



TIM O'HARE ASSOCIATES  
SOIL & LANDSCAPE CONSULTANCY

Mr Simon Sivyer  
H. Sivyer Transport Ltd  
160 Sydenham Road  
London  
SE26 5JZ

12<sup>th</sup> October 2018  
Our Ref: TOHA/18/7783/SS  
Your Ref: 167852

Dear Sirs

**Topsoil Analysis: Trugrow Topsoil**

We have completed the analysis of the soil sample recently submitted, referenced *Trugrow Topsoil*, and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for general landscape purposes. 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 H Sivyer Transport Ltd site.

**SAMPLE EXAMINATION**

The sample was described as a dark yellowish brown (Munsell Colour 10YR 3/4), slightly moist, friable, non-calcareous, very fine LOAMY SAND with a weakly developed, very fine to fine granular structure\*. The sample was slightly stony, with stones up to 20mm, and contained occasional organic fines and occasional 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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Plate 1: Trugrow topsoil sample

### **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:

- detailed particle size analysis (% 5 sands, silt, clay);
- 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).

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 *loamy sand* texture class. However, further detailed particle size analysis revealed the sample to have a very high proportion of particles in the *very fine sand* (0.05-0.15mm) fraction. Topsoils such as this are prone to self-compaction when initially placed in a landscape environment, which can lead to limited drainage and poor aeration, particularly if the soil does not display a well defined structure. To reduce the risk of self-compaction, we recommend placing this soil to a maximum depth of 300mm, which is in line with *BS3882:2015*, section A.3.

The stone content of the sample was low and, as such, stones should not restrict the use of the soil for general landscape purposes.

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

The sample was alkaline in reaction (pH 7.7). 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 well supplied with organic matter and most major plant nutrients.

The sample contained an elevated level of extractable potassium (1633 mg/l) that exceeded the maximum permissible value given in BS3882:2015 – Table 1 (1500 mg/l).

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 homegrown 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 exceed 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 an alkaline, non-saline, non-calcareous, very fine loamy sand with a weak structure and low stone content. The sample was well supplied with organic matter and all major plant nutrients. Of the potential contaminants determined, none exceeded their guideline values.

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.

The sample was largely compliant with the requirements of the British Standard for Topsoil (BS3882:2015 – *Specification for Topsoil – Table 1, Multipurpose Topsoil*), except for the elevated extractable potassium level.

On this occasion, this non-compliance is considered minor when reviewed in the context of all the other results and considering the proposed end-use of this soil.

## **Recommendations**

### **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



**Aaron Cross**  
BSc  
Graduate Soil Scientist



**Tim O'Hare**  
BSc MSc MISOilSci MBIAC CSci  
Principal Consultant

For and on behalf of Tim O'Hare Associates LLP



Client:	H Sivyer Transport Ltd
Project:	Trugrow Topsoil
Job:	Topsoil Analysis - BS3882:2015
Date:	11/10/2018
Job Ref No:	TOHA/18/7783/SS

Sample Reference		Acreditation	
Clay (<0.002mm)	%	UKAS	
Silt (0.002-0.05mm)	%	UKAS	
Very Fine Sand (0.05-0.15mm)	%	UKAS	
Fine Sand (0.15-0.25mm)	%	UKAS	
Medium Sand (0.25-0.50mm)	%	UKAS	
Coarse Sand (0.50-1.0mm)	%	UKAS	
Very Coarse Sand (1.0-2.0mm)	%	UKAS	
Texture Class (UK Classification)	--	UKAS	
Stones (2-20mm)	% DW	GLP	
Stones (20-50mm)	% DW	GLP	
Stones (>50mm)	% DW	GLP	

Trugrow Topsoil	
	11
	8
	71
	5
	3
	1
	1
	LS
	4
	0
	0

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	

	7.7
	1273
	3093
	6.3
	9.9
	0.31
	19
	46
	1633
	263

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	

	9
	< 0.2
	23
	< 4.0
	36
	29
	< 0.3
	9
	< 1.0
	68
	3.6
	< 1
	< 1

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	
Benzo(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	

	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.05
	< 0.8

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	

	< 0.001
	< 0.001
	< 0.001
	< 1.0
	< 2.0
	< 8.0
	11
	12
	< 0.001
	< 0.001
	< 0.001
	< 1.0
	< 2.0
	< 10
	< 10
	< 10

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	

	< 0.001
	< 0.001
	< 0.001
	< 0.001
	< 0.001
	< 0.001

LS = LOAMY SAND

#### Visual Examination

The sample was described as a dark yellowish brown (Munsell Colour 10YR 3/4), slightly moist, friable, non-calcareous, very fine LOAMY SAND with a weakly developed, very fine to fine granular structure\*. The sample was slightly stony, with stones up to 20mm, and contained occasional 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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*A Cross*

Aaron Cross  
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Graduate Soil Scientist