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Our Ref: TOHA/24/1206/6/SS  
Your Ref: see below

Dear Sirs

**Subsoil Analysis Report: Bury Hill Horsham Yard – Bury Hill Kent Subsoil**

We have completed the analysis of the soil sample recently submitted, referenced *Bury Hill Kent Subsoil* and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for use as subsoil in 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 Subsoil (*BS8601:2013 – Specification for subsoil and requirements for use – Table 1, Multipurpose Subsoil*), including analysis of potential contaminants.

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the subsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing, or for any project-specific applications, especially after the subsoil has left the Bury Hill Landscape Supplies Ltd site.

**SAMPLE EXAMINATION**

The sample can be described as a yellowish brown (Munsell Colour, 10YR 5/6), moist, friable, non-calcareous SAND with a single grain structure. The sample was stone free, and no unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

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Plate 1: Bury Hill Kent Subsoil 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 of the soil. The following parameters were determined:

- detailed particle size analysis (5 sands, silt, clay);
- stone content (2-20mm, 20-75mm, >75mm);
- saturated hydraulic conductivity;
- pH and electrical conductivity (1:2.5 water extract);
- exchangeable sodium percentage;
- calcium carbonate;
- organic matter content;
- visible contaminants;
- heavy metals (Sb, As, B, Ba, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, V, 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 Saturated Hydraulic Conductivity**

The sample fell into the *sand* texture class. Further detailed particle size analysis revealed the sample to have a sufficiently narrow particle size distribution with a predominance of *medium sand* (0.25-0.50mm). This is acceptable for subsoil in general landscape applications as porosity levels are maintained in a compacted state and the risk of particle interpacking is minimised..

The subsoil represented by this sample would be described as 'free draining' which is confirmed by the high saturated hydraulic conductivity result (294 mm/hr).

The particle size distribution falls outside of the range indicated in *BS8601:2013 – Figure 1*, on account of the high sand content.

### **Stone Content**

The sample was stone-free and, as such, stones should not restrict the use of the soil for use as subsoil in general landscape purposes.

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

The sample was acid in reaction (pH 5.6), with a pH value that would be suitable as subsoil for general landscape purposes providing species with a wide pH tolerance or those known to prefer acid soils are selected for planting.

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<sub>4</sub> extract (*BS8601* requirement) fell below the maximum specified value (2800 µS/cm) given in *BS8601:2013 – Table 1*.

### **Organic Matter Content**

The organic matter content was low (<0.5%) and compliant with *BS8601:2013 – Table 1*.

### **Potential Contaminants**

With reference to *BS8601:2013 – Section 4.2: Note 2*, there is a requirement to confirm levels of potential contaminants in relation to the subsoil'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 of selected potential contaminants that affect human health have been assessed for the concentrations that affect human health have been assessed for *residential* end-use against 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 for Assessment of Land Affected by Contamination – Policy Companion Document (2014).

Of the potential contaminants determined, none exceeded their respective 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 *BS8601:2013 – Table 1*.

## CONCLUSION

The purpose of the analysis was to determine the suitability of the sample for use as subsoil in general landscape applications (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Subsoil (*BS8601:2013 – Specification for subsoil and requirements for use – Table 1, Multipurpose Subsoil*).

From the soil examination and subsequent laboratory analysis, the sample was described as an acid, non-saline sandy loam with a single grain structure and low stone content. The organic matter content was low and consistent with subsoil. Of the potential contaminants determined, none exceeded their respective guideline values.

To conclude, based on our findings, the subsoil represented by this sample would be considered suitable for landscape applications where a free-draining subsoil is required or where there will be a low drought risk.

The sample was largely compliant with the requirements of the British Standard for Subsoil (*BS8601:2013 – Specification for subsoil and requirements for use – Table 1, Multipurpose Subsoil*) with the exception of the high sand content. On this occasion, this non-compliance is considered minor provided the landscape application proposed for this subsoil requires a free-draining subsoil.

### Soil Handling Recommendations

Reference should be made to Section 6.0 of *BS8601:2013* with regard to the handling and management of the subsoil:

“Soils generally lose strength and become less resistant to damage as they become wetter; therefore, it is essential that they are stripped, handled and trafficked only in the appropriate conditions of weather and soil moisture, and with suitable machinery. If sustained heavy rainfall (e.g. >10 mm in 24 h) occurs during soil stripping operations, work should be suspended and not restarted until the ground has had at least one dry day or until a suitable moisture content has been reached. A soil can be considered to have a suitable moisture content for stripping and handling if the whole thickness of the subsoil layer being stripped and/or handled is at a moisture content below the plastic limit as determined in accordance with BS 1377-2:1990 (incorporating Amendment No. 1).

Machinery should be selected and routed to minimise soil compaction.”

Further guidance is provided in Clauses 6.1–6.5.

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



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Graduate Soil Scientist



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

For & on behalf of Tim O'Hare Associates LLP



