatic EC 5-7     | 70                                                                  | 140        | 300        | 370                                                                           | 690        | 1400       | 13                                         | 27     | 57     | 26000 (1220)                                             | 46000 (2260)  | 86000 (4710)  | 56000                                                               | 56000  | 92000 (4710)  | 76000 (1220)                                              | 84000 (2260) | 92000 (4710)  | LQM (2014) |
| Aromatic EC >7-8    | 130                                                                 | 290        | 660        | 860                                                                           | 1800       | 3900       | 22                                         | 51     | 120    | 56000 (869)                                              | 110000 (1920) | 180000 (4360) | 56000                                                               | 56000  | 100000 (4360) | 87000 (869)                                               | 95000 (1920) | 100000 (4360) | LQM (2014) |
| Aromatic EC >8-10   | 34                                                                  | 83         | 190        | 47                                                                            | 110        | 270        | 8.6                                        | 21     | 51     | 3500 (613)                                               | 8100 (1500)   | 17000 (3580)  | 5000                                                                | 5000   | 8500 (1500)   | 7200 (613)                                                | 8500 (1500)  | 9300 (3580)   | LQM (2014) |
| Aromatic EC >10-12  | 74                                                                  | 180        | 380        | 250                                                                           | 590        | 1200       | 13                                         | 31     | 74     | 16000 (364)                                              | 28000 (899)   | 34000 (2150)  | 5000                                                                | 5000   | 9700 (899)    | 9200 (364)                                                | 9700 (899)   | 10000         | LQM (2014) |
| Aromatic EC >12-16  | 140                                                                 | 330        | 660        | 1800                                                                          | 2300 (419) | 2500       | 23                                         | 27     | 130    | 36000 (169)                                              | 37000         | 38000         | 5100                                                                | 5100   | 10000         | 10000                                                     | 10000        | 10000         | LQM (2014) |
| Aromatic EC >16-21  | 260                                                                 | 540        | 930        | 1900                                                                          | 1900       | 1900       | 46                                         | 110    | 260    | 28000                                                    | 28000         | 28000         | 3800                                                                | 3800   | 7700          | 7600                                                      | 7700         | 7800          | LQM (2014) |
| Aromatic EC >21-35  | 1100                                                                | 1500       | 1700       | 1900                                                                          | 1900       | 1900       | 370                                        | 820    | 1600   | 28000                                                    | 28000         | 28000         | 3800                                                                | 3800   | 7800          | 7800                                                      | 7800         | 7900          | LQM (2014) |

| Parameter                                 | Residential with homegrown produce (mg/kg, unless otherwise stated) |         |        | Residential without homegrown produce (mg/kg, unless otherwise stated) |       |        | Allotment (mg/kg, unless otherwise stated) |        |        | Commercial / Industrial (mg/kg, unless otherwise stated) |       |       | Public Open Space near Residential (mg/kg, unless otherwise stated) |        |        | Public Open Space - Park (mg/kg, unless otherwise stated) |              |               | Source     |
|-------------------------------------------|---------------------------------------------------------------------|---------|--------|------------------------------------------------------------------------|-------|--------|--------------------------------------------|--------|--------|----------------------------------------------------------|-------|-------|---------------------------------------------------------------------|--------|--------|-----------------------------------------------------------|--------------|---------------|------------|
|                                           | 1%                                                                  | 2.50%   | 6%     | 1%                                                                     | 2.50% | 6%     | 1%                                         | 2.50%  | 6%     | 1%                                                       | 2.50% | 6%    | 1%                                                                  | 2.50%  | 6%     | 1%                                                        | 2.50%        | 6%            |            |
| SOM                                       |                                                                     |         |        |                                                                        |       |        |                                            |        |        |                                                          |       |       |                                                                     |        |        |                                                           |              |               |            |
| Aromatic EC >35-44                        | 1100                                                                | 1500    | 1700   | 1900                                                                   | 1900  | 1900   | 370                                        | 820    | 1600   | 28000                                                    | 28000 | 28000 | 3800                                                                | 3800   | 3800   | 7800                                                      | 7800         | 7900          | LQM (2014) |
| Aromatic EC >44-75                        | 1600                                                                | 1800    | 1900   | 1900                                                                   | 1900  | 1900   | 1200                                       | 2100   | 3000   | 28000                                                    | 28000 | 28000 | 3800                                                                | 3800   | 3800   | 7800                                                      | 7800         | 7900          | LQM (2014) |
| VOCs                                      |                                                                     |         |        |                                                                        |       |        |                                            |        |        |                                                          |       |       |                                                                     |        |        |                                                           |              |               |            |
| 1,2-dichloroethane (1,2-DCA)              | 0.0071                                                              | 0.011   | 0.019  | 0.0092                                                                 | 0.013 | 0.023  | 0.0046                                     | 0.0083 | 0.016  | 0.67                                                     | 0.97  | 1.7   | 29                                                                  | 29     | 29     | 21                                                        | 24           | 28            | LQM (2014) |
| 1,1,1-trichloroethane                     | 8.8                                                                 | 18      | 39     | 9                                                                      | 18    | 40     | 48                                         | 110    | 240    | 660                                                      | 1300  | 3000  | 140000                                                              | 140000 | 140000 | 57000 (1425)                                              | 76000 (2915) | 100000 (6392) | LQM (2014) |
| 1,1,2,2-tetrachloroethane                 | 1.6                                                                 | 3.4     | 7.5    | 3.9                                                                    | 8     | 17     | 0.41                                       | 0.89   | 2      | 270                                                      | 550   | 1100  | 1400                                                                | 1400   | 1400   | 1800                                                      | 2100         | 2300          | LQM (2014) |
| tetrachloroethene                         | 0.18                                                                | 0.39    | 0.9    | 0.18                                                                   | 0.4   | 0.92   | 0.65                                       | 1.5    | 3.6    | 19                                                       | 45    | 95    | 1400                                                                | 1400   | 1400   | 810 (424)                                                 | 1100 (951)   | 1500          | LQM (2014) |
| tetrachloromethane (Carbon tetrachloride) | 0.026                                                               | 0.056   | 0.13   | 0.026                                                                  | 0.056 | 0.13   | 0.45                                       | 1      | 2.4    | 2.9                                                      | 6.3   | 14    |                                                                     |        |        | 190                                                       | 270          | 400           | LQM (2014) |
| Trichloroethene                           | 0.016                                                               | 0.034   | 0.075  | 0.017                                                                  | 0.036 | 0.08   | 0.041                                      | 0.091  | 0.21   | 1.2                                                      | 2.6   | 5.7   | 120                                                                 | 120    | 120    | 70                                                        | 91           | 120           | LQM (2014) |
| Trichloromethane (chloroform)             | 0.91                                                                | 1.7     | 3.4    | 1.2                                                                    | 2.1   | 4.2    | 0.42                                       | 0.83   | 1.7    | 99                                                       | 170   | 350   | 2500                                                                | 2500   | 2500   | 2600                                                      | 2800         | 3100          | LQM (2014) |
| Chloroethene (Vinyl chloride)             | 0.00064                                                             | 0.00087 | 0.0014 | 0.00077                                                                | 0.001 | 0.0015 | 0.00055                                    | 0.001  | 0.0018 | 0.059                                                    | 0.077 | 0.12  | 3.5                                                                 | 3.5    | 3.5    | 4.8                                                       | 5            | 5.4           | LQM (2014) |
| 2,4,6-Trinitrotoluene (TNT)               | 1.6                                                                 | 3.7     | 8.1    | 65                                                                     | 66    | 66     | 0.24                                       | 0.58   | 1.4    | 1000                                                     | 1000  | 1000  | 130                                                                 | 130    | 130    | 260                                                       | 270          | 270           | LQM (2014) |

| Parameter                    | Residential with homegrown produce (mg/kg, unless otherwise stated) |       |       | Residential without homegrown produce (mg/kg, unless otherwise stated) |             |             | Allotment (mg/kg, unless otherwise stated) |       |       | Commercial / Industrial (mg/kg, unless otherwise stated) |              |              | Public Open Space near Residential (mg/kg, unless otherwise stated) |       |       | Public Open Space - Park (mg/kg, unless otherwise stated) |              |              | Source     |
|------------------------------|---------------------------------------------------------------------|-------|-------|------------------------------------------------------------------------|-------------|-------------|--------------------------------------------|-------|-------|----------------------------------------------------------|--------------|--------------|---------------------------------------------------------------------|-------|-------|-----------------------------------------------------------|--------------|--------------|------------|
|                              | 1%                                                                  | 2.50% | 6%    | 1%                                                                     | 2.50%       | 6%          | 1%                                         | 2.50% | 6%    | 1%                                                       | 2.50%        | 6%           | 1%                                                                  | 2.50% | 6%    | 1%                                                        | 2.50%        | 6%           |            |
| SOM                          |                                                                     |       |       |                                                                        |             |             |                                            |       |       |                                                          |              |              |                                                                     |       |       |                                                           |              |              |            |
| RDX                          | 120                                                                 | 250   | 540   | 13000                                                                  | 13000       | 13000       | 17                                         | 38    | 85    | 210000                                                   | 210000       | 210000       | 26000                                                               | 26000 | 27000 | 49000 (18.7)                                              | 51000        | 53000        | LQM (2014) |
| HMX                          | 5.7                                                                 | 13    | 26    | 6700                                                                   | 6700        | 6700        | 0.86                                       | 1.9   | 3.9   | 110000                                                   | 110000       | 110000       | 13000                                                               | 13000 | 13000 | 23000 (0.35)                                              | 23000 (0.39) | 24000 (0.48) | LQM (2014) |
| Aldrin                       | 5.7                                                                 | 6.6   | 7.1   | 7.3                                                                    | 7.4         | 7.5         | 3.2                                        | 6.1   | 9.6   | 170                                                      | 170          | 170          | 18                                                                  | 18    | 18    | 30                                                        | 31           | 31           | LQM (2014) |
| Dieldrin                     | 0.97                                                                | 2     | 3.5   | 7                                                                      | 7.3         | 7.4         | 0.17                                       | 0.41  | 0.96  | 170                                                      | 170          | 170          | 18                                                                  | 18    | 18    | 30                                                        | 30           | 31           | LQM (2014) |
| Atrazine                     | 3.3                                                                 | 7.6   | 17.4  | 610                                                                    | 620         | 620         | 0.5                                        | 1.2   | 2.7   | 9300                                                     | 9400         | 9400         | 1200                                                                | 1200  | 1200  | 2300                                                      | 2400         | 2400         | LQM (2014) |
| Dichlovos                    | 0.032                                                               | 0.066 | 0.014 | 6.4                                                                    | 6.5         | 6.6         | 0.0049                                     | 0.01  | 0.022 | 140                                                      | 140          | 140          | 16                                                                  | 16    | 16    | 26                                                        | 26           | 27           | LQM (2014) |
| Alpha-Endosulfan             | 7.4                                                                 | 18    | 41    | 160 (0.003)                                                            | 280 (0.007) | 410 (0.016) | 1.2                                        | 2.9   | 6.8   | 5600 (0.003)                                             | 7400 (0.007) | 8400 (0.016) | 1200                                                                | 1200  | 1200  | 2400                                                      | 2400         | 2500         | LQM (2014) |
| alpha-Hexachlorocyclohexane  | 0.23                                                                | 0.55  | 1.2   | 6.9                                                                    | 9.2         | 11          | 0.035                                      | 0.087 | 0.21  | 170                                                      | 180          | 180          | 24                                                                  | 24    | 24    | 47                                                        | 48           | 48           | LQM (2014) |
| beta-hexachlorocyclohexanes  | 0.085                                                               | 0.2   | 0.46  | 3.7                                                                    | 3.8         | 3.8         | 0.013                                      | 0.032 | 0.077 | 65                                                       | 65           | 65           | 8.1                                                                 | 8.1   | 8.1   | 15                                                        | 15           | 16           | LQM (2014) |
| gamma-hexachlorocyclohexanes | 0.06                                                                | 0.14  | 0.33  | 2.9                                                                    | 3.3         | 3.5         | 0.0092                                     | 0.023 | 0.054 | 67                                                       | 69           | 70           | 8.2                                                                 | 8.2   | 8.2   | 14                                                        | 15           | 15           | LQM (2014) |
| Chlorobenzene                | 0.46                                                                | 1     | 2.4   | 0.46                                                                   | 1           | 2.4         | 5.9                                        | 14    | 32    | 56                                                       | 130          | 290          | 11000                                                               | 13000 | 14000 | 1300 (675)                                                | 2000 (1520)  | 2900         | LQM (2014) |
| 1,2-Dichlorobenzene          | 23                                                                  | 55    | 130   | 24                                                                     | 57          | 130         | 94                                         | 230   | 540   | 2000 (571)                                               | 4800 (1370)  | 11000 (3240) | 90000                                                               | 95000 | 98000 | 24000 (571)                                               | 36000 (1370) | 51000 (3240) | LQM (2014) |
| 1,3-Dichlorobenzene          | 0.4                                                                 | 1     | 2.3   | 0.44                                                                   | 1.1         | 2.5         | 0.25                                       | 0.6   | 1.5   | 30                                                       | 73           | 170          | 300                                                                 | 300   | 300   | 390                                                       | 440          | 470          | LQM (2014) |

| Parameter                              | Residential with homegrown produce (mg/kg, unless otherwise stated) |           |      | Residential <u>without</u> homegrown produce (mg/kg, unless otherwise stated) |           |           | Allotment (mg/kg, unless otherwise stated) |       |      | Commercial / Industrial (mg/kg, unless otherwise stated) |                             |                             | Public Open Space near Residential (mg/kg, unless otherwise stated) |                             |                             | Public Open Space - Park (mg/kg, unless otherwise stated) |                             |                             | Source     |
|----------------------------------------|---------------------------------------------------------------------|-----------|------|-------------------------------------------------------------------------------|-----------|-----------|--------------------------------------------|-------|------|----------------------------------------------------------|-----------------------------|-----------------------------|---------------------------------------------------------------------|-----------------------------|-----------------------------|-----------------------------------------------------------|-----------------------------|-----------------------------|------------|
|                                        | 1%                                                                  | 2.50%     | 6%   | 1%                                                                            | 2.50%     | 6%        | 1%                                         | 2.50% | 6%   | 1%                                                       | 2.50%                       | 6%                          | 1%                                                                  | 2.50%                       | 6%                          | 1%                                                        | 2.50%                       | 6%                          |            |
| SOM                                    | 61                                                                  | 150       | 350  | 61                                                                            | 150       | 350       | 15                                         | 37    | 88   | 4400 (224)                                               | 10000 (540)                 | 25000 (1280)                | 17000                                                               | 17000                       | 17000                       | 36000 (224)                                               | 36000 (540)                 | 36000 (1280)                | LQM (2014) |
| VOCs Continued                         |                                                                     |           |      |                                                                               |           |           |                                            |       |      |                                                          |                             |                             |                                                                     |                             |                             |                                                           |                             |                             |            |
| 1,2,3-Trichlorobenzene                 | 1.5                                                                 | 3.6       | 8.6  | 1.5                                                                           | 3.7       | 8.8       | 4.7                                        | 12    | 28   | 102                                                      | 250                         | 590                         | 1800                                                                | 1800                        | 1800                        | 770 (134)                                                 | 1100 (330)                  | 1600 (789)                  | LQM (2014) |
| 1,2,4-Trichlorobenzene                 | 2.6                                                                 | 6.4       | 15   | 2.6                                                                           | 6.4       | 15        | 55                                         | 140   | 320  | 220                                                      | 530                         | 1300                        | 15000                                                               | 17000                       | 19000                       | 1700 (318)                                                | 2600 (786)                  | 4000 (1880)                 | LQM (2014) |
| 1,3,5-Trichlorobenzene                 | 0.33                                                                | 0.81      | 1.9  | 0.33                                                                          | 0.81      | 1.9       | 4.7                                        | 12    | 28   | 23                                                       | 55                          | 130                         | 1700                                                                | 1700                        | 1800                        | 380 (36.7)                                                | 580 (90.8)                  | 860 (217)                   | LQM (2014) |
| 1,2,3,4-Tetrachlorobenzen <sub>e</sub> | 15                                                                  | 36        | 78   | 24                                                                            | 56        | 120       | 4.4                                        | 11    | 26   | 1700 (122)                                               | 3080 (304)                  | 4400 (728)                  | 830                                                                 | 830                         | 830                         | 1500 (122)                                                | 1600                        | 1600                        | LQM (2014) |
| 1,2,3,5-Tetrachlorobenzen <sub>e</sub> | 0.66                                                                | 1.6       | 3.7  | 0.75                                                                          | 1.9       | 4.3       | 0.38                                       | 0.9   | 2.2  | 49 (39.4)                                                | 120 (98.1)                  | 240 (235)                   | 78                                                                  | 79                          | 79                          | 110 (39)                                                  | 120                         | 130                         | LQM (2014) |
| 1,2,4,5-Tetrachlorobenzen <sub>e</sub> | 0.33                                                                | 0.77      | 1.6  | 0.73                                                                          | 1.7       | 3.5       | 0.06                                       | 0.16  | 0.37 | 42 (19.7)                                                | 72 (49.1)                   | 96                          | 13                                                                  | 13                          | 13                          | 25                                                        | 26                          | 26                          | LQM (2014) |
| Pentachlorobenzen <sub>e</sub>         | 5.8                                                                 | 12        | 22   | 19                                                                            | 30        | 38        | 1.2                                        | 3.1   | 7    | 640 (43)                                                 | 770 (107)                   | 830                         | 100                                                                 | 100                         | 100                         | 190                                                       | 190                         | 190                         | LQM (2014) |
| Hexachlorobenzen <sub>e</sub>          | 1.8 (0.2)                                                           | 3.3 (0.5) | 4.9  | 4.1 (0.2)                                                                     | 5.7 (0.5) | 6.7 (1.2) | 0.47                                       | 1.1   | 2.5  | 110 (0.2)                                                | 120                         | 120                         | 16                                                                  | 16                          | 16                          | 30                                                        | 30                          | 30                          | LQM (2014) |
| Phenol                                 | 280                                                                 | 550       | 1100 | 750                                                                           | 1300      | 2300      | 66                                         | 140   | 280  | 760 <sub>dir</sub> (31000)                               | 1500 <sub>dir</sub> (35000) | 3200 <sub>dir</sub> (37000) | 760 <sub>dir</sub> (31000)                                          | 1500 <sub>dir</sub> (35000) | 3200 <sub>dir</sub> (37000) | 760 <sub>dir</sub> (31000)                                | 1500 <sub>dir</sub> (35000) | 3200 <sub>dir</sub> (37000) | LQM (2014) |

| Parameter                                   | Residential with homegrown produce<br>(mg/kg, unless otherwise stated) |       |      | Residential <u>without</u> homegrown produce<br>(mg/kg, unless otherwise stated) |       |      | Allotment<br>(mg/kg, unless otherwise stated) |       |      | Commercial / Industrial<br>(mg/kg, unless otherwise stated) |       |      | Public Open Space near Residential<br>(mg/kg, unless otherwise stated) |       |       | Public Open Space - Park<br>(mg/kg, unless otherwise stated) |       |      | Source     |
|---------------------------------------------|------------------------------------------------------------------------|-------|------|----------------------------------------------------------------------------------|-------|------|-----------------------------------------------|-------|------|-------------------------------------------------------------|-------|------|------------------------------------------------------------------------|-------|-------|--------------------------------------------------------------|-------|------|------------|
|                                             | 1%                                                                     | 2.50% | 6%   | 1%                                                                               | 2.50% | 6%   | 1%                                            | 2.50% | 6%   | 1%                                                          | 2.50% | 6%   | 1%                                                                     | 2.50% | 6%    | 1%                                                           | 2.50% | 6%   |            |
| SOM                                         |                                                                        |       |      |                                                                                  |       |      |                                               |       |      |                                                             |       |      |                                                                        |       |       |                                                              |       |      |            |
| Chlorophenols (excluding pentachlorophenol) | 0.87 (g)                                                               | 2     | 4.5  | 94                                                                               | 150   | 210  | 0.13 (g)                                      | 0.3   | 0.7  | 3500                                                        | 4000  | 4300 | 620                                                                    | 620   | 620   | 1100                                                         | 1100  | 1100 | LQM (2014) |
| Pentachlorophenol                           | 0.22                                                                   | 0.52  | 1.2  | <sup>27</sup><br>(16.4)                                                          | 29    | 31   | 0.03                                          | 0.08  | 0.19 | 400                                                         | 400   | 400  | 60                                                                     | 60    | 60    | 110                                                          | 120   | 120  | LQM (2014) |
| Carbon Disulphide                           | 0.14                                                                   | 0.29  | 0.62 | 0.14                                                                             | 0.29  | 0.62 | 4.8                                           | 10    | 23   | 11                                                          | 22    | 47   | 11000                                                                  | 11000 | 12000 | 1300                                                         | 1900  | 2700 | LQM (2014) |
| Hexachlorobutadiene                         | 0.29                                                                   | 0.7   | 1.6  | 0.32                                                                             | 0.78  | 1.8  | 0.25                                          | 0.61  | 1.4  | 31                                                          | 66    | 120  | 25                                                                     | 25    | 25    | 48                                                           | 50    | 51   | LQM (2014) |

(g) derived based on 2,3,4,6-tetrachlorophenol; dir - based on a threshold protective of direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustration only); (vap) calculated for vapour phase only. SOM – Soil Organic Matter; (4.5) solubility.