



TIM O'HARE ASSOCIATES  
SOIL & LANDSCAPE CONSULTANCY

Mr Justin Dampney  
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Parley  
Christchurch  
Dorset BH6 5AD

11<sup>th</sup> May 2018  
Our Ref: TOHA/18/7580/2/SS  
Your Ref: 1178PPW

Dear Sirs

**Topsoil Analysis Report: Parley – 15-20mm Enriched Soil**

We have completed the analysis of the soil sample recently submitted, referenced *15-20mm Enriched Soil*, and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil (BS3882:2015 – *Specification for Topsoil – Table 1, Multipurpose Topsoil*).

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing or waste designation purposes, especially after the topsoil has left the Eco Sustainable Solutions site.

**SAMPLE EXAMINATION**

The sample was described as a very dark grey (Munsell colour 10YR 3/1), moist, friable, slightly calcareous, SANDY LOAM with a weakly developed, medium to coarse granular structure\*. The sample was slightly stony and contained organic fines and woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

\*This appraisal of soil structure was made from examination of a disturbed sample(s). Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

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## **ANALYTICAL SCHEDULE**

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- particle size analysis (sand, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn);
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

## **RESULTS OF ANALYSIS**

### **Particle Size Analysis and Stone Content**

The sample fell into the *sandy loam* texture class, which is usually considered suitable for general landscape applications provided the soil's physical condition is satisfactory.

The stone content of the sample was moderate and, as such, stones are unlikely to constitute a limitation for general landscape purposes. However, it may be prudent to reduce a proportion of the larger stones by raking, picking, burying or screening, should the soil be used for amenity grass areas or sports pitches.

### **pH and Electrical Conductivity Values**

The sample was alkaline in reaction (pH 7.9). This pH value would be considered suitable for general landscape purposes providing species with a wide pH tolerance or those known to prefer alkaline soils are selected for planting, turfing and seeding.

The electrical conductivity (salinity) value (water extract) was moderate, which indicates that soluble salts should not be present at levels that would be harmful to plants.

The electrical conductivity value by CaSO<sub>4</sub> extract (BS3882 requirement) fell below the maximum specified value (3300 µS/cm) given in BS3882:2015 – Table 1.

### **Organic Matter and Fertility Status**

The sample was adequately supplied with organic matter and all major plant nutrients.

The C:N ratio of the sample was acceptable for general landscape purposes.

### **Potential Contaminants**

With reference to BS3882:2015 - Table 1: Notes 3 and 4, there is a recommendation to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with home grown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels (C4SLs) for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

### **Phytotoxic Contaminants**

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

### **CONCLUSION**

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes. The analysis has also been undertaken to determine the sample's compliance with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

From the soil examination and subsequent laboratory analysis, the sample was described as a alkaline, non-saline, slightly calcareous sandy loam with a weakly developed structure and moderate stone content. The sample contained sufficient reserves of organic matter and all major plant nutrients. Of the potential contaminants determined, none exceeded their respective guideline values.

To conclude, based on our findings, the topsoil represented by this sample **would be considered suitable** for general landscape purposes provided species with a wide pH tolerance or those known to prefer alkaline soils are selected and the physical condition of the soil is satisfactory.

The topsoil was fully compliant with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

### **RECOMMENDATIONS**

#### **Stone Removal**

To reduce the stone content for *informal* and *formal recreation* end uses (Annex A.4 of *BS3882:2015*), it may be prudent to remove a portion of the larger stones (>20mm) by intensive picking, raking, burying or screening prior to seeding or turfing.

#### **Soil Handling Recommendations**

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, resspreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of *BS3882:2015*.

Further guidance on the management, preparation and handling of soils is provided in the DEFRA publication *Construction code of practice for the sustainable use of soils on construction sites*, 2009.

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We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully



**Matthew Heins**  
BSc (Hons)  
Soil Scientist



**Laura Hathaway-Jenkins**  
BSc MSc EngD MISOilSci  
Senior Associate

For & on behalf of Tim O'Hare Associates LLP



**TIM O'HARE ASSOCIATES**  
SOIL & LANDSCAPE CONSULTANCY

|             |                                |
|-------------|--------------------------------|
| Client:     | Eco Sustainable Solutions Ltd  |
| Project:    | Parley                         |
| Job:        | Topsoil Analysis - BS3882:2015 |
| Date:       | 11/05/2018                     |
| Job Ref No: | TOHA/18/7586/2/SS              |

| Sample Reference                  |      |               |
|-----------------------------------|------|---------------|
|                                   |      | Accreditation |
| Clay (<0.002mm)                   | %    | UKAS          |
| Silt (0.002-0.063mm)              | %    | UKAS          |
| Sand (0.063-2.0mm)                | %    | UKAS          |
| Texture Class (UK Classification) | ---  | UKAS          |
| Stones (2-20mm)                   | % DW | GLP           |
| Stones (20-50mm)                  | % DW | GLP           |
| Stones (>50mm)                    | % DW | GLP           |

|                                                         |       |      |
|---------------------------------------------------------|-------|------|
| pH Value (1:2.5 water extract)                          | units | UKAS |
| Electrical Conductivity (1:2.5 water extract)           | uS/cm | UKAS |
| Electrical Conductivity (1:2 CaSO <sub>4</sub> extract) | uS/cm | UKAS |
| Exchangeable Sodium Percentage                          | %     | UKAS |
| Organic Matter (LOI)                                    | %     | UKAS |
| Total Nitrogen (Dumas)                                  | %     | UKAS |
| C : N Ratio                                             | ratio | UKAS |
| Extractable Phosphorus                                  | mg/l  | UKAS |
| Extractable Potassium                                   | mg/l  | UKAS |
| Extractable Magnesium                                   | mg/l  | UKAS |

|                             |       |        |
|-----------------------------|-------|--------|
| Total Arsenic (As)          | mg/kg | MCERTS |
| Total Cadmium (Cd)          | mg/kg | MCERTS |
| Total Chromium (Cr)         | mg/kg | MCERTS |
| Hexavalent Chromium (Cr VI) | mg/kg | MCERTS |
| Total Copper (Cu)           | mg/kg | MCERTS |
| Total Lead (Pb)             | mg/kg | MCERTS |
| Total Mercury (Hg)          | mg/kg | MCERTS |
| Total Nickel (Ni)           | mg/kg | MCERTS |
| Total Selenium (Se)         | mg/kg | MCERTS |
| Total Zinc (Zn)             | mg/kg | MCERTS |
| Water Soluble Boron (B)     | mg/kg | MCERTS |
| Total Cyanide (CN)          | mg/kg | MCERTS |
| Total (mono) Phenols        | mg/kg | MCERTS |

|                          |       |        |
|--------------------------|-------|--------|
| Naphthalene              | mg/kg | MCERTS |
| Acenaphthylene           | mg/kg | MCERTS |
| Acenaphthene             | mg/kg | MCERTS |
| Fluorene                 | mg/kg | MCERTS |
| Phenanthrene             | mg/kg | MCERTS |
| Anthracene               | mg/kg | MCERTS |
| Fluoranthene             | mg/kg | MCERTS |
| Pyrene                   | mg/kg | MCERTS |
| Benz[a]anthracene        | mg/kg | MCERTS |
| Chrysene                 | mg/kg | MCERTS |
| Benzo[b]fluoranthene     | mg/kg | MCERTS |
| Benzo[k]fluoranthene     | mg/kg | MCERTS |
| Benzo[a]pyrene           | mg/kg | MCERTS |
| Indeno[1,2,3-cd]pyrene   | mg/kg | MCERTS |
| Dibenzo[a,h]anthracene   | mg/kg | MCERTS |
| Benzo[g,h,i]perylene     | mg/kg | MCERTS |
| Total PAHs (sum USEPA16) | mg/kg | MCERTS |

|                          |       |        |
|--------------------------|-------|--------|
| Aliphatic TPH >C5 - C6   | mg/kg | MCERTS |
| Aliphatic TPH >C6 - C8   | mg/kg | MCERTS |
| Aliphatic TPH >C8 - C10  | mg/kg | MCERTS |
| Aliphatic TPH >C10 - C12 | mg/kg | MCERTS |
| Aliphatic TPH >C12 - C16 | mg/kg | MCERTS |
| Aliphatic TPH >C16 - C21 | mg/kg | MCERTS |
| Aliphatic TPH >C21 - C35 | mg/kg | MCERTS |
| Aliphatic TPH (C5 - C35) | mg/kg | MCERTS |
| Aromatic TPH >C5 - C7    | mg/kg | MCERTS |
| Aromatic TPH >C7 - C8    | mg/kg | MCERTS |
| Aromatic TPH >C8 - C10   | mg/kg | MCERTS |
| Aromatic TPH >C10 - C12  | mg/kg | MCERTS |
| Aromatic TPH >C12 - C16  | mg/kg | MCERTS |
| Aromatic TPH >C16 - C21  | mg/kg | MCERTS |
| Aromatic TPH >C21 - C35  | mg/kg | MCERTS |
| Aromatic TPH (C5 - C35)  | mg/kg | MCERTS |

|                                    |       |        |
|------------------------------------|-------|--------|
| Benzene                            | mg/kg | MCERTS |
| Toluene                            | mg/kg | MCERTS |
| Ethylbenzene                       | mg/kg | MCERTS |
| p & m-xylene                       | mg/kg | MCERTS |
| o-xylene                           | mg/kg | MCERTS |
| MTBE (Methyl Tertiary Butyl Ether) | mg/kg | MCERTS |

|          |      |           |
|----------|------|-----------|
| Asbestos | ND/D | ISO 17025 |
|----------|------|-----------|

SL = SANDY LOAM

**Visual Examination**

The sample was described as a very dark grey (Munsell colour 10YR 3/1), moist, friable, slightly calcareous, SANDY LOAM with a weakly developed, medium to coarse granular structure. The sample was slightly stony and contained organic fines and woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

Results of analysis should be read in conjunction with the report they were issued with

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**15-20mm Enriched Soil**

|    |
|----|
| 10 |
| 12 |
| 78 |
| SL |
| 16 |
| 6  |
| 0  |

|      |
|------|
| 7.9  |
| 1126 |
| 2838 |
| 5.9  |
| 8.3  |
| 0.29 |
| 17   |
| 73   |
| 1007 |
| 125  |

|       |
|-------|
| 5     |
| < 0.2 |
| 21    |
| < 4.0 |
| 24    |
| 58    |
| 0.3   |
| 8     |
| < 1.0 |
| 94    |
| 2.4   |
| < 1   |
| < 1   |

|        |
|--------|
| < 0.05 |
| < 0.05 |
| < 0.05 |
| < 0.05 |
| 0.24   |
| 0.22   |
| 0.68   |
| 0.65   |
| 0.31   |
| 0.32   |
| 0.53   |
| 0.12   |
| 0.35   |
| 0.19   |
| < 0.05 |
| 0.25   |
| 3.9    |

|         |
|---------|
| < 0.001 |
| < 0.001 |
| < 0.001 |
| < 1.0   |
| 2.2     |
| 8.5     |
| 60      |
| 71      |
| < 0.001 |
| < 0.001 |
| < 0.001 |
| < 1.0   |
| 9.1     |
| 27      |
| 120     |
| 150     |

|         |
|---------|
| < 0.001 |
| < 0.001 |
| < 0.001 |
| < 0.001 |
| < 0.001 |
| < 0.001 |

|              |
|--------------|
| Not-detected |
|--------------|

*Matthew Heins*

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