

## **7. LANDSCAPE WORKS**

### **7.1 General**

In general, the EM & A requirements concerning the landscape works of the EIA relate to contractual matters during implementation, particularly regarding items such as topsoil and tree preservation.

All landscape works shall be designed and implemented to the satisfaction of Highways Department / Landscape Unit, Agriculture and Fisheries Department and Regional Services Department for soft landscape areas, and Highways Department/ Maintenance Division for hard landscape in accordance with WBTC No. 18/94.

### **7.2 Existing trees**

All efforts shall be made to minimise the felling of existing trees. Works areas shall be the minimum practically possible. Tree transplanting shall be considered for accessible and suitably sized trees. Where tree felling is unavoidable, tree felling approval shall be gained in accordance with WBTC 24/94. Compensatory tree planting shall be included as part of the landscape works for the Project. As a minimum, the same number of trees shall be replanted as those felled.

#### *Protection of existing vegetation to be retained*

Adequate measures for the protection of existing vegetation shall be specified. Existing vegetation identified to be retained shall be protected from disturbance by robust fencing and hoarding. Penalties for tree damage shall be included in the contract documents to enforce these requirements.

#### *Tree transplanting*

The transplantability of all trees affected by the works shall be assessed as part of the tree survey and felling application. Where the species or significance of a tree is appropriate and it is physically feasible and cost effective, trees shall be transplanted. New locations for transplanted trees shall be agreed with the relevant Government department. Trees to be transplanted shall be indicated in the Tree Felling Application. Adequate provisions and safeguards shall be made within the contracts for transplanting. Any transplanted trees which die due to the contractors' fault shall be replaced at the contractors' expense and to HyD's satisfaction.

### **7.3 Landscape considerations in the earthworks design**

The following general principles shall be considered in the design:

- wherever feasible, slopes shall be designed to be capable of re-vegetation;

- slope gradients shall allow them to be safely planted and maintained, generally it is not possible to plant slopes steeper than 1:1.5, however, slopes steeper than this could be planted using an alternative method such as a hydroseeding;
- earthworks shall aim, as far as possible, to blend with the surrounding and adjacent landforms, the angle of slope shall relate to the natural angle of slopes in the area and to ensure a subtle transition between newly formed slopes and existing landform, limited additional grading may be necessary at the crest;
- in critical locations, retaining walls and structures shall be considered to reduce the extent of cut;
- planting adjacent to road structures is important for screening and reduction of scale. Where space permits, trees and shrubs shall be planted and where space is limited the structures can be softened by climbing plants;
- if the lower sections of the cut slopes are formed in rock, at-grade planters shall be incorporated into the design to soften the appearance of the slopes;
- the use of shotcrete shall be avoided wherever possible for visual and environmental reasons. Where the use of such stabilisation techniques are unavoidable, they can be partially mitigated by minimising the areas of application to those where it is required for geotechnical reasons. Shotcrete shall be stained or coloured to blend more effectively with the surroundings. Openings for localised planting shall be considered and if space allows toe planters to accommodate screen planting shall be incorporated into the design;
- access to landscape areas for both planting works and slope maintenance operations must be considered from the outset. On steep slopes, ring bolts shall be set into u-channels to anchor safety ropes. It is generally anticipated that service vehicles and operatives will use the hard shoulder and adjacent roads/tracks to access roadside planting. Where this is impossible, additional methods of access should be provided.

#### **7.4 Landscape Proposals**

The landscape proposals will undertake to minimise the visual impacts as highlighted within the EIA Report, particularly through the use of roadside screen planting, slope planting and introduction of tree planting as visual relief.

All earthworks, new roadside areas and areas disturbed by construction shall receive landscape treatments. Soft landscape treatments shall be used wherever engineering conditions allow. Consideration should be given to sight line requirements. Hardworks shall be considered in all other locations. All landscape treatments shall be low maintenance.

All formed soil slopes shall be hydroseeded on completion for stabilisation, erosion control and aesthetic reasons. Hydroseeding of rock slopes shall also be considered to soften the appearance of the slope. It is not intended to establish full grass cover for the entire rockface, but to visually soften it by providing partial vegetative cover through the establishment of clumps of grass on ledges and in pockets on the rockface.

Subsequent landscape treatments shall relate to the existing vegetation patterns and types and be supplemented with fast growing species to create an initial impact. The treatments shall be in accordance with the recommendations for mitigation given in the EIA Report for the Project. Planting on slopes shall be designed to create a complete vegetative cover that will be self-sustaining and require no maintenance following establishment. Planting will be in accordance with Works Branch Technical Circular No 25/92 "Allocation of Space for Urban Tree" where appropriate.

Soft landscape works including slope planting, access road verge and medium, amenity planting and trees in paving and planters, shall be included as an integral part of the highway proposals and shall be approved by HyD/Landscape Unit, AFD and RSD (the ultimate maintenance agencies) prior to tender. Hard landscape works including elements such as roadside planters, bollards, benches, litter bins and tree guards shall be approved by HyD/Maintenance, RSD and ASD in accordance with WBTC No. 18/94.

The soft landscape works shall be subject to a one year Establishment Period as part of the Contract.

## **7.5 Appearance of engineering structures**

Consideration shall be given to the appearance of engineering structures which shall:

- be aesthetically compatible with the environment;
- represent creative solutions; and
- incorporate effective landscape treatments, such as mounding and screen planting.

Structures shall be submitted to ACABAS for approval.

## **7.6 Irrigation**

Watering of plant material shall be considered in dry areas below structures, in high profile amenity/ ornamental areas, and in planters constructed on retaining walls and rock slopes. Watering methods and requirements shall be discussed with the future maintenance agency and is likely to be by manual irrigation with waterpoints provided to serve each area.

Irrigation design, where required, shall be to the satisfaction of RSD and DSD and, if automatic, ASD and EMSD.