



INFILL AND SOIL SPECIFICATIONS FOR CIVIL ENGINEERS AND LANDSCAPE CONTRACTORS ON BROWNFIELD SITES

INTRODUCTION

Many industrial regions, brownfield sites and waste tips have areas of derelict land which needs to be landscaped, possibly after detoxification and construction work is completed. Additional costs can be incurred if the substrate left on site is unsuitable for plant growth. This can be avoided if appropriate remediation and landscaping are budgeted and supervised in the site clearance contract. Involvement of a landscape consultant or ecologist at an early stage of a redevelopment project can save engineering costs and avoid the need to import expensive topsoil for landscaping.

Similar considerations apply to the landscaping of areas surrounding industrial buildings and the establishment of low maintenance vegetation on road building projects.

The following specifications aim to ensure that a site is prepared for landscaping in the most cost effective manner.

GENERAL CONSIDERATIONS

- Discuss a suitable landscaping plan with an ecologist or landscape consultant at the project planning stage.
- Determine overall objectives and contours of the final landscape scheme before commencing the civil engineering stage.
- Closely supervise the deposition of all material into which planting will be made to ensure that it complies with the specifications below.

Effective liaison between the landscape manager and the civil engineers to achieve compliance with these principles will avoid costly mistakes.

MATERIAL FOR PLANTING TREES AND SHRUBS

Depth of rooting material

The depth of rooting material should be a minimum of two metres for trees and a minimum of half a metre for shrubs. These minima may be relaxed where they cover in situ subsoil

which is conducive to root penetration. Subsoils such as clays (unless waterlogged), sands, well jointed chalk are readily penetrated by plant roots and require the minimum of soil covering. Old roadways, concrete floors, granite and other hard rock are unlikely to support mature trees unless covered to a depth of at least two metres.

Scattered concrete foundation blocks of up to five cubic metres can be tolerated, provided they occupy less than 20 per cent of the surface area and the rooting medium (infill) is mounded over them.

Acceptable materials

Topsoil, clay, sand, crushed stone, slag or crushed masonry are all acceptable materials. However, materials derived from former industrial sites, including slag tips and fuel ash should have been chemically analysed to ensure that they do not contain unacceptable contaminants, particularly heavy metals, before commencing the project.

- Crushed stone, masonry and slag should include a high proportion of sand-sized particles and have a volume mean particle diameter of less than 100 cubic centimetres, provided that the spaces between the large particles are filled with sand-sized particles.
- No more than 5 per cent should be decomposable organic matter such as wood or paper.
- No more than 5 per cent should be stones of house-brick size or greater.

Tipping

Where there is a significant percentage of soil or clay in the infill, avoid soil compaction by refraining from driving loaded lorries over already tipped material. In contrast, if the infill is of unconsolidated large particles such as crushed masonry, compaction can be advantageous to soil moisture retention. The type of material being tipped should be monitored continuously and unsatisfactory loads rejected. In particular, guard against deposition of loads of uncrushed masonry and chemically contaminated waste.

Levelling

As soon as tipping is complete, agree the intended final contours of the area with the site manager. Smooth the substrate to the agreed contours by bulldozer as soon as possible, working only when the substrate is sufficiently dry to avoid extensive compaction.

Preparation for planting

Do not cover areas to be used for tree planting with topsoil. Any loads of topsoil available should be reserved for planting pits or directed to areas intended for high quality grass. If perennial weeds appear, spot spray with a suitable systemic herbicide such as glyphosate for grasses and 2,4-D for broad leaved weeds. If annual weeds appear, spray with a suitable non-residual herbicide such as glyphosate before they flower. It is of the utmost importance that no weeds are permitted to seed on the site or on surrounding areas before planting.

Planting

Plant into a weed-free surface between October and March. Generally, trees and shrubs planted into in-situ topsoil can be slot-planted. On stony sites where spade-planting is difficult use 'Rootrainer' grown seedlings which can be planted into holes made with a pointed steel bar. Planting into poorly water retentive infilled substrates such as crushed masonry may require more expensive pit planting, the pits being filled with topsoil mixed with a water-retaining polymer.

MATERIAL FOR SOWING GRASS AND WILDFLOWERS

Depth of rooting material

The required depth of rooting material depends on the standards of visual appearance desired of the vegetation and the quality of the rooting material. On sites where the infill material is permeable to plant roots, adequately moisture retentive and not anaerobic (soils over household waste tips can be anaerobic) a 5cm layer of weed seed free topsoil will be sufficient. Certain substrates such as well-consolidated brick rubble, chalk or fine sand can be vegetated without any topsoil (see fertiliser below) and is ideal for establishing a wildflower seed mixture. However, for grass or lawn areas establishment is much faster and drought resistance better if a 5cm. layer of topsoil is applied. Where a high quality effect, with no summer browning of the vegetation is required a 15 cm layer of topsoil is desirable. For formal grass and lawns, a rooting depth of 20-30cm of well structured sand-sized particles or topsoil is recommended.

Acceptable materials

These are the same as those listed for planting trees and shrubs, with the following provisions:

- No particles of house-brick size or greater and no unsightly material such as plastic or paper should be present in the top 20 cm of infill.
- Where a mixture of substrates is used, an ecologist should be consulted to ensure suitable positioning of each substrate type.
- Where the material is crushed hard masonry or stone, it must contain a sufficiently high proportion of fines with no voids between the larger particles and be well consolidated after deposition to retain moisture after several weeks drought.

- **Tipping and levelling**

Soil, sand and particularly clay must on no account be excessively compacted by vehicles during any stage of the project.

As soon as tipping is complete, agree the contours of the area with the site manager. Smooth the substrate to the agreed contours by bulldozer as soon as possible, working only when the substrate is sufficiently dry to avoid extensive compaction.

If topsoil is to be spread on areas intended to grow high quality pure grass, do so immediately after levelling the site, without excessively compacting the subsoil. On pure clay, 2-5 cm. of weed free topsoil can greatly assist the establishment of grass and wildflowers. It is absolutely essential that weeds are not permitted to establish on the site. Weeds on adjacent areas must be prevented from setting seed to prevent deposition of weed seeds on the site. If weeds appear, spot spray perennials with a suitable systemic herbicide. Spray annual weeds with a suitable non-residual herbicide before they flower.

FERTILISER

On most natural soils and subsoils it is seldom desirable to apply fertiliser to sites where wildflowers are to be established. This is because weeds and grasses tend to grow much more rapidly than many wildflowers on fertile soils. However, on sites where the intention is to establish wildflowers or grassland on pure sand or substrates composed of crushed masonry or quarry waste, application of 200 kg. per hectare of 10:10:10 N.P.K. fertiliser at the time of sowing can greatly speed the establishment of the plants without producing excessive growth in the long term.

SOWING

Grass and wildflower mixtures establish best if sown in September. Sowing in February to the end of April can be successful, but soil moisture becomes critical for later sowing.

Recommendations for soil preparation, suitable seed mixtures and seed sowing are included in Herbiseed Brief Wild Flower Guides Numbers 2, 3 4 and 10. Nevertheless, for major projects you are advised to involve a Herbiseed ecologist at the project planning stage to ensure that the most cost-effective land preparation and seed mixtures are chosen for the project.

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