PARTICULAR SPECIFICATION

APPENDIX AT

TREE TRANSPLANTING

1 TRANSPLANTING OF TREES - METHOD

1.1 Transplanting of trees shall be carried out in accordance to the methodology outlined below:

a) Lightly prune or reduce the tree crown as directed by NParks;

b) Trench around tree base to a depth of at least 1m but not exceeding 1.5m, and with a radius to be decided by NParks. The diameter of the resultant rootball shall be subjected to NParks approval.

c) Wrap and firmly secure the rootball with coarse textile material or approved material and ropes before listing it and severing the remaining roots from ground;

d) Lift, load and transport the tree to the receiving hole carefully so that the ball of earth does not disintegrate and ensure that the top of the rootball is level with existing grade of the receiving site;

e) Place the tree vertically and carefully in the receiving hole; remove binding materials, backfill hole with approved loamy soil and lighting ram soil to a height of 200mm above surrounding ground. The Contractor is to ensure that the root collar of the tree is not buried;

f) The Contractor shall provide proper staking or guying in accordance to **Clause 4** herein;

g) Transplanting shall be carried out within twenty four (24) hours of trenching the rootball, unless prior permission is obtained; and

h) The Contractor shall maintain such transplanted tree for a period of eight (8) weeks after the trees are being transplanted.

1.2 All plant material is to be carefully protected and if necessary, wrapped in the nursery/or on site during lifting, awaiting transportation, during transportation, unloading and during storage on site.

1.3 The Contractor shall barricade all voids in the ground where trenching is carried out and the voids shall be backfilled immediately after removal of the transplanted trees.

1.4 For areas that are inaccessible to lorry cranes, instant trees with smaller rootballs shall be transported with the aid of a Tree Tote Sling or a heavy duty rootball cart.

2 TRANSPLANTING OF TREES TO NPARKS HOLDING AREA

2.1 Transplanting of trees method shall be carried out accordance to **Clause 1**. Trees to be transplanted directly into the ground in holding area shall be carried out beow:-

a) Prepare the receiving hole to the depth of the rootball. Receiving hole is to be lined with root control bag and backfill with infill materials as directed by NParks; and

2.2 Transplanting tree to holding area, where trees are not be planted in-ground.

a) Prepare wire mesh retainer according to the size of the root ball. The retainer is to be lined with geotextile as directed by NParks; and

b) Place the tree vertically and carefully in the retainer lined with geotextile, backfill with infill materials as directed by NParks.

3 PROTECTION OF PLANTS IN TRANSIT

3.1 All plant materials are to be carefully protected and if necessary, wrapped in the nursery before lifting, or awaiting transportation, during transportation and protected sufficiently during rigging and lifting to the planting site.

3.2 Plants to be transported or moved are to be thoroughly wrapped and protected prior to transporting. Rootballs are to be wrapped and tied with gunny sack or hessian sacks or other approved material if not containerised. Exposed trunks are to be wrapped in similar materials including the lower parts of the branch system. The upper branch system, especially if well furnished with leaves and twigs during transport is to be completely wrapped in lightweight netting or cloth tied carefully to avoid damage to branches, damage from overhead structures and from buffeting and shall be covered by canvas as protection from wing. Anti-transpirants shall be applied if necessary.

3.3 Any evidence of unsatisfactory protection to roots, trunk, branches and leaves shall result in plants being rejected. Unprotected plants must not be transported during very hot weather, and all plants and rootballs must be kept moist during transportation and storage. No plant material shall be left on site unplanted for more than two days.

3.4 Where necessary, the Contractor shall acclimatise instant trees and saplings that are being imported from regional countries in an approved holding area and properly set them out and supported to maintain sufficient distances in between trees to prevent damage to tree branches and form. These trees are to be staked, watered and maintained prior to planting on site.

4 STAKING AND GUYING

4.1 NParks may request any type of staking and guying for planting and transplanting works. The Contractor shall deemed to have provided such staking or guying in the Contract Price.

4.2 Unless otherwise instructed by the Authority, tripod staking consisting of three galvanised pipes should be used for all newly planted or transplanted trees and single stem palms.

4.3 Ties are to be of an approved nylon type. Ties are to be fastened with a rubber hose or approved equivalent to avoid rubbing, chafing or abrasion of the bark.

4.4 Some of the common types of staking and guying are:

a) Tripod or quadropod staking for large trees or palms. Three or four stakes shall be positioned equidistantly around the tree and firmly driven into the ground at angles of between 30-40 degrees. The inner ends of the stakes shall extend beyond the tree trunk by not more than 150mm and shall not be higher than 300mm below the lowest branch. The tree trunk shall be wrapped in gunny sack at the point where the tree stakes are to be fastened in order to prevent bark damage. The stakes shall be neatly and firmly fastened to the tree trunk using rubber hose or cord. String or raffia shall not be used;

b) Multiply Guying for large trees or palms. A minimum of three wire guys are to be used per tree. Each guy wire is to be fastened by a loop around the lowest branches of the tree at the junction of the main trunk. Loops are to have protective rubber or plastic hose to prevent chafing and are to be fastened back to the guy wire by means of u-clamps or bolts. Guy wires are to be fastened at ground level to short stakes firmly driven at an angle into the ground. Stakes shall be a minimum length of 600mm and are driven deep enough to resist movement. A notch is to be made near the top of each stake for the fastening of the guy wire. Stakes shall be positioned equally around the tree and shall be at least 300mm beyond the extent of the tree pit. Distance away from the tree shall be gauged on site to provide firm and secure guying. Each guy wire is to have one turnbuckle located near the fastening to the stake. Guy wires are to be kept properly tensioned and adjusted to maintain the tree in a vertical position without guy wires being too rigid. Guy wires are to be marked with flags or tape to alert the public of its presence to prevent accidents;

c) Double Staking for trees and palms. Two stakes shall be driven into the ground in a vertical position on either side of and outside the rootball of the tree so as to form a straight line with the trunk at the centre. Stakes shall be driven in to penetrate the bottom of the tree pit and be deep enough to resist lateral movement when tested. Stakes shall not extend beyond the lowest branch of the tree and if necessary are to be sawn off at the top. Fastening or securing of the tree may be carried out by using either:

    i. Cross-Bar – a cross bar of the same section as the stakes are fastened in a horizontal position to the outside of the stakes by tying securely at a level below the lowest branch. The tree is fasten to the cross bar with a single adjustable tie of an approved rubberized or plastic type with a spacer and shall be fastened to prevent chafing or abrasion of the bark. No fixing are to be driven into the tree trunk; or

    ii. Wire/Hose Loops. Two separate wire or rope loops are made about the trunk just below the lowest branch with each being fastened back to one of the vertical stakes. Each loop is to have a protective outer covering or sheath of rubber hose to prevent chafing or abrasion of the bark. The wire or rope is to be fastened to the stakes in a manner that allows adjustment of the tension to be made easily. Tension on each wire is to be equal to maintain the tree in a vertical position. When directed by NParks, the tree may be secured with a second set of loops at a lower level.

d) Single Staking for trees and palms of sapling size only. A single stake is driven vertically into the ground 150mm - 250mm away from the tree. The stake is driven beyond the rootball and shall be firm when tested. The top of the stake shall be 100mm below the lowest branch. Two ties of an approved rubberized or plastic type are to be used. Ties are to be fastened with rubber hose to avoid rubbing, chafing or abrasion of the bark; and

e) Barricade type staking where a square timber barricade with cross-bars is constructed around a newly planted tree. The height of the barricade/cross bars shall be ¾ the trunk height when planted and the tree is secured via four (4) nos. of Hose Loop nylon ties diagonally across the top of the square barricade.

4.5 All staking materials shall be provided by the Contractor during planting/transplanting. The Contractor shall ensure that such staking provisions must be maintained to support the tree until it is established or to be removed upon the instruction of the authority. During the establishment period and before handover to the authority, the Contractor shall replace all missing, fallen and damaged staking upon discovery at his own cost.