# Tree Transplanting

## 1. General principles and approaches

1.1 Selecting trees for transplanting

Transplanting involves a good deal of planning, preparation and operations to ensure that the trees are not unduly harmed, and could overcome the unavoidable stresses. Most importantly, they could recover at the receiving site and continue to grow well to serve amenity and landscape functions for at least a few more decades. Plenty of time, effort and resources are needed to implement transplanting successfully. Trees may not be able to tolerate the stresses. Some may succumb to the inordinate pressure. Others may be irreversibly weakened and will continue to decline. Thus in general only the strongest trees with good tree form, having a promising prospect of recovering from the temporary set back, and the species known to withstand transplant stresses, are chosen for transplanting. Larger trees are usually preferred over smaller ones. For rare species, efforts will be made to save them even if they may not be robust or may not have good tree structure.

1.2 Root ball diameter

Whether a tree will survive the transplant is largely hinged upon the size of the root ball. A large root ball will preserve more roots and increase the chance of success. But a large root ball is difficult to handle and expensive to prepare and transport. The converse is true for a small root ball. In practice, a compromise is made in determining the size of a root ball, which should be large enough to accommodate a sufficient amount of roots, and yet not too large as to make the operation unduly difficult. Ideally, the root ball should reach the drip line (outer edge of the crown). In practice, a rule of thumb could be applied. The diameter of the root ball should be at least 10 times the DBH. The root ball could either be circular or square in plan.

1.3 Root ball depth

The depth of a root ball, contrary to common belief, does not need to be too deep even for large trees. Based on modern arboricultural research, most tree roots are found to be confined to the top 1 m or so of the soil. Thus a root ball of about 1 m deep will be adequate for most trees, unless the tree is exceptionally large in which case the depth could be correspondingly increased. As a rule of thumb, for a root ball <2 m diameter, a depth of 80 cm is recommended. For a root ball 2-4 m diameter, a depth of 100 cm is recommended. For a root ball >4 m diameter, a depth of 120 cm is recommended.

1.4 Containment of root balls

The root ball should be held in a rigid container to avoid deformation of the soil, which could break and seriously harm the roots. For a medium or large tree requiring a sizeable root ball >2 m diameter, it should be securely protected by steel sheets welded together and reinforced by I-beams. A strong box must be built around the root ball so that it could be lifted without deforming the soil, and that the root ball can remain intact in the course of transportation and handling associated with planting at the receiving site. A structural engineer should be drafted into the team to help with the steel box design and construction, and the lifting and transportation of the tree. Lifting harnesses should only be attached to the steel members; they must not be attached to the tree trunk or any parts of the tree. For small root balls <2 m diameter, the ball and burlap method using Hessian cloth and ropes would suffice. Lifting harnesses should only be attached to the root ball. For both methods, the bottom of the root ball must be properly secured before lifting the tree.

1.5 Avoidance of branch pruning

There is no need to prune the branches or top the trees before transplanting. In Hong Kong most landscape contractors still adhere to this erroneous 19$^{th}$ century practice, which has been found to be unnecessary based on modern arboricultural research. Trees are carefully selected for transplanting based mainly on their good form and robustness. Any attempt to prune a tree severely will destroy its tree form and health, rendering them unsuitable for transplanting. It does not make sense to degrade before the move the very quality of a tree that qualifies it as transplantable. If necessary, the crown could be cleaned up by removing dead, dying, decayed, broken, crossed and competing branches. If it is found necessary, a small amount of leaves, not more than 20%, could be picked by hand without harming or pruning any woody tissues of the tree.

1.6 Timing of transplanting operations for small trees

For small trees with trunk girth less than 50 cm, they are considered to be young and could be able to tolerate transplant stresses and to recover from the transplant shock. Root pruning, root ball formation and lifting could be conducted in one go, preferably within a span of about one week. The recommended time for transplanting work is the less active growing season in winter. Moving shortly before the return of warmth and rainfall in March will be the best choice, as the settled tree could soon resume more active growth and hence could recover better from transplant shock.

1.7 Timing of transplanting operations for medium trees

For trees with a trunk girth 50-100 cm, a two-phase root pruning is recommended to spread out the transplant shock. Each pruning step should be separated by a three-month recuperation period. The root ball could be divided into four equal sectors (demarcated by two imaginary diameters at right angle to each other), and labelled in the clockwise direction as Sectors A, B, C and D. Sector A shall be reckoned from the north compass point. Roots shall be pruned at the outermost edge (along the circumference) of the circle. Root pruning shall be scheduled to extend over six months as follows:

- November: First pruning shall cut two opposite sectors A and C
- November to February: Three months of recuperation period
- February: Second pruning shall cut two opposite sectors B and D
- February to May: Three months of recuperation period
- May: Lifting and moving the tree to the receiving site

1.8 Receiving site

As far as possible, the trees should be transplanted within the same site. In situ transfer could reduce the chance of tree damage in the course of transportation and increase the probability of long-term survival. In case the medium and large trees have to be moved to another site, any request to trim their crowns down to the width of a carriageway should be resisted. Such a drastic treatment will ruin the trees, and most importantly the very raison d'être for their transplanting will be lost. It will no longer be worthwhile to transplant such damaged and degraded trees. Special permission could be sought from the Transport Department to transport a tree wider than the normal carriageway width on public roads.

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