

SUTHERLAND SHIRE

LANDSCAPE

PART 5: TREE PROTECTION ON
CONSTRUCTING SITES

SUTHERLAND SHIRE
ENVIRONMENTAL SPECIFICATION 2020



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1. Introduction

The Landscape Specification is divided into five sections. Part 1 - *Planting and Landscaping Guidelines* provides information on recommended landscaping standards and techniques. Part 2 – *Specific Uses* provides information on landscaping for specific uses. Part 3 – *Locality Guidelines* provides landscaping guidelines for specific locations. Part 4 - *Plant Selection* contains an extract from the Sutherland Shire Council publication, '*Sutherland Shire Plants A Guide to Indigenous Plant Species Suitable for Landscape and Revegetation Projects*'. This publication has a system for selecting native plants for revegetation and landscaping. The plants have been classified according to their suitability for various urban environmental zones, their landscape uses and their individual characteristics. This section, Part 5 – *Tree protection on Construction Sites* provides detailed guidelines for tree protection.

2. Tree protection on construction sites

2.1 General

- The application of any measures for the protection of trees on development sites is determined by the species characteristics of the subject tree, and the existing physical constraints of the growing environment on site both above and below ground.
- This Appendix is based on Australian Standard AS4970
- Additional or alternative conditions may be appropriate for particular sites. Such additional or alternative conditions may be founded upon professional judgement based on:
 - the experience of the Consulting Arboriculturist
 - scientific research
 - new technology
 - industry best practice
 - consideration of the individual tree species and its relative tolerance to development impacts
 - the individual or cumulative factors present or proposed to impact upon the growing environment essential for the trees' survival
- Where this report makes reference to the retention of subject trees it is for their incorporation into the landscaping works for the site, and includes adjacent neighbours land containing trees and Council owned trees located on abutting road reserve locations

2.2 Protection of Retained Trees

Location of services

If a utility service is to be located within the area of the dripline of a protected tree or within the **Tree Protection Zone**, alternate solutions can be employed, such as excavating a narrow trench passing directly towards the tree along a radius to not closer than 1m from the trunk, tunnel straight beneath the tree, preferably not less than 750mm deep, and exit on the opposite side along another radius.. Provided the trench is kept as narrow as possible, the amount of root severance will be minimal, and will be far less than if a trench passes close beside the tree. It may be necessary to sleeve a service where it passes beneath a tree in order to reduce the risk of damage to the service and facilitate future servicing and repair. The tunnelling could be achieved by the use of lateral boring, or thrust boring equipment to link the two trenches. Such tunnelling is usually undertaken beneath structural woody roots radiating away from the trunk and not just under the centre of the tree, and this may be permissible if such works are excavated manually using hand tools and a Consulting Arboriculturist supervises the works.

Other Tree Protection Measures

Australian Standard AS4970 states that the following alternate protection measures should be used when tree protection fencing cannot be installed or requires temporary removal.

Trunk and branch protection

Where necessary, install protection to the trunk and branches of trees. The materials and positioning are to be specified by the project arborist. A minimum height of 2m is recommended.

Do not attach temporary power lines, stays, guys and the like to the tree. Do not drive nails into the trunks or branches.

Ground Protection

If temporary access for machinery is required within the TPZ, ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards. Rumble boards should be of suitable thickness to prevent soil compaction and root damage.

These measures may be applied to root zones beyond the TPZ.

Root protection during works within the TPZ

Some approved works within the TPZ, such as regrading, installation of piers or landscaping may have potential to damage roots.

If the grade is to be raised the material should be coarser or more porous than the underlying material. Depth and compaction should be minimised.

Manual excavation should be carried out under the supervision of the project arborist to identify roots critical to tree stability. Relocation or redesign of works may be required.

Where the project arborist identifies roots to be pruned within or at the outer edge of the TPZ, they should be pruned with a final cut to undamaged wood. Pruning cuts should be made with sharp tools such as secateurs, handsaws or chainsaws. Pruning wounds should not be treated with dressings or paints. It is not acceptable for roots within the TPZ to be 'pruned' with machinery such as backhoes or excavators.

Where roots within the TPZ are exposed by excavation, temporary root protection should be installed to prevent them drying out. This may include jute mesh or hessian sheeting as multiple layers over exposed roots and excavated soil profile, extending to the full depth of the root zone. Root protection sheeting should be pegged in place and kept moist during the period that the root zone is exposed.

Other excavation works in proximity to trees, including landscape works such as paving, irrigation and planting can adversely affect root systems. Seek advice from the project arborist.

Scaffolding

Where scaffolding is required it should be erected outside the TPZ. Where it is essential for scaffolding to be erected within the TPZ, branch removal should be minimised. This can be achieved by designing scaffolding to avoid branches or tying back branches. Where pruning is unavoidable, it must be specified by the project arborist in accordance with AS4373.

Ground below the scaffolding should be protected by boarding (eg scaffold board or plywood sheeting). Where access is required, a board walk or other surface material should be installed to minimise soil compaction. Boarding should be placed over a layer of mulch and impervious sheeting to prevent soil contamination. The boarding should be left in place until the scaffolding is removed.

3. Demolition of Built Structures: Precautions to Protect Trees

3.1 Demolition of landscape structures

The demolition of walls, driveways retaining walls, paths and pools etc. within 6m of a tree to be retained should be undertaken manually using hand tools. Where a driveway is to be demolished being of concrete strip or slab type construction, it should be undertaken by working from the end of the driveway closest to the building back towards the street by utilising the driveway as a stable platform to prevent soil compaction. Where a concrete slab driveway passes less than 1m from the base of a tree and the area beneath the driveway is to be undisturbed and incorporated into the landscape works for the site, the volume of space previously occupied by the driveway must be replaced with local top soil from the site or otherwise a loamy sand, to replace the mass of the concrete on the root plate which may be critical to the ballast and centre of mass for the stability of the tree. If the tree becomes unstable immediately contact the Consultant Arboriculturist.

3.2 Removal of existing trees near trees to be retained

Removal of a tree within 6m of a tree to be retained should be undertaken only by cutting down such a tree without damaging the trees to be retained, and by grinding out its stump. Where possible the structural roots of 20mm diameter or greater of the tree to be cut down should not be removed, to minimise soil disturbance and to reduce the impact on the roots of any tree to be retained nearby. Where structural roots are to be removed this should be undertaken manually by the use of non-motorized hand tools after the stump has been ground out when such roots are often easier to locate from the site of the stump from which they have been severed.

Poisoning of cut stumps is to be avoided where trees of the same species are being retained nearby so that no accidental translocation of the poison occurs. Root grafting and shared root stocks are common where stands of the same species are found.

4. Excavation and construction close to Tree Protection Zones

4.1 Excavation close to Tree Protection Zones

- Where structural woody roots with a diameter of 20mm or greater are to be pruned outside the area of the **Tree Protection Zone**, they are to be excavated manually first by using hand tools to determine their location. A waterknife or airknife can be used as a mechanised alternative to locate such structural woody roots. Once located those roots to be severed are to be cut cleanly with a final cut to undamaged woody tissue and this will prevent tearing damage to the roots from excavation equipment which can extend beyond the point of excavation back towards the tree.
- Where a large vigorous tree is to be retained near a built structure, and dependent upon its taxa, age class and propensity for its roots system to regenerate, it may be prudent to install a root barrier immediately adjacent to the footing of the new building, or to deepen and strengthen the footings themselves to act as a root barrier, but for such structural advice an appropriately qualified chartered structural engineer or architect should be consulted.

4.2 Root location and protection where structures are to be positioned near a retained tree

- If walls or a driveway or other structures are to be constructed near a protected tree, careful excavation is to be undertaken manually by using non-motorized hand tools to determine the location of first order and lower order structural roots with a diameter of 20mm or greater, without damaging them. Boundary walls or fences should use columns or posts with infill panels, or a wall to be constructed with suspended sections 100mm clear above or beside any structural woody root or further as required, or any new wall to be built only to the depth of that existing. Structural woody roots to be

further protected by utilising the construction techniques of pier or bridge footings, or screw piles between or over them with a minimum clearance above or beside of 100mm, or further as required to allow for future and ongoing growth. Where a driveway or footpath is to pass by the tree a suspended slab is to be constructed or approved similar, to protect the roots that may be encountered at, near, or above ground, and may be constructed on structural soil.

- Alternatively a footpath or driveway may be constructed at or above ground level without any excavation, removing turf by raking, having sprayed with herbicide first if time permits. Here the path or driveway section is to extend at ground level beyond the individual tree's 'tree protection zone' (TPZ) has been passed.

Table 1 Tree Diameter and Root Protection Zone

Tree diameter at breast height (mm)	Root Protection Zone (metres)	Tree diameter at ground level (mm)	Structural Root Zone (metres)
100	2	100	1.5
125	2	125	1.5
150	2	150	1.5
175	2.1	175	1.6
200	2.4	200	1.7
225	2.7	225	1.8
250	3.0	250	1.8
275	3.3	275	1.9
300	3.6	300	2.0
325	3.9	325	2.1
350	4.2	350	2.1
375	4.5	375	2.2
400	4.8	400	2.3
425	5.1	425	2.3
450	5.4	450	2.4
475	5.7	475	2.4
500	6.0	500	2.5
525	6.3	525	2.5
550	6.6	550	2.6
575	6.9	575	2.6
600	7.2	600	2.7
625	7.5	625	2.7

650	7.8	650	2.8
675	8.1	675	2.8
700	8.4	700	2.8
725	8.7	725	2.9
750	9.0	750	2.9
775	9.3	775	3.0
800	9.6	800	3.0
825	9.9	825	3.1
850	10.2	850	3.1
875	10.5	875	3.1
900	10.8	900	3.2
925	11.1	925	3.2
950	11.4	950	3.2
975	11.7	975	3.3
1000	12.0	1000	3.3