TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Andy Whitfield
Wright Landscapes
Pickmere Nursery
Pickmere Lane
Knutsford
Cheshire
WA16 0JL

25th July 2025
Our Ref: TOHA/25/1929/1/SS
Your Ref: PO 18387

Wright Landscapes

Dear Sirs

Topsoil Analysis Report: Science and Industry Museum, Manchester

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

The purpose of the analysis was to determine the suitability of the sample for the proposed landscape scheme. In addition, the sample has been tested in accordance with the supplied Planit I.E. External Works Specification (*Science and Industry Museum – Upper Yard and Station Approach – Doc. Ref. 2913-PLA-XX-XX-SP-L-0004 - Rev. D4, C01 – 02.10.2024*), of which Clauses 300 and 340A of section Q28 require the topsoil to be tested in accordance 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.

SAMPLE EXAMINATION

The sample was described as a brown (Munsell Colour 10YR 5/4), dry, non-plastic, non-calcareous SAND with a single grain structure. The sample was virtually stone-free and contained a low proportion of organic fines and occasional woody fragments. No unusual odours or deleterious materials were observed.

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);
- stone content (2-20mm, 20-50mm, >50mm);
- saturated hydraulic conductivity;
- 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

Detailed Particle Size Analysis and Stone Content

The sample fell into the *sand* texture class, with a total sand content of 95%. Further characterisation of the sand fraction indicates that most of the sand is *fine sand* (0.15-0.25mm), and the remainder is largely *very fine sand* (0.05-0.15mm) and *medium sand* (0.25-0.50mm). This grading is favourable for planting as it should ensure satisfactory porosity for both water attenuation and aeration whilst also enabling drainage of surplus water. However, the limitation posed by this grading is the higher risk of nutrient leaching and drought stress in the warmer summer months, and particularly given the sample's low organic matter content. This can be addressed by increasing the organic matter content of the topsoil to at least 5%, and to introduce a long-lasting soil conditioner that improves both nutrient and water retention.

The sample was virtually stone free and, as such, stones will not restrict the use of the soil for landscape purposes.

Saturated Hydraulic Conductivity

The saturated hydraulic conductivity result (185 mm/hr) recorded for the sample was high and the topsoil would be described as 'free-draining'. This could be reduced to a more favourable rate by increasing the organic matter content.

pH and Electrical Conductivity Values

The sample was strongly alkaline in reaction (pH 8.3). This pH value would be considered suitable for landscape purposes provided species with a wide pH tolerance or those known to prefer alkaline soils are selected.

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

The electrical conductivity value by $CaSO_4$ 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 mineral plant nutrients (P, K, Mg) but was deficient in organic matter and total nitrogen. This deficiency can be remedied by ameliorating the topsoil with additional green compost.

Wright Landscapes

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

Potential Contaminants

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a requirement 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 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 sample for the proposed landscape scheme. In addition, the sample has been tested in accordance with the supplied Planit I.E. External Works Specification (*Science and Industry Museum – Upper Yard and Station Approach – Doc. Ref. 2913-PLA-XX-XX-SP-L-0004 - Rev. D4, C01 – 02.10.2024*), of which Clauses 300 and 340A of section Q28 require the topsoil to be tested in accordance 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 strongly alkaline, non-saline, non-calcareous, virtually stone free *sand* with a single grain structure and a high saturated hydraulic conductivity. The sample contained sufficient reserves of mineral plant nutrients but was deficient in organic matter and total nitrogen. 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 the proposed landscape scheme provided the organic matter content is increased, a soil conditioner is applied, and species with a wide pH tolerance 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)* with the exception of the high total sand content and the low organic matter content.

RECOMMENDATIONS

Compost Application

To address the deficiency in organic matter, we recommend applying and incorporating suitable compost (e.g. PAS100:2018 /Landscape Institute/WRAP grade (10mm screened) green compost) into the upper 300mm of topsoil (ensuring the soil is dry and friable) at a rate of **15%** by volume.

Soil Conditioners

To improve the water and nutrient retention capacities of this soil, we recommend an application of the soil conditioner *TerraCottem "Universal"* from Inturf, at the manufacturers recommended rate (https://www.inturf.com/terracottem/terracottem-universal/).

Wright Landscapes

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. spreading, cultivating, planting). As a consequence, soil handling operations should be carried out when soil is sufficiently dry to be 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 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.

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





For & on behalf of Tim O'Hare Associates LLP

Wright Landscapes

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	**Wright Landscapes**
Project:	**Science and Industry Museum, Manchester**
Job:	**Topsoil Analysis - BS3882:2015**
Date:	**25/07/2025**
Job Ref No:	**TOHA/25/1929/1/SS**

Sample Reference			**Eaton Hall Topsoil**
		Accreditation	
Clay (<0.002mm)	%	UKAS	2
Silt (0.002-0.063mm)	%	UKAS	3
Very Fine Sand (0.05-0.15mm)	%	UKAS	27
Fine Sand (0.15-0.25mm)	%	UKAS	55
Medium Sand (0.25-0.50mm)	%	UKAS	11
Coarse Sand (0.50-1.0mm)	%	UKAS	1
Very Coarse Sand (1.0-2.0mm)	%	UKAS	1
Total Sand (0.063-2.0mm)	%	UKAS	95
Texture Class (UK Classification)	--	UKAS	S
Stones (2-20mm)	% DW	GLP	1
Stones (20-50mm)	% DW	GLP	0
Stones (>50mm)	% DW	GLP	0
Saturated Hydraulic Conductivity (m)	mm/hr	A2LA	185
pH Value (1:2.5 water extract)	units	UKAS	8.3
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS	770
Electrical Conductivity (1:2 $CaSO_4$ extract)	uS/cm	UKAS	2498
Exchangeable Sodium Percentage	%	UKAS	3.6
Organic Matter (LOI)	%	UKAS	2.0
Total Nitrogen (Dumas)	%	UKAS	0.16
C : N Ratio	ratio	UKAS	7
Extractable Phosphorus	mg/l	UKAS	44
Extractable Potassium	mg/l	UKAS	443
Extractable Magnesium	mg/l	UKAS	105
Total Arsenic (As)	mg/kg	MCERTS	1
Total Cadmium (Cd)	mg/kg	MCERTS	< 0.2
Total Chromium (Cr)	mg/kg	MCERTS	3
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS	< 1.8
Total Copper (Cu)	mg/kg	MCERTS	8
Total Lead (Pb)	mg/kg	MCERTS	6
Total Mercury (Hg)	mg/kg	MCERTS	< 0.3
Total Nickel (Ni)	mg/kg	MCERTS	3
Total Selenium (Se)	mg/kg	MCERTS	< 1.0
Total Zinc (Zn)	mg/kg	MCERTS	18
Water Soluble Boron (B)	mg/kg	MCERTS	0.7
Total Cyanide (CN)	mg/kg	MCERTS	< 1.0
Total (mono) Phenols	mg/kg	MCERTS	< 1.0
Naphthalene	mg/kg	MCERTS	< 0.05
Acenaphthylene	mg/kg	MCERTS	< 0.05
Acenaphthene	mg/kg	MCERTS	< 0.05
Fluorene	mg/kg	MCERTS	< 0.05
Phenanthrene	mg/kg	MCERTS	< 0.05
Anthracene	mg/kg	MCERTS	< 0.05
Fluoranthene	mg/kg	MCERTS	< 0.05
Pyrene	mg/kg	MCERTS	< 0.05
Benzo(a)anthracene	mg/kg	MCERTS	< 0.05
Chrysene	mg/kg	MCERTS	< 0.05
Benzo(b)fluoranthene	mg/kg	MCERTS	< 0.05
Benzo(k)fluoranthene	mg/kg	MCERTS	< 0.05
Benzo(a)pyrene	mg/kg	MCERTS	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS	< 0.05
Dibenzo(a,h)anthracene	mg/kg	MCERTS	< 0.05
Benzo(g,h,i)perylene	mg/kg	MCERTS	< 0.05
Total PAHs (sum USEPA16)	mg/kg	MCERTS	< 0.80
Aliphatic TPH >C5 - C6	mg/kg	MCERTS	< 0.010
Aliphatic TPH >C6 - C8	mg/kg	MCERTS	< 0.010
Aliphatic TPH >C8 - C10	mg/kg	MCERTS	< 0.010
Aliphatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aliphatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aliphatic TPH >C16 - C21	mg/kg	MCERTS	< 8.0
Aliphatic TPH >C21 - C35	mg/kg	MCERTS	< 8.0
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Aromatic TPH >C5 - C7	mg/kg	MCERTS	< 0.010
Aromatic TPH >C7 - C8	mg/kg	MCERTS	< 0.010
Aromatic TPH >C8 - C10	mg/kg	MCERTS	< 0.020
Aromatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aromatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aromatic TPH >C16 - C21	mg/kg	MCERTS	< 10
Aromatic TPH >C21 - C35	mg/kg	MCERTS	< 10
Aromatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Benzene	mg/kg	MCERTS	< 0.005
Toluene	mg/kg	MCERTS	< 0.005
Ethylbenzene	mg/kg	MCERTS	< 0.005
o-xylene	mg/kg	MCERTS	< 0.005
p&m-xylene	mg/kg	MCERTS	< 0.005
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS	< 0.005
Asbestos	ND/D	ISO 17025	Not-detected

S = SAND

Visual Examination

The sample was described as a brown (Munsell Colour 10YR 5/4), dry, non plastic, non-calcareous SAND with a single grain structure. The sample was virtually stone-free and contained a low proportion of organic fines and occasional woody fragments. No unusual odours or deleterious materials were observed.

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

Ross Friar
MEnvSci
Soil Scientist

Wright Landscapes