Cuadrilla

Preston New Road Exploration Site

Soil Handling Guidance for Clients and Contractors

Report Ref

Issue 02 | 11 October 2016

Job number 230382-00

Ove Arup & Partners Ltd
63 St Thomas Street
Bristol BS1 6JZ
United Kingdom
www.arup.com

ARUP

Document Verification

ARUP

Job title		Preston New Road Exploration Site			**Job number** 230382-00
Document title		Soil Handling Guidance for Clients and Contractors			**File reference**
Document ref		Report Ref			
Revision	**Date**	**Filename**			
02	29 11 2016	**Description**	Draft 2		
			Prepared by	Checked by	Approved by
		Name	Matt Jackson		
		Signature			
Issue	11 Oct 2016	**Filename**	Soil handling guidance.docx		
		Description			
			Prepared by	Checked by	Approved by
		Name	Matt Jackson		
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

Contents

1 Introduction

1.1 This strategy has been informed by:

- DEFRA Construction Code for the Sustainable Use of Soils on Construction Sites (2009),
- BS 3882:2007 Specification for topsoil and requirements for use
- BS 8545:2014 Trees: from nursery to independence in the landscape
- BS 5837:2012 Trees in relation to design, demolition and construction

A full and comprehensive soil storage, management and interpretative report would be required from a specialist to inform the construction management and soil strategy.

2 Testing schedule for site won and imported soils

2.1 Testing, analysis and interpretative report

Prior to the stripping of any site topsoil and subsoil, detailed testing and analysis should be carried out to assess its suitability for re-use within the ornamental shrub, transplant and turfed areas.

2.2 Sampling

Samples of the site won and imported topsoil and subsoil proposed for use for the landscape scheme are to be taken for analysis. Each sample shall be truly representative of the existing site subsoil / existing site topsoil. One composite sample shall be taken for every 250m³ of soil being considered.

Each composite sample shall be made up of 10 no. sub-samples taken from the full depth from evenly spaced locations across the site.

The sub-samples shall be mixed together and quartered down to form two 1kg composite samples.

Each composite sample shall be placed in a clean plastic bag and labelled with the supplier's name, date of sampling and sample location.

Of each pair of composite samples:

- one composite sample shall be sent to a testing laboratory from the list below (clause 3.5.2), with a request for each one to be analysed strictly in accordance with the testing schedule given below; and
- one composite sample shall be sent to the Landscape Architect for cross reference with the analysis.

2.3 Soil testing schedule

Each composite sample shall be tested, prior to approval by the Landscape Architect, in accordance with the topsoil and subsoil specifications

The following parameters should be requested:

1. Visual examination to record: Munsell colour, structure, consistency, stone size and shape, presence of any deleterious materials
2. pH Value (RB427 Method)
3. Electrical Conductivity (1:2.5 soil/water extract)
4. Particle Size Analysis (clay, silt, 5 sands)
5. Permeability
6. Stone Content by % weight (>2mm, >20mm, >50mm)
7. Total Nitrogen (% -Dumas Method)

8. Extractable Phosphorus, Potassium & Magnesium (RB427 Method)
9. Organic Matter (% - RB427 Method)
10. Heavy Metals – As, Cd, Cr, Pb, Hg, Se, Cu, Ni, Zn, B
11. Total Cyanide & Total (mono) Phenols
12. Soluble Sulphate, Elemental Sulphur & Total Sulphide
13. Polyaromatic Hydrocarbons (specified US EPA 16)
14. Total Petroleum Hydrocarbons (C10-C40 by GC-FID)

3 Existing Site Won Soil Stripping and Storage

3.1 Generally

3.1.1 Stripping and storage of the existing site topsoil and site subsoil should be carried out as necessary to achieve the required levels and depths of topsoil and subsoil for the ornamental shrub, native planting and turfed areas (refer to clause 3.5). Refer to DEFRA Construction Code for the Sustainable Use of Soils on Construction Sites (2009) for more details.

3.1.2 No works or storage of soil shall be allowed within the Root Protection Areas (RPA) of existing trees without the express consent of Arboriculturalist. Refer to BS 5837:2012 Trees in relation to design, demolition and construction.

3.2 Removal of inorganic materials prior to soil stripping

3.2.1 Following the stripping of all site vegetation (as detailed in Section 2 above), an assessment should be made as to whether any part of the existing ground is made up with inorganic materials, hardstanding etc. If this is the case, all such material is to be excavated to a sufficient depth that the original soil layer is reached.

3.2.2 All inorganic materials etc. are to be removed and disposed of off site, to allow promotion of a free draining growing medium. The Contractor is responsible for assessing the extent and depth of material to be broken out, and is to allow for this in his price.

3.3 Calculation of quantities of soil required

3.3.1 The Contractor shall calculate the quantities of soil required to be stripped for the soft landscaped areas (ornamental shrub, native planting and turfed areas). *Refer to clause 3.5 for details of both the required depths of topsoil / subsoil, and the depths of reduce level excavations.*

- In some areas, the existing site soils may be left in-situ, but will require some additional subsoil spreading to make up the levels prior to topsoil spreading
- In other areas, reduce level excavations of the existing site soils may be necessary to achieve the correct levels, prior to top soiling works

3.4 Topsoil stripping and storage

3.4.1 Where existing topsoil is available on the site, topsoil for re-use shall be stripped from the top humus bearing horizons of the soil and shall be stored at an agreed site in preparation for re-spreading in the areas to be landscaped. The Contractor shall inspect the topsoil prior to stripping. Prior to uplifting and topsoiling the Contractor shall give the Employer and Landscape Consultant 48 hours' notice.

3.4.2 Determine the depth of the existing site topsoil and carefully strip to remove surface layers without incorporating sub-soil or other deleterious matter.

3.4.3 Soil should be stripped in layers of no more than 150mm thick. This should be carried out using the digging bucket of a tracked excavator 360 machine or similar, with the teeth up to the lip of the bucket used to comb the surface in order to break up any clods. Any pockets of compacted clay or stony soil to be removed from site. No equipment should be permitted to travel over stripped area.

3.4.4 Soil stripping shall only be carried out when the soil is in a sufficiently dry condition, capable of being handled without significant damage

3.4.5 Remove topsoil in successive linear strips without driving over disturbed ground.

3.4.6 The Contractor shall avoid any double handling of stripped topsoil prior to tipping in the temporary soil heaps.

3.4.7 Topsoil shall be tipped from dump trucks onto the storage areas, building up linear heaps to form un-compacted stockpiles. These should be shaped to shed water and be:

- maximum height of two metres when un-compacted
- maximum width of ten metres

3.4.8 On no account is the topsoil to be compacted in the heaps or trafficked over by machinery. All material to be placed from the core outwards in successive strips.

3.4.9 Tidy up edge of heap and gently rake to shape heap with a slightly convex surface. No machinery shall drive over any part of the spoil heap.

3.4.10 Take all necessary measures to ensure weed control by application of appropriate, non-residual herbicides to topsoil heap to prevent noxious weeds seeding or otherwise causing a nuisance.

3.5 Depth of strip

3.5.1 It is the contractor's responsibility to dig trial holes across the site, to establish how deep the existing site soil is which is suitable for re-use. As detailed in clause 3.2, all inorganic materials, hardstanding etc is to be first excavated to a sufficient depth, and removed from site, so that the original soil layer may be reached.

3.5.2 Once the depth of suitable material for stripping and re-use across the site is established, the quantity required for subsoil to all ornamental shrub, native planting and turfed areas is required to be stripped, for storage and re-spreading.

3.6 Loose tipping method of subsoil stripping

3.6.1 All soil shall be stripped using the 'loose-tipping' method that involves the use of tracked excavator and dump trucks.

3.6.2 A tracked hydraulic excavator, fitted with a wide, flat edged ditching/grading bucket, shall be used to strip the soil and load it into a dump truck. A tracked dozer shall NOT be used to strip the soil, unless approved.

3.7 Subsoil storage

3.7.1 The dump truck, running along a pre-designated route, shall then transport the soil to the designated stockpile location. The Contractor shall avoid any double handling of stripped soil prior to tipping in the temporary soil heaps.

3.7.2 The soil, having been transported to the storage area in a dump truck, shall be "loose-tipped" in a line of heaps (maximum ten heaps wide) to form a windrow.

3.7.3 Soil shall be tipped from dump trucks onto the storage areas, building up linear heaps to a maximum height of two metres, un-compacted, and to a maximum width of ten metres. On no account is the soil to be

compacted in the heaps or trafficked over by machinery. All material to be placed from the core outwards in successive strips.

3.7.4 Dump trucks shall not traverse across or reverse up the stockpile.

3.7.5 To protect from wet weather once the final height is achieved, the tracked excavator shall re-grade the sides and top of the stockpile and firm the surface by tracking across it to form a smooth gradient and to seal in the dry topsoil and reduce rainfall infiltration over the winter period.

3.8 Stockpile location

3.8.1 Soil shall be stored in an area of the site where it shall not interfere with other site operations so that it can be left undisturbed during the construction process.

3.9 Site clearance

3.9.1 The area that is to be used for storing the soil shall be cleared of vegetation and any waste arising from the development eg. building rubble and fill materials.

3.9.2 Any in-situ soil present at the storage location shall also be stripped prior to stockpiling. If necessary, provision shall be made to replace this soil after the soil storage period.

3.10 Soil protection

3.10.1 Once the soil stockpiles have been completed, the area shall be cordoned off with Herras fencing (or similar and approved) to prevent any disturbance or contamination by other construction activities.

3.11 Herbicide treatment

3.11.1 At least three weeks before re-spreading the soil, any existing vegetation on the surface of the soil stockpiles shall be sprayed off using an appropriate non-residual, contact herbicide (eg. Glyphosate). A BASIS qualified contractor shall be appointed to carry out all herbicide treatments. Attention to the requirements under current

COSHH and any other relevant Health and Safety regulations shall be adhered to.

3.11.2 Temporary grass or wildflower seed plant could be considered to reduce application of herbicides on soil storage areas

Schedule 1 – Soil depth and type requirements

1. Trees in soft landscape (excluding native woodland whips, transplants and feathers and avenue of trees) planting, ornamental shrubs and hedging soil requirement -

    - Minimum topsoil depth: 450mm (min. 800mm x 800mm width and length of tree pit)
    - Due to the previous nature and use of the site (Grade 2 agricultural soil) it is unlikely we would require additional subsoil minimum, but if this is not available we would need subsoil depth: 300mm

2. Grass turf areas soil requirement -

    - Minimum topsoil depth: 150mm
    - Due to the previous nature and use of the site (Grade 2 agricultural soil) it is unlikely we would require additional subsoil minimum, but if this is not available we would need subsoil depth: 300mm

3. Native woodland whips, feathers and transplants soil requirement -

    - Due to the previous nature and use of the site (Grade 2 agricultural soil) it is unlikely we would require additional topsoil, but if this is not available we would need topsoil depth: 150mm

4. Trees in hard landscape and avenue of trees soil requirement –

    - Minimum topsoil depth: 800mm (min. 1200mm x 1200mm width and length of tree pit)
    - Due to the previous nature and use of the site (Grade 2 agricultural soil) it is unlikely we would require additional subsoil minimum, but if this is not available we would need subsoil depth: 300mm