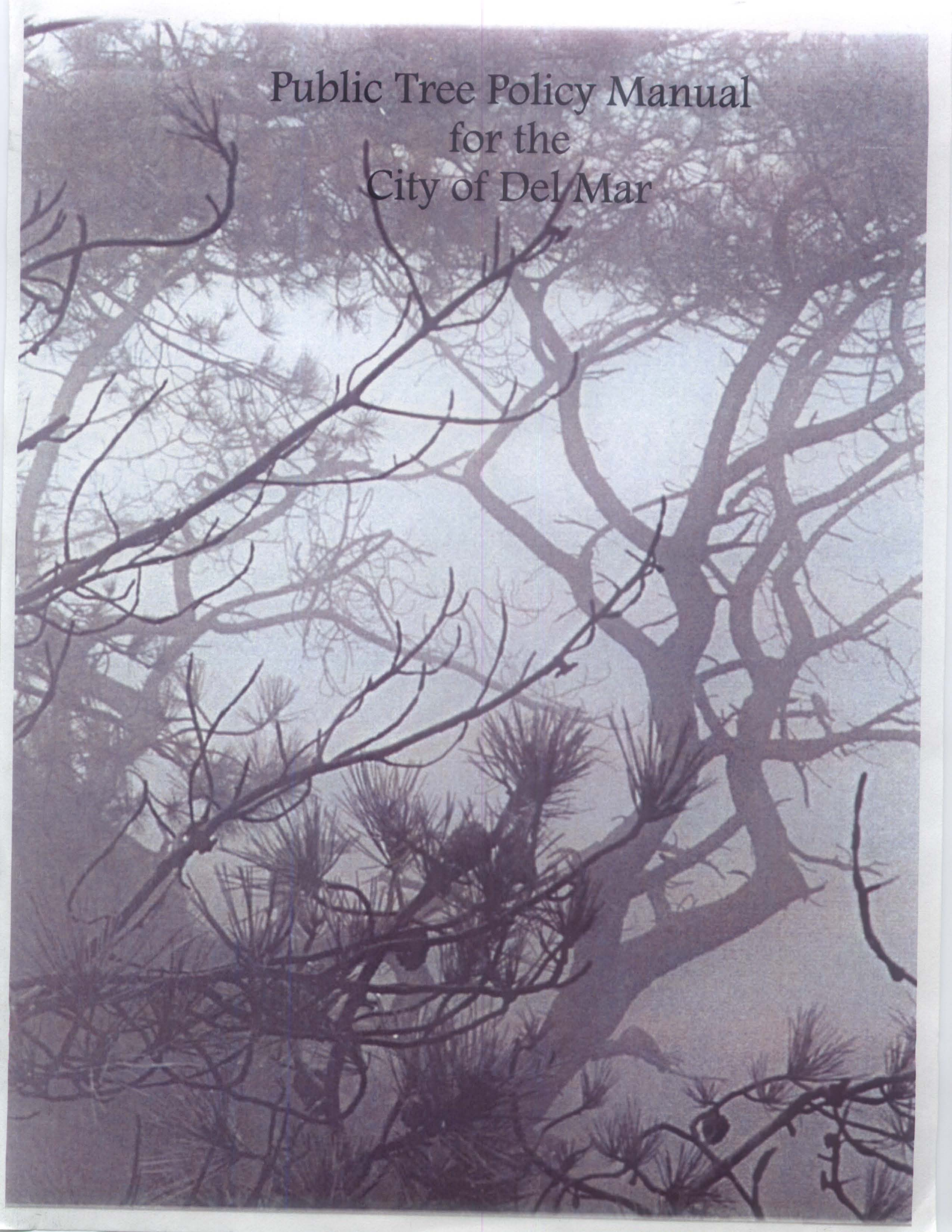
Public Tree Policy Manual for the City of Del Mar



Published by
The City of Del Mar
Department of Planning and Community
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October 2003
Final Approval – February 2, 2004

This document is available on the
City of Del Mar's website:
www.delmar.ca.us

Cover Photo by Harriet Schuman

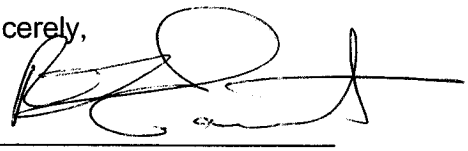
Del Mar Residents, City Officials and All Interested Parties

On February 2, 2004, the City Council of the City of Del Mar officially approved the Public Tree Policy Manual for the City of Del Mar as represented in this report.

Countless hours of effort by many citizens, city officials and staff have been donated to the preparation and adoption of the Manual. Formal acknowledgements of these efforts cannot nearly equal in value the contributions that have been made by these individuals toward the future of the Del Mar Community.

In this context, we believe, and trust that others will agree, that this Public Tree Policy Manual serves as a standard excellence equal to the task of preserving the quality of our liveable village.

Sincerely,



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City of Del Mar

Public Tree Policy Manual
Standards and Specifications

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PURPOSE

The City of Del Mar is committed to the preservation of its unique village-like atmosphere, which is distinguished by its valuable and treasured community forest. Through sustaining the ecosystem, creating visually aesthetic landscaping, and maintaining and encouraging a diversity of trees, both in terms of age and species, our goal to preserve our environment can be achieved.

The Tree Ordinance (Section 23.50) of the Del Mar Municipal Code provides for the orderly protection of specified trees to promote the health, safety, welfare, and quality of life for the residents of the City. By assuring the preservation and protection of the urban forest through regulations and standards of care, our natural resources will continue to enhance the landscape, streets, and parks, while helping to define the unique character of Del Mar.

This Public Tree Policy Manual establishes the specific technical regulations, standards, and specifications needed to implement the Ordinance, and to realize the City's public forest goals.

These goals are intended to provide consistent care and achievement in the following areas:

- Insure and promote preservation of the existing tree canopy cover within the City limits.
- Provide recommended standards for the maintenance of protected and public trees. Del Mar's protected trees are the Torrey Pine and the Monterey Cypress as well as all trees of any species which are located within the Central Commercial, Open Space Overlay Zones of the City, within a public right-of-way, or on public or city-owned property.
- Provide a standardized content for tree reports required by the City.
- Establish criteria for determining when a tree is unsafe and a possible threat to public health, safety, welfare and/or the urban forest.
- Provide standards for the replacement of trees that are permitted to be removed.
- Increase the survivability of trees during and after construction events by providing protection standards and best management practices.

Although the primary intent of this policy manual is to provide guidance to the City for the management of public trees, all Del Mar residents are urged to use it as a reference tool for selecting, planting and maintaining privately-owned trees within the City.

SECTION 1.00 DEFINITIONS

For the purposes of this *Policy* and interpretation of regulations, the following definitions shall apply:

1. Certified Arborist is an individual who has demonstrated knowledge and competency through obtainment of the current International Society of Arboriculture arborist certification, or a Registered Consulting Arborist with the American Society of Consulting Arborists. A certified arborist can be found in the yellow pages of the local telephone book or from the Western Chapter of the ISA at (916) 641-2990 (www.wcisa.org). A Registered Consulting Arborist with the American Society of Consulting Arborists can be found by utilizing the ASCA's referral directory on www.asca-consultants.com .

2. City Arborist means the person designated as such by the City of Del Mar.

3. Compaction means compression of the soil structure or texture by any means that creates an upper layer that is impermeable ('cap'). Compaction is injurious to roots and the health of a tree *(see Soil Compaction Damage, Section 5.20-A).*

4. Dangerous see Hazardous.

5. Dead Tree means a tree that is dead or that has been damaged beyond repair or is in an advanced state of decline (where an insufficient amount of live tissue, green leaves, limbs or branches, exists to sustain life) and has been determined to be such by a certified arborist. This definition may include a tree that is "dying." If the tree has been determined to be dead, removal may be permitted in accordance with Section 23.50.080 C-1 of the Del Mar Municipal Code.

6. Diameter at Breast Height (DBH) or Diameter at Standard Height (DSH) means the diameter of the perimeter tree trunk at four and one-half feet (or 54 inches) above natural grade level The diameter may be calculated by using the following formula: DBH= circumference at 4.5-feet / 3.142 (D=C/Pi). To determine the DBH of multi-trunk trees or measuring trees on slopes, consult the current Guide for Plant Appraisal, published by the Council of Tree and Landscape Appraisers.

7. Director means the Director of Planning and Community Development or the Director's designee, unless otherwise specified in the Policy.

8. Discretionary Development Approval means Design Review Board or City Council approval.

9. Disturbance refers to all of the various activities from construction or development that may damage trees.

10. Dripline Area means the suggested minimum area within X distance from the trunk of a tree in a typical location, measured from the perimeter of the trunk of the tree at 54-inches above natural grade, where X equals a distance ten times the diameter of the trunk at 54-inches above natural grade, or the distance to the outermost edge of the tree canopy, whichever is the lesser distance. (Example; a tree with a DBH of 24" has a drip line radius of 240", (24"DBH x 10 = 240" or 20 feet from the trunk in all directions; 18"DBH x 10 = 180" or 15 feet.

11. Excessive Pruning means removing in excess of one-fourth (25 percent) or greater, of the functioning leaves and stems. Pruning in excess of 25 percent is injurious to the tree and is a prohibited act. Excessive pruning typically results in the tree appearing as a 'bonsai', 'lion's-tailed', 'lolly-popped' or overly thinned *(see 'Standards for Pruning Protected Trees', Section 2.15)*. "Heading Cuts' and "Topping Cuts" are considered to be excessive pruning in the City of Del Mar.

Unbalanced Crown: Excessive pruning also includes removal of the leaf or stem area predominantly on one side, topping, or excessive tree canopy or crown raising. Exceptions are when clearance from overhead utilities or public improvements is required or to abate a hazardous condition or a public nuisance *(see Definitions, Section 1.17)*.

Roots: Excessive pruning may include the cutting of any root two (2) inches or greater in diameter. It is recommended that a Certified Arborist be consulted prior to the any cutting or removal of tree roots.

12. Hazardous Tree refers to a tree that possesses a structural defect which poses an imminent risk if the tree or part of the tree that would fall on someone or something of value (target)*(see Hazardous Trees, Section 4.00)*

13. Injury means a wound resulting from any activity, including but not limited to 'excessive pruning', cutting, trenching, excavating, altering the grade, paving or compaction within the tree protection zone of a tree. Injury shall include bruising, scarring, tearing or breaking of roots, bark, trunk, branches or foliage, herbicide or poisoning, or any other action foreseeably leading to the death or permanent damage to tree health.

14. Project Arborist means a certified arborist (*see Certified Arborist, Section 1.1*) retained by a property owner or development applicant for the purpose of overseeing on-site activity involving the welfare of the trees to be retained. The project arborist shall be responsible for all reports, appraisals, tree preservation plans, or inspections as required.

15. Protected Tree means: 1) a tree of the species *Cupressus macrocarpa* (Monterey Cypress); 2) a tree of the species *Pinus torreyana* (Torrey Pine); 3) a tree of any species located on property within the Central Commercial, Open Space Overlay Zones of the City, within a public right-of-way, or on public or City-owned property; or 4) any tree planted as a result of required mitigation for the removal of another Protected Tree(s).

16. Protective Tree Fencing means a temporary enclosure erected around a tree to be protected at the boundary of the Tree Protection Zone. The fence serves three primary functions: 1) to keep the foliage crown, branch structure and trunk clear from direct contact and damage by equipment, materials or disturbances; 2) to preserve roots and soil in an intact and non-compacted state; and 3) to identify the Tree Protection Zone (*see Section 5.15-E*) in which no soil disturbance is permitted and activities are restricted.

17. Public Nuisance means something that is offensive to the community or that violates the legal rights of persons or the community, as determined only by the Director of Planning and Community Development, City Attorney or the Public Works Department.

18. Public Tree means any tree growing within the street right-of-way [outside of private property], public property or easements. In some cases, property lines lie several feet behind the sidewalks or the edge of the paved street. A City Encroachment Permit is required prior to any work on or around these trees. Check with the Public Works Department to verify prior to any work near a street tree.

19. Recommended Practice means an action, treatment, technique or procedure that may be implemented for superior care or preservation of trees. Recommended practices may be required under specific conditions of approval for discretionary development projects or injury mitigation.

20. Removal means any of the following: 1) complete tree removal such as cutting to the ground or extraction of the tree; or 2) taking any action foreseeably leading to the death of a tree or permanent damage to its health or structural integrity, including but not limited to excessive pruning, cutting, girdling, poisoning, over watering, unauthorized relocation or transportation of a tree, or trenching, excavation, altering the grade, or paving within the dripline of the tree.

21. Required Practice means a mandatory action, treatment, technique or standard of care required to be implemented by the property owner, developer, contractor or designee for the preservation of trees.

22. Root Buffer means a temporary layer of material to protect the soil texture and roots. The buffer shall consist of a base course of tree chips spread over the root area to a minimum of 6-inch depth, capped by a base course of 3/4-inch quarry gravel to stabilize 3/4-inch plywood on top.

23. Site Plan means a set of drawings (e.g. preliminary drawings, site plan, grading, demolition, building, utilities, landscape, irrigation, tree survey, etc.) that show existing site conditions and proposed landscape improvements, including trees to be removed, relocated or retained. Site plans shall include the following minimum information that may impact trees: 1) surveyed tree location, species, size (height, width, DBH or DSH), dripline area (including trees located on neighboring property that overhang the project site) and street trees within 30-feet of the project site; 2) paving, concrete, trenching or grade change (including the limits of over-excavation) located within the tree protection zone; 3) existing and proposed utility pathways; 4) surface and subsurface drainage and aeration systems to be used; 5) walls, tree wells, retaining walls and grade change barriers, both temporary and permanent; 6) landscaping, irrigation and lighting within dripline of trees, including all lines, valves, etc; or 7) location of other landscaping and significant features. All of the final approved site plan sheets shall reference tree protection instructions (*see also Site Plan, Section 6.35*).

24. Soil Compaction means the compression of soil particles that may result from the movement of construction tools (wheelbarrows etc.), workers, heavy machinery and trucks, or storage of construction materials, structures, paving, etc. within the Tree Protection Zone. Soil compaction can result in atrophy of roots and potential death of the tree, with symptoms often taking 3 to 10-years to manifest (*see Soil Compaction, Section 5.20-A; and Aeration, Section 2.50-A*).

25. Soil Fracturing means the loosening of hard or compacted soil around a tree by means of a pneumatic soil probe (Gro-gun) that delivers sudden bursts of air to crack, loosen or expand the soil to improve the root growing environment.

26. Target is a term used to include people, vehicles, structures or something subject to damage by a tree. Note: A tree may not be a hazard if a *"target"* is absent within the falling distance of a tree or its parts (e.g., a defective tree in a non-populated area away from pathways may not be considered a hazard.)

27. Topping means the practice of cutting back large-diameter branches or truncating the main stem.

28. Tree Appraisal means a method of determining the monetary value of a tree as it relates to the real estate value of the property, neighborhood or community. When required, a certified arborist determines the appraisal by adjusting a tree's basic value by its condition, location and species using the most recent edition of the Guide for Plant Appraisal, published by the Council of Tree and Landscape Appraisers (*see Tree Reports, Section 6.00*).

29. Tree Protection and Preservation Plan means a plan prepared by a certified arborist or registered landscape architect that outlines measures to protect and preserve trees on a project (*see Tree Protection and Preservation Plan, Section 5.10 and Reports, Section 6.30*). This plan shall include requirements for preconstruction; treatments during demolition and/or construction; establishment of a Tree Protection Zone for each tree; tree monitoring and inspection schedule; and a provision for continued maintenance of those trees after construction according to the requirements in this Manual.

30. Tree Protection Zone or (TPZ) means, unless otherwise specified by a project arborist or City Arborist, the area of temporary fenced tree enclosure (*see Protective Tree Fencing, Section 5.15-D, and Section 5.15-E*). Within the TPZ, roots that are critical for tree survival are typically found in the upper three foot soil horizon, and may extend beyond the dripline area. Protecting the roots in the TPZ is necessary to ensure the tree's survival. The TPZ is a restricted activity zone where no soil disturbance is permitted, unless otherwise approved. TPZ must be identified for each tree and shown on all applicable improvement plans for a development project. Restricted and approved activities within the TPZ are outlined in Section 5.15-E. Unless otherwise specified, the approved minimum TPZ shall be formulated in the following way: the TPZ radius shall be 10 times the DBH of the trunk or the distance to the outermost edge of the tree canopy, whichever is the lesser distance. (*see Dripline area, Section 1.10*). For example: a 2-foot DBH = a 20-foot radius from the perimeter of the trunk—or a 40-foot TPZ. The City Arborist retains discretionary right to extend or modify the TPZ at any time.

31. Tree Report means a report submitted to the City for review that is prepared by a certified arborist retained by the property owner or agent.

32. Tree Survey Report In the case of a discretionary development approval, a tree survey report is required to provide information about all trees on the site including: inventory of all trees, location, species, size, condition, maintenance needs, potential impacts of disturbance, recommended mitigation measures, tree appraisal value, etc. (*see Tree Reports, Section 6.00*).

33. Tree Policy Manual is this document.

34. Trenching means any excavation to provide irrigation, install foundations, utility lines, services, pipe, drainage or other property improvements below grade. Trenching within the TPZ is injurious to roots and tree health and is prohibited, unless approved. If trenching is approved within the TPZ, it must be in accordance with instructions and table outlined in this Manual (*see Trenching, Section 5.20-C, and Pavement and Hardscape Conflicts with Tree Roots, Section 5.40*).

35. Verification of Tree Protection means the project arborist shall verify, in writing, that all pre-construction conditions have been met (tree fencing, erosion control, pruning, etc.) and are in place. An initial inspection of protective fencing and written verification must be submitted to the City Arborist prior to demolition, grading or building permit issuance (*see Inspections, Section 5.30*).

36. Vertical Mulching means augering, hydraulic or air excavation of vertical holes within a tree's root zone to loosen and aerate the soil, typically to mitigate compacted soil. Holes are typically penetrated 4- to 6-feet on center, 2- to 3-feet deep, 2- to 6-inches in diameter and backfilled with either perlite, vermiculite, peat moss or a mixture thereof.

SECTION 2.00 TREE MAINTENANCE GUIDELINES

INTRODUCTION
This chapter establishes recommendations for the care and maintenance of Del Mar's public trees. These recommendations apply to all persons who own or are engaged in the business of repairing, maintaining, or preserving these trees. The following recommendations are set forth for pruning (including for utility, fire safety and traffic encroachment purposes), planting, watering, soil and nutrient requirements, as well as insect, disease and fruit control. Guidelines for selecting an arborist are also included. These guidelines are based on sound arboricultural principles and are applicable to trees, shrubs and woody plants.

2.10 PROHIBITED ACTS

The following prohibited maintenance practices for protected trees apply.

A. Excessive Pruning
Except for clearance pruning of utility lines, traffic or abating a Public Nuisance, excessive pruning (*see Excessive Pruning, Section 1.11*) shall be considered a prohibited act.

B. Topping
Topping shall be considered a prohibited act (*see Topping, Section 1.27*). Seek alternatives to topping (*see Types of Pruning, Section 2.20-A*).

C. Other prohibited actions
Taking any action which could lead to the death of a tree or could permanently damage its health, including but not limited to excessive pruning, cutting, girdling, poisoning, over watering, unauthorized relocation or transportation of a tree, or trenching, excavating, altering the grade, or paving within the dripline area of a tree.

2.15 STANDARDS FOR PRUNING PUBLIC TREES

The most compelling reason to prune trees is to develop a strong, safe framework. All work to be performed on public trees shall be in accordance with the following standards:

A. Permission
Prior to performing any work on a public tree, an Encroachment Permit from the City of Del Mar must first be obtained. The requirement does not pertain to City personnel or contracted service providers involved in work related/approved activities.

B. Specifications
When an Encroachment Permit is required for work involving a public tree, specifications for the proposed work shall be written and shall be administered by a qualified arborist. Such specifications shall be designed to promote the preservation of tree structure and health.

C. Industry Standards

All work on public trees shall be in accordance with the most current edition of the following industry standards: (*see Performance Standards. Standard Practices for Tree Care Operations - ANSI A300-1995 Appendix G; Safety Standards, ANSI Z133.1-1994, Appendix H; and Tree Pruning Guidelines, Appendix F).*

2.20 PRUNING MATURE TREES

There are six types of pruning that may be required for use on mature regulated trees (*see ISA Tree Pruning Guidelines, Appendix F*). Prior to working on the tree, the tree worker is required to be familiar with these types of pruning as stated in the Performance Standards, ANSI, A300-1995. Species-specific pruning promotes the natural shape of the tree (i.e. excurrent, decurrent, vase-shaped, fast growing, etc.)

A. Types of Pruning

- Crown Cleaning
- Crown Thinning
- Crown Raising
- Crown Restoration
- Crown Reduction
- Utility Pruning

B. Tree Injury

Climbing and pruning practices shall not injure the tree except for the pruning cuts.

C. Timing of Pruning

To reduce the probability of insect infestation, disease, or infection, the following seasonal restrictions apply, except when public safety is a concern (*see Tree Pruning, Surgery and Removal, Section 5.15-G*):

- Pine (Pinus spp.) or Elm (Ulmus spp.): Do not prune March-October.
- All species: Do not prune during the flush of spring shoot growth.
- Trees with thin bark: Do not prune in summer when sunscald injury may be a factor.
- Deciduous trees (leafless in winter): Best pruned November-February.
- Hazardous trees of any species may be pruned any time of the year for abatement reasons.

2.25 PRUNING DISTRESSED TREES

Distressed trees require as much leaf area as possible to overcome stressed conditions. To avoid additional injury, the following measures shall be followed for these trees.

A. Injury or Disturbance

If a tree has been damaged by injury or disturbance, delay pruning until deadwood becomes evident (typically 1-3 years after injury). Crown cleaning is then recommended.

B. Neglect

Trees that have received little or no care or maintenance may need moderate crown thinning, reduction of end weights, or entire crown restoration.

2.30 PRUNING YOUNG TREES

Pruning trees early will improve life expectancy and is a proven, cost-effective measure. Added benefits are also reflected in safer trees with fewer branch failures. Trees that serve as replacements for public trees shall be pruned in the following way:

- Young trees should be pruned during the second year after planting to improve their structure, and only minor crown cleaning every 3-7 years thereafter. Refer to ISA Tree Pruning Guidelines (*see Appendix F*).

- Branches should be spaced at least 18-inches apart to alleviate tight grouping branches.

- Select permanent branching and allow temporary low branching on the lowest part of the trunk to remain.

2.35 WILDLIFE AVOIDANCE / MIGRATORY BIRD TREATY ACT COMPLIANCE

Prior to pruning any tree, it is important to ensure that birds and other wildlife are not currently nesting in the subject tree. For most species of trees, November through February is the best time to prune when considering the health interests of the trees. This time frame is also the best time to prune when trying to avoid bird nests.

It is important to note that state and federal regulations (such as the Migratory Bird Treaty Act) prohibit the disturbance and destruction of active bird nests.

2.40 FERTILIZING

Apply fertilizer only if specified by the City Arborist. Fertilizing mature trees is generally not necessary. Fertilizing may be specified for trees that will be impacted by an upcoming disturbance, grade changes, or a modified environment. Fertilizing, in these instances, may aid the tree to overcome the stress caused by disturbance. Specifications for fertilizing trees will be determined by the City Arborist or City Landscape Architect on a case by case basis.

2.45 WATERING SCHEDULE

Newly installed trees, including drought tolerant species, are dependent upon supplemental irrigation until established, typically for two years. If a tree is native to areas of higher rainfall, then the tree will require supplemental water – usually by means of an irrigation system – throughout its life cycle, unless the tree finds a subterranean water source. Periods of extreme heat, wind or drought may require more or less water than recommended in these specifications. The method and amount that is applied may vary depending upon soil composition, drainage, heat, wind, planting location, or periods of abnormal rainfall (*see Drainage, Section 3.40-C*). With the specific exception of Torrey Pine trees (*see Appendix I*); the watering of public trees or their replacements shall follow these standards:

A. New trees

During the establishment period (1-2 years), trees should be watered thoroughly to their root depth as frequently as needed. A watering schedule, which should include watering frequency and quantity, is recommended. The minimum standards should be as follows:

- 1-3 months in the ground: 4 times per month or as necessary
- 4-6 months in the ground: 2 times per month or as necessary
- 7-12 months in the ground: 1 time per month or as necessary

B. Mature trees

Most mature public trees in the City of Del Mar are established in areas without formal watering systems. These trees shall only receive manual irrigation when it is determined necessary by the City Arborist in order to restore the health of the tree(s). In this case, the watering specifications shall also be determined by the City Arborist.

C. Watering Methods

The method and type of watering system to be used is dependent on the location as well as the associated public improvements installed at the time of the tree planting. It is recommended that trees planted in association with the construction of public improvements (medians, parkways, sidewalk tree wells, etc.) should be irrigated by automated watering systems. The type of automatic irrigation system used shall be determined by the Public Works Director in consultation with the City Landscape Architect and City Arborist.

Trees planted in public areas where no irrigation system exists shall be hand-watered until established. After that, a watering schedule determined by the City Arborist or Landscape Architect, shall be in effect until deemed to be no longer necessary.

2.50 SOIL IMPROVEMENT

Every effort to avoid compaction of soil porosity within the Tree Protection Zone shall be taken at all times (*see Soil Compaction, Section 1.24*). When required by the conditions of the Design Review Board (for a project or as mitigation for injury or a prohibited action), the following performance standards for improvement of compacted or damaged soil shall be implemented:

A. Aeration

Soil that is damaged or compacted within the dripline of public trees shall be loosened or aerated to promote root growth and enhance tree vitality. One of the following aeration methods shall be specified in effort to correct compacted soil conditions:

- Vertical Mulching: auger holes 2 to 4-inch diameter, 2 to 3-feet deep, on 4-foot centers and backfilled with porous material such as perlite, vermiculite or volcanic rock (*see Vertical Mulching, Section 1.36*).

- Radial Trenching: with an air excavator, excavate a soil trench 3 to 6-inches wide and a minimum of 12-inches deep from (approximately) 3-feet from the trunk out to the dripline area. The trenches shall radiate out from one foot apart at the closest point.

- Soil-fracturing with a pneumatic air-driven device (*see Site Plan, Section 1.23*).

- Subsurface injections under moderate hydraulic pressure using a three-foot probe and applied on 3-foot centers under the dripline.

B. Drainage

Adequate drainage must be provided to the surrounding soil for the planting of new trees. If the trees are to be planted in impermeable or infertile soil, and water infiltration rates are less than 2-inches an hour, then one of the following drainage systems or other approved measures must be implemented (*see Drainage, Section 3.40-C*).

- French drain, a minimum of three feet in depth
- Drain tiles or lines beneath the trees
- Auger six drain holes at the bottom perimeter of the planting pit, a minimum of 4-inches in diameter, 24-inches deep and filled with medium sand or fine gravel

2.60 INSECT AND DISEASE CONTROL

If action against pests is warranted, Integrated Pest Management (I.P.M.) suggests that the pest source be identified and targeted with a specific and timely treatment. If it appears that insects or disease may lead to the death of a public tree, then it is the responsibility of the City of Del Mar to evaluate the condition according to the following guidelines and treat the problem in a timely fashion to prevent further deterioration of the tree.

A. Insects

For treatment, consult a pest control operator that is licensed by the California Department of Pesticide Regulation. Accurate timing is critical for success.

- Nontoxic materials should be used whenever possible.

B. Disease and Decay - above ground

Disease such as heart-rot decay that erodes the health or weakens the structure of a public tree may compromise the safety of people or property (*see Hazardous Trees, Section 4.00*). It is the City's responsibility to correct a known hazardous condition in a timely fashion.

- Consult with a certified arborist for remedy possibilities, for example, pruning out infected branches, thinning, or the spray application of a chemical treatment.

C. Disease - below ground

Soil borne diseases, such as Root Rot (Phytophthora sp.), are present in Del Mar soils. Often, a poor landscape design surrounding old trees encourages harmful and often lethal diseases. The following conditions that favor a disease environment must be avoided.

- Conditions to avoid: Compacting of the soil within the tree's dripline, adding fill dirt, rototilling, trenching, removing soil from the tree root area, and excessive or regular watering on or near the tree trunk area and planting incompatible water-loving plants within the tree's dripline. Combined with poorly drained soil, these factors often activate normally dormant fungi to become opportunistic and infect the tree, which can lead to the decline and eventual death of the tree. This decline can be slow and may not be evident for many years.

- Landscape Design: When planning landscaping around a public tree, an evaluation of the tree and soil must be performed to determine if there is a disease present. If the tree is diseased and it is reasonable to expect that landscaping will contribute to decline, permanent damage or render it hazardous, it is the obligation of the City to take reasonable measures to reduce or eliminate the conditions that may cause the decline of the public tree.

2.80 FRUIT CONTROL

While many trees produce flowers or fruit of some kind, some trees can be considered a nuisance if the use area is not compatible with the litter generated by the tree. For example, the dropping fruit of the European Olive (Olea europaea), American Sweet Gum (Liquidamber styraciflua), or acorn drip of a Holly Oak (Quercus ilex) may be a safety hazard if it is in the proximity of a handicap ramp or other high pedestrian area. Insuch cases, control measures are warranted. Control can only be successful if materials are applied carefully at optimum timing. For treatment to control the situation, consult a pest control operator that is licensed by the California Department of Pesticide Regulation.

2.90 FIRE PROTECTION

The following measures are recommended (but not required) to be followed by Del Mar homeowners. If followed, they may help avoid a catastrophic and irreplaceable fire loss to persons, houses, hillsides and mature trees that are centuries old.

Checklist:

- ❑ Keep dry grass mowed below 6-inches.
- ❑ A 30-foot defensible space should be maintained.
- ❑ No vegetation growing or combustible storage under decking.
- ❑ No tree canopy within 10-feet of chimney spark arrester.
- ❑ Break up solid areas of non-fire-resistant, continuous plant growth (which create a fire-ladder).
- ❑ Ask nursery professionals or get advice from a landscape architect or garden designer about fire-resistant shrubs to use in landscaping.
- ❑ Keep tree(s) well watered, regularly pruned and in healthy condition.
- ❑ Prevent build-up of leaves and old branches.
- ❑ No firewood storage within 10-feet of structures.
- ❑ Make sure your driveway, road and bridges allow access for fire equipment (14-foot vehicle clearance needed).
- ❑ Homes adjacent to slopes over 30% will need additional clearing and thinning of vegetation from the structure 100-200 feet to protect against radiant and convective heat currents and flame reach.

2.95 TIPS FOR SELECTING AN ARBORIST

A. Who should you look for?

Hiring a tree care provider deserves careful consideration and caution. A mistake can be expensive and long lasting, while the right choice can assure health, beauty and longer life for your trees and landscape. The following suggestions will help Del Mar residents select an arborist:

- Look for professional membership affiliations. Membership does not guarantee quality, but a lack of may cast doubt on the company's commitment to professionalism.

- Use an arborist or tree worker that has been certified through a program of the International Society of Arboriculture (ISA). This program is the standard of performance for appropriate training, experience and knowledge about tree care.

- It is best to use an arborist who is familiar with the trees and ordinances of the City of Del Mar.

- Require a certificate of insurance including liability for personal injury and property damage, and workers compensation. Phone arborist's insurance company to make certain each policy is current. Under some circumstances, the City may be held financially responsible if an uninsured worker is injured or if damage is done to private property.

- Ask for local references and information about other jobs the company or individual has done in San Diego County. Experience, education and good reputation are signs of a good arborist.

- Have more than one arborist look at your job and give you a written estimate that clearly states their scope of work. Don't expect a company to lower its bid to match another's bid. Be willing to pay for the estimate, if necessary. Two or more opinions and estimates are worth the extra effort.

- A good arborist will offer a wide range of services including removal, pruning, fertilizing, cabling, pest control, etc.

- A good arborist will not recommend topping.

- A knowledgeable arborist will not use climbing spikes if the tree is to remain in the landscape. These should be used only for tree removal or an emergency rescue. Climbing spikes should never be used for trimming, even on palm trees.

- Beware of an arborist who is eager to remove a living tree. Removal clearly should be a last resort.

B. The Contract for Services

To be assured of having your work performed to the standards you expect a contract should include all the necessary assurances. Most companies will provide their own contract and should include the following basics:

- Dates that work will begin and end.

- List exactly what will be done (*see Types of Pruning, Section 2.20*). If the trees are to be sprayed, get a written statement detailing the insect or disease to be treated, the chemical to be used, and what precautions need to be taken.

- If fertilizer is to be used, how many pounds of fertilizer per inch of trunk diameter will be applied and by what method.

- Cleanup procedures should be listed. Clarify if a tree removal includes grinding the stump and surface roots and if so, how deep?

- Will they remove grindings and backfill the hole?

- A traffic/pedestrian control plan.

C. Using Arborists for Preventative Care

- A proactive tree and plant health care program can assure that minor, early pruning will prevent major, corrective pruning later on.

- Annual inspections will likely help you develop the landscape relatively hazard-free and display attractive curb appeal.

- Consulting arborists also offer advice and appraisals, diagnosis of problems, and recommend treatment. They also can provide a second opinion, if needed.

SECTION 3.00 REMOVAL, REPLACEMENT AND PLANTING OF TREES

INTRODUCTION
A Protected Tree may not be removed without City review and approval, except in certain emergencies. The purpose of City review is to verify that the removal is allowed under City law, and to prevent unnecessary tree removal. In some cases, a removed tree must be replaced by the property owner or, in the case of Public Trees, the City. This section refers to the permit application process used for the proposed removal of protected trees and it also provides the technical specifications to be used when planting a new or replacement tree.

3.10 TREE REMOVAL

A. Allowable Removal
A Tree Removal Permit is required to remove a Protected Tree, except in certain situations outlined in DMMC 23.50.050 *(see Appendix A).*

In the case of Public Trees, a [separate] Encroachment Permit from the City is also required. (This statement does not apply to the City or its contractors).

B. Permit Application
Tree Removal Applications are available at the City of Del Mar, Planning Department, 1050 Camino del Mar or on the City's website at www.delmar.ca.us.

3.20 TREE PLANTING SPECIFICATIONS

The following specifications pertain to all trees that are to be planted within the public right-of-way or on publicly-owned property with the exception of Torrey Pine trees, for which specific planting and watering specifications are included as Appendix I. Also, it is highly recommended that the residents of Del Mar follow the species and planting recommendations listed in this manual.

A. Species
Replacement trees shall be of the same species unless the Director of Public Works determines, through consultation with the City Arborist and/or Landscape Architect, that another species would be more suitable for the location. Factors to be considered include: the long term health of the tree in the location; its compatibility with the adjacent uses; and any adopted streetscape or master planting plans that encompass the tree's location. In the event that an alternative species of tree should be planted, the new species shall be selected from the applicable plan or the Preferred Species Tree List (see Appendix C).

B. Location
The location of a replacement tree shall be subject to the approval of the Public Works Director. A replacement tree shall be planted in a reasonable location as close as possible to the removed tree, unless otherwise noted in an approved streetscape or master planting plan.

C. Area Requirements

The planting area that can be considered a minimum size for a tree varies by species. A reference for the width of parkways and tree wells that is to be used as a standard for tree planting area is the most current publication of Street Trees Recommended for Southern California, published by Street Tree Seminar, Inc.

3.30 PLANTING STOCK AND MATERIALS

A. Quality

It is the contractor's responsibility to supply stock that meets ANSI Z60.1-1996 and City of Del Mar Tree Policy Manual Standards and Specifications.

- All plants and trees installed within the City of Del Mar shall conform with American Association of Standards, ANSI Z60.1-1996, *Specifications for Acceptance of Nursery Trees at the Time of Delivery*, in all ways.

- Plants shall be sound, healthy, vigorous, and free of plant disease and insect pests and their eggs.

- Container stock shall be grown for at least 8-months in containers in which delivered and shall not be root bound or have girdling roots.

- Trees shall not have been topped or headed-back.

B. Miscellaneous Materials

When deemed necessary by the City Landscape Architect or City Arborist, the following materials, as specified, shall be used:

- Tree stakes: Support stakes shall be treated or untreated 2-inch diameter Lodgepole Pine, two stakes per tree or approved equivalent. No cross brace shall be used. After installation, stakes shall be trimmed so that the branches clear the top of the stake. Generally, the stakes shall have an installed height of two-thirds the height of the tree.

- Tree Ties. V.I.T or Cinch-Tie: Tree Supports (recommended) or equivalent, twist brace, fabric-reinforced rubber (3/8-inch minimum), or equivalent approved by the City of Del Mar shall be used and installed in a figure eight fashion to support the tree to the stakes at the bending point of the truck.

- Mulch: Screened untreated wood chips 1/2- to 1-inch in size, spread to a 2-inch depth out to the edge of the root ball. The mulch should be kept at least six inches away from the trunk and shall be applied to each tree at two-times the diameter of the tree rootball, if feasible.

- Root Control Barriers: Where appropriate, use along public sidewalks, and as indicated on approved plans and drawings. 18-inch linear barrier shall be used. Unless specified otherwise, a 10-foot length shall be placed on center with the tree and on the sidewalk or curb side only. Root barrier boxes or barrier circles that encircle the tree are not approved. Site appropriate geotextile rootbarriers with pre-emergent may be used.

- Mower guards. For trees in turf areas requiring regular mowing, the tree stem shall be protected with Tree Guard or equivalent and shall be 4' x 4' unless specified otherwise.

- Tree Grates: Where sidewalk width is less than 8-feet and new trees will be installed in a tree well, decomposed granite, d.g., shall be used as a mulch covering that is flush with the surrounding paving, as approved by Public Works. Tree grates are appropriate for some areas of The Village area in Del Mar where a 60" wide pedestrian width cannot be attained without the use of tree grates. Tree grates shall be mounted in tree grate frames. Minimum size for tree grates shall be 5 feet square, but rectangular and larger sizes are encouraged for certain medium to large trees.

3.40 PLANTING SITE PREPARATION

A. Soil Preparation and Conditioning

- All debris, wood chips, pavement, concrete and rocks over 2-inches in diameter shall be removed from the planting pit to a minimum of 24-inch depth, unless specified otherwise *(see also Soil Improvement, Section 2.50)*.

B. Planter Pit

- Trees in a confined planter pit or sidewalk area:
  - The planting hole shall be excavated to the depth of the tree rootball/nursery container x the width of the exposed area.
  - Scarify the sides of the pit.
  - Soil beneath the root ball shall be native, undisturbed soil.

- Trees in all other areas:
  - Excavate the hole's width a minimum of two times the diameter of the container, and deep enough to allow the root ball of the container to rest on firm soil.
  - Scarify the sides and the bottom of the pit.
  - Soil beneath the root ball shall be native, undisturbed soil.

- The tree should be placed so that the long term height of the container root ball will be 1-2-inches higher than the existing grade level.

C. Drainage

1. Planting Percolation Test. A minimum of one test per improvement site is required. Additional tests may be needed as required by Landscape Architect or City Arborist. Fill planting hole with water; provide drainage that is greater than 2-inches per hour. If percolation is less, one or more of the following mitigation measures must be implemented for tree planting *(see Soil Improvement, Section 2.50)*.

2. Poor drainage. For capital improvement projects, a percolation test is required to ensure there is adequate drainage for planting new trees. A minimum of one test per site shall be reviewed with City Landscape Architect or City Arborist prior to

plant installation. One or more of the following mitigations are required for locations with poor drainage.

Mitigation for locations with poor drainage:

- Install French drain. The trench shall radiate aay from the tree and be a minimum of 18-inches in depth filled with drain rock. The grade shall fall away from the tree trunk.
- Install perforated pipe directing water away from the tree.
- Install a drain chimney at the bottom of the planting pit, with a filter-fabric lined, perforated hollow pipe a minimum of 4-inches in diameter to ensure percolation of all water from the filled planter pit. Auger bore drain holes to penetrate hardpan or cileechee clay a minimum of 12-inches into undisturbed pervious soil. Angle the boring as close to vertical as possible.

D. Aeration tubes for trees

- Trees planted in the City right-of-way, sidewalk planter pits, planting strip, medians or protected trees when specifically required in improvement plans, shall use 4-inch diameter perforated aeration piping (rigid or flexible), circling the bottom of the planter connected by a 'T' fitting to two riser tubes with grated caps and wrapped with filter fabric – or other detail as approved by Public Works Director. A detail shall be shown on the approved landscape plans.
- All trees not in a planter *(see Aeration Tube Table,* 3-1) shall be planted with 4-inch diameter perforated aeration tubes with grated plastic caps placed at the edge of the root ball to the bottom of the pit per Table 3-1, Aeration Tubes. Irrigation heads shall not be installed inside the aeration pipes.
- Any of the above holes, pipes, grates or fixtures shall include the installation of Filter Fabric wrap over the side openings and be secured as recommended by manufacturer when connected to an approved aeration system.

TABLE 3-1
Aeration Tubes

AERATION TUBE TABLE	
TREE SIZE	NUMBER OF TUBES
15 gallon trees	one tube
24' box trees	two tubes
36' box trees	two tubes
48" box trees or larger	four tubes or as needed

3.50 PLANTING THE TREE

Unless otherwise directed by the City Arborist or City Landscape Architect, the tree planting guidelines of this policy (see appendix J) shall be used. These guidelines are also intended as a handy reference for private property owners.

3.60 PLANTING IN DIFFICULT SOIL CONDITIONS

A. Turf Areas

In turf areas the watering berm may be eliminated. Trees in turf areas shall have a ring of mulch. The turf shall be maintained a minimum of one foot from the new tree stem, with mulch placed on top of the root ball. The mulch shall be 6-inches away form and not touching the tree stem. In turf areas, install tree guard.

B. Alternate Specifications

Occasionally, tree planting must occur in poor or difficult soil where standard-planting techniques will result in poor-to-average performance or mortality (such as unique or unusual regional geology, slope, soil volume, restrictive physical or chemical properties, poor drainage, etc.). In this case, the responsible party must investigate alternative solutions to enable long-term tree growth. Alternative planting specifications or plans that vary from the native or typical soil conditions shall be submitted to the City Arborist for approval prior to installation.

- Alternative or specified soils, such as engineered, amended or structural urban tree soil mix, including written specifications and physical samples, shall be submitted for approval from the City Arborist and/or Landscape Architect *(see Alternative Base Course Materials, Section 5.40-*D).

SECTION 4.00 HAZARDOUS TREES

INTRODUCTION
Health and safety of a tree are two distinct functional characteristics. A vigorous and healthy tree may not necessarily be of sound wood or structure. To remove a dangerous tree, it must first be evaluated and determined to be "hazardous" as defined in this section. This must be verified in writing by the City Arborist and a Tree Removal Permit shall be obtained before its removal. In accordance in DMMC 23.50.050(C), the City may remove a tree in an emergency situation for reasons of public health, safety and welfare.

A. Tree Hazard Responsibility
On public property, it is the responsibility of the City to mitigate or abate a known hazardous condition of a tree that may be of questionable structure or deemed as hazardous.

B. Recognizing Tree Hazards
Determining whether or not a tree's defect constitutes a condition that presents an imminent hazard requires a high degree of knowledge and experience. Hazard tree assessment of a tree should be evaluated only by an arborist who is familiar with tree physiology and can interpret the external signs of weaknesses, perform internal checks if necessary, and recommend mitigation. The City Arborist shall be responsible for hazard assessment of public trees. (*see Hazard Reduction and Prevention, Section 4.40, and Hazard Evaluation Form, Section 4.20-B*).

4.10 EMERGENCY REMOVAL CONDITIONS

A. Abatement
When a public tree has partially failed or is deemed about to fail and persons or properties are immediately threatened, the Planning Department may approve removal without an Arborist's Report. In emergency circumstances, the situation may exempt the tree from Tree Removal Permit process; however, the tree must be removed in accordance with DMMC Sections 23.50.040 and 23.50.050 (see Appendix A).

4.20 CRITERIA USED BY THE CITY TO DETERMINE IF A TREE IS HAZARDOUS

A. Definition of Hazardous
If a tree possesses a structural defect that may cause the tree or part of the tree to fall on someone or something of value (i.e. *'target'*), and the condition is determined to be imminent, the tree is considered hazardous.

B. Evaluation Form
The City uses the national standard, an ISA - HAZARD EVALUATION FORM as a basis to determine the hazard rating of a tree (*see Hazard Rating, Section 4.25*). This form or an approved equivalent must be completed by the City Arborist.

C. Authorization

If the hazardous condition or *target* cannot be mitigated or reduced to a less than significant level then the tree shall be authorized by the City, in accordance with DMMC Section 23.50.080 C-6, to be removed to abate the condition.

4.25 DETERMINING A TREE'S HAZARD RATING

For the purpose of removal, if a tree is declared a hazard, it must be rated for the level of hazard to persons or property by using the Hazard Rating Formula, or other professional methodology acceptable to the City of Del Mar (*see Hazard rating formula Table 4-1 and Appendix* E).

TABLE 4-1
Hazard Rating Formula

ISA – HAZARD RATING FORMULA **International Society of Arboriculture**			
Failure Potential	**+ Target**	**+ Additional Factors/Size of Part**	**= Hazard Rating**
	+	+	=
1 = low	**1 = low**	**1 = low**	**3 – low**
4 = severe	**4 = severe**	**4 = severe**	**12 = severe**
Note: The above factors are combined to quantify a hazard rating. For example, a minimum rating of 3 is the safest (a low predicable hazard), and the maximum rating of 12 is an imminent hazard (a high predictable hazard). Further details regarding this formula can be found in the ISA-HAZARD EVALUATION FORM (see Appendix C) and the ISA publication * Evaluation of Hazard Trees in Urban Areas, most current edition.			

A. Failure Potential Rating

Failures do not occur at random, but are the result of a combination of defects and aggravating conditions. The scope of the professional evaluation will include structural defects in the tree, including branches, trunk and roots, and shall employ the most current methods of internal decay inspection available); soil/slope and/or creek bank stability; individual species susceptibility to failure; pruning; history; decay weaknesses and any other compromising or pertinent factors considered by the consultant.

B. Target Rating

Evaluation of potential targets shall include people, structures, or property use and occupancy that are imminently threatened. Property use shall consider structures or activities under or around the tree (e.g. building, parking, pedestrian, recreational, utility lines, hardscape, etc.). Occupancy shall consider frequency of use (occasional, intermittent, frequent, or constant), and whether the target will be present when failure occurs.

- Consideration shall be given to whether the target can reasonably be removed or isolated to reduce the hazard rating to a less than significant level. (A target means people or property, public or private).

- A tree may be a potential hazard if it is: (a) a tree with the potential to fail; (b) in an environment that increases the likelihood of failure and; (c) a tree that would strike a target.

C. Additional Factors

Evaluation of other factors that contribute to aggravating conditions shall be considered, such as: size of the affected defect (i.e. a small branch versus the entire tree uprooting); significant potential of fire, utility line contact or catastrophic effects, etc.

4.40 HAZARD REDUCTION AND PREVENTION

A healthy, vigorous tree that receives regular care is less likely to become hazardous than one that is ignored. Prevention is the best solution to the tree hazard problem.

If there are no other options to abate the hazard, the tree may need to be removed entirely (*see Removing a Hazardous Tree, Section 4.10*).

The following checklist may help to avoid future problems:

- ❑ Inspect public trees during scheduled maintenance.
- ❑ Avoid planting brittle species where falling limbs could injure people or property.
- ❑ Prune trees when they are young (*see Pruning Young Trees, Section 2.30*) and regularly thereafter.
- ❑ Use correct pruning methods, always making the pruning cut outside the branch collar. This will allow only the minimum of decay infection.
- ❑ Do not allow topping (*see Definition, Section 1.27*).
- ❑ Plant trees that are not problematic and that fit the site. Select trees based upon their mature height and shape, and make sure the species selected matches the soil and other site characteristics.
- ❑ Erect Tree Protection Zone fencing-around or slightly beyond the root protection zone of trees during construction. Insist that these root protection zones be honored by construction workers.
- ❑ The risk of a hazard tree may be reduced by removing dead and broken branches or reducing branch end weights.
- ❑ Do not plant trees with a narrowly forked stem v-crotch, imbedded bark or girdling root ball.
- ❑ Where a valuable specimen tree may be suspected of developing into a hazardous tree, use landscaping to keep people at a safe distance (*see Determining if a Tree is Hazardous, Section 4.20*).
- ❑ Plant a wide variety of tree species to avoid a monoculture.
- ❑ Develop a diverse tree population with regard to age (20% juvenile, 20% young adult trees, 20% adult, 20% mature).

SECTION 5.00 PROTECTION OF TREES DURING CONSTRUCTION

INTRODUCTION
The objective of this section is to reduce the negative impacts of construction on trees to a less than significant level. The tree protection policies/practices provided herein are intended to insure that appropriate practices will be implemented during a construction project to eliminate undesirable consequences that may result from uninformed or careless acts, and preserve both trees and property values. This chapter of the policy manual has been written to not only protect public trees during the course of public development/construction projects, but to also provide clear direction to applicants for private development when tree protection has been made a condition of Design Review approval.

Typical negative impacts that may occur during construction include:

- Mechanical injury to roots, trunk or branches.
- Compaction of soil, which leads to the degradation of the functioning roots and inhibits the development of new ones and restricts drainage, thus desiccating the roots and enabling water mold fungi to develop.
- Changes in grade which can cut or suffocate roots.
- Alteration of the water table – either raising or lowering.
- Microclimate change, exposing sheltered trees to sun or wind.
- Sterile soil conditions, associated with stripping off topsoil.

Construction projects within the dripline of protected trees shall be implemented to meet the protective practices described in Section 5.00.

5.10 TREE PROTECTION AND PRESERVATION PLAN

Prior to commencement of a development project, the property owner shall have prepared a Tree Protection and Preservation Plan if any activity is proposed within the dripline of a Protected Tree or he/she has been directed to do so by the Design Review Board or City Council. The Tree Protection Plan shall be prepared by a certified arborist or registered landscape architect to assess impacts to trees, recommend mitigation to reduce impacts to a less than significant level and identify construction guidelines to be followed through all phases of a construction project.

5.15 PRE-CONSTRUCTION REQUIREMENT

The following seven elements shall be incorporated within the Tree Protection and Preservation Plan prior to building permit issuance or the commencement of work.

A. Site Plan

On all improvement plans for the project, dimension accurate trunk locations and diameter of all "Protected" trees or trees to be preserved within the development area. Additionally, the plans shall accurately show the dripline of the tree(s) and clearly indicate the Tree Protection Zone to be enclosed with the specified tree fencing as a bold dashed line.

B. Written Report

The Tree Protection and Preservation Plan shall include a letter-type report (*see Tree Protection and Preservation Report, Section 6.30).* The report shall be 1) submitted to the Planning Department and kept in the project file for the subject development project; and 2) printed as additional "notes" on the City approved grading plan and construction plans for the project.

The written report shall consider all applicable requirements of this Chapter and shall include the "Standard Tree Protection Notes" provided by this policy (*see Appendix D*).

C. Verification of Tree Protection

The project arborist or contractor shall verify, in writing, that all preconstruction conditions have been met (tree fencing, erosion control, pruning, etc.) and are in place. Written verification must be submitted to and approved by the Planning Department prior to demolition, grading or building permit issuance (see *Inspections, Section 5.30*).

D. Pre-construction Meeting

The demolition, grading and underground contractors, construction superintendent and other pertinent personnel are required to meet with the Project Arborist at the site prior to beginning work to review procedures, tree protection measures and establish haul routes, staging areas, contacts, watering, etc.

E. Protective Tree Fencing for Protected Trees, Street Trees or Designated Trees

Fenced enclosures shall be erected around trees to be protected to achieve three primary goals: (1) to keep the foliage crowns and branching structure clear from contact by equipment, materials and activities; (2) to preserve roots and soil conditions in an intact and non-compacted state and; (3) to identify the tree protection zone (TPZ) in which no soil disturbance is permitted and activities are restricted, unless otherwise approved (see *Tree Protection Zone, Section 1.30 and 5.15-F).*

Size and Type of Fence:

All trees to be preserved shall be protected with five or six (5' – 6') foot high chain link fences. Fences are to be mounted on two-inch diameter galvanized iron posts, driven into the ground to a depth of at least 2-feet at no more than 10-foot spacing. References to this detail shall appear on grading, demolition, utility and site improvement plans.

Area to be Fenced:

- **Type I Tree Protection**
  The fences shall enclose the entire area under the canopy dripline or TPZ of the tree(s) to be saved throughout the life of the project, or until final improvement work within the area is required, typically near the end of the project. Parking Areas: If the fencing must be located on paving or sidewalk

that will not be demolished, the posts may be supported by an appropriate grade level concrete or metal base.

- **Type II Tree Protection**
  For trees situated within a narrow planting strip, only the planting strip shall be enclosed with the required chain link protective fencing in order to keep the sidewalk and street open for public use.

- **Type III Tree Protection**
  Trees situated in a small tree well or sidewalk planter pit shall be wrapped with 2-inches of orange plastic fencing as padding from the ground to the first branch with 2-inch thick wooden slats bound securely on the outside. During installation of the wood slats, caution shall be used to avoid damaging any bark or branches. Major scaffold limbs may also require plastic fencing as directed by the City Arborist.

Duration: Tree fencing shall be erected before demolition, grading or construction begins and remain in place until final inspection of the project permit, except for work specifically required in the approved plans in which case the project arborist or City Arborist (in the case of street trees) must be consulted.

Warning Sign: A warning sign shall be prominently displayed on each fence. The sign shall be a minimum of 8.5x11-inches and clearly state: "WARNING – Tree Protection Zone – No Unauthorized Entry. This fence shall not be removed."

F. Tree Protection Zone (TPZ)

Each tree to be retained shall have a designated TPZ identifying the area sufficiently large enough to protect the tree and roots from disturbance. The recommended TPZ area can be determined by the formula outlined (*see Definitions, Tree Protection Zone, Section 1.30).* The TPZ shall be shown on all site plans *(see Definitions, Site Plan, Section 1.23)* for the project. Improvements or activities such as paving, utility and irrigation trenching and other ancillary activities shall occur outside the TPZ, unless authorized by the City Arborist. Unless otherwise specified, the protective fencing shall serve as the TPZ.

1. Activities prohibited within the TPZ include:

   - Parking vehicles, storage of building materials, refuse, or excavated spoils, or dumping of poisonous materials on or around trees and roots. Poisonous materials include, but are not limited to: paint, petroleum products, concrete or stucco mix, dirty water or any other material which may be deleterious to tree health.

   - The use of tree trunks as winch support, anchorage, temporary power pole, signposts or other similar function.

   - Cutting of tree roots by utility trenching, foundation digging, placement of curbs and trenches and other miscellaneous excavation without prior approval of the Project Arborist.

- Soil disturbance or grade change (*see Activities During Construction & Demolition Near Trees, Section 5.20).*

- Drainage changes.

2. Activities permitted or required within the TPZ include:

   - Mulching. During construction, wood chips may be spread within the TPZ to a 4-to 6-inch depth, leaving the trunk clear of mulch, to help inadvertent compaction and moisture loss from occurring. The mulch may be removed if improvements or other landscaping is required. Mulch material shall be 2-inch unpainted, untreated wood chip mulch or approved equal.

   - Root Buffer. When areas under the tree canopy cannot be fenced, a temporary buffer is required and shall cover the root zone and remain in place at the specified thickness until final grading stage (*see Definitions, Section 1.22, and Heavy Equipment, Section 5.20-C4).*

   - Irrigation, aeration, fertilizing or other beneficial practices that have been specifically approved for use within the TPZ.

3. Erosion Control. If a tree is adjacent to or in the immediate proximity to a grade slope of 8% (23 degrees) or more, then approved erosion control or silt barriers shall be installed outside the TPZ to prevent siltation and/or erosion within the TPZ.

G. Tree Pruning, Surgery and Removal

Prior to construction, various trees may require that branches be pruned clear from structures, activities, building encroachment or may need to be strengthened by means of mechanical support or surgery. The most compelling reason to prune is to develop a strong, safe framework and tree structure. Such pruning, surgery or the removal of trees shall adhere to the following standards:

1. Pruning limitations:

   - Minimum Pruning: If the project arborist recommends that trees be pruned, and the type of pruning is left unspecified, the standard pruning shall consist of 'crown cleaning' as defined by ISA Pruning Guidelines (*see Pruning, Section 2.15, and Appendix F).* Trees shall be pruned to reduce hazards and develop a strong, safe framework.

   - Maximum Pruning: Maximum pruning should only occur in the rarest situation approved by the City Arborist. No more than one-fourth (25 percent) of the functioning leaf and stem area may be removed within one calendar year of any *protected or* designated tree, or removal of foliage so as to cause the unbalancing of the tree. It must be recognized that trees are individual in form and structure, and that pruning needs may not always fit strict rules. The project arborist shall assume all responsibility for special pruning practices that vary from the standards outlined in this manual *(see Excessive Pruning, Section 1.11).*

- Tree Workers. Pruning shall not be attempted by construction or contractor personnel, but shall be performed by a qualified tree care specialist or certified tree worker, according to specifications contained within this Manual *(see Pruning Mature Trees, Section 2.20).*

2. Surgery. Prior to construction, if it is necessary to promote health and prolong useful life or the structural characteristics, then trees shall be provided the appropriate treatments (e.g. cavity screening, bark tracing, wound treatment, cables, rods or pole supports) as specified by the project arborist *(see ANSI A-300, Appendix G).*

3. Tree Removal Procedure. When trees are removed and adjacent trees that are to be preserved must be protected, then the following tree removal practices apply:

   - Tree Removal
     Removal of trees that extend into the branches or roots of Protected Trees shall not be attempted by demolition or construction personnel, grading or other heavy equipment. A certified arborist or tree worker shall remove the tree carefully in a manner that causes no damage above or below ground to trees that remain.

   - Stump Removal
     If roots are entangled with trees that are to remain, these stumps shall have their roots severed before extracting the stump. Removal shall include the grinding of stump and roots to expose soil beneath stump to provide drainage. In sidewalk or small planter areas to be replanted with a new tree, the entire stump shall be removed and the planting pit dug to a depth of 30-inches. If dug below 30-inches, compact the backfill to prevent settling. Large surface roots three feet from the outside circumference shall be removed, including the spoils, and backfilled with City approved topsoil to grade, and the area tamped to settle the soil.

5.20 ACTIVITIES DURING CONSTRUCTION & DEMOLITION NEAR TREES

Soil disturbance or other injurious and detrimental activity within the Tree Protection Zone (TPZ) is prohibited unless approved by the City based on a tree report. If an injurious event inadvertently occurs, or soil disturbance has been specifically conditioned for project approval, then the following mitigation is required:

A. Soil Compaction
If compaction of soil occurs, it shall be mitigated as outlined in *Soil Compaction Damage, Section 5.20-E and/or Soil Improvement, Section 2.50.*

B. Grading Limitations within the Tree Protection Zone
Grade changes outside of the TPZ shall not significantly alter drainage to the tree.

- Grade changes within the TPZ are not permitted.

C. Trenching, Excavation and Equipment Use

Trenching, excavation or boring activity within the TPZ is restricted to the following activities, conditions and requirements if approved by the City Arborist. Mitigating measures shall include prior notification to and direct supervision by the project arborist.

1. Notification. Contractor shall notify the project arborist a minimum of 24 hours in advance of the activity in the TPZ.

2. Root Severance. Roots that are encountered shall be cut to sound wood and repaired (*see Root Injury, Section 5.25-A1).* Roots 2-inches and greater must remain injury free.

3. Excavation. Any approved excavation, demolition or extraction of material shall be performed with equipment sitting outside the TPZ. Methods permitted are by hand digging, or hydraulic or pneumatic air excavation technology. Avoid excavation within the TPZ during hot, dry weather.

   - If excavating or trenching for drainage, utilities, irrigation lines, etc., it is the duty of the contractor to tunnel under any roots 2-inches in diameter and greater.

   - Prior to excavation for foundation/footings/walls, grading or trenching within the TPZ, roots shall first be severed cleanly 1-foot outside the TPZ and to the depth of the future excavation. The trench must then be hand dug and roots pruned with a sharp handsaw or other approved root pruning equipment.

4. Heavy Equipment. Use of backhoes, steel tread tractors or any heavy vehicles within the TPZ is prohibited unless approved by the City Arborist. If allowed, a protective root buffer is required. The protective buffer shall consist of a base course of tree chips spread over the root area to a minimum of 6-inch depth, layered by ¾-inch quarry gravel to stabilize and ¾-inch plywood on top. This buffer within the TPZ shall be maintained throughout the entire construction process.

   - Structural design. If injurious activity or interference with roots greater than 2-inches will occur within the TPZ, plans shall specify a design of special foundation, footing, walls, concrete slab or pavement designs subject to City Arborist approval. Discontinuous foundations such as concrete pier and structural grade beam must maintain natural grade (not to exceed a 4-inch cut), to minimize root loss and allow the tree to use the existing soil.

   - Basement excavations shall be designed outside the TPZ of all protected trees and shall not be harmful to other mature or neighboring property trees.

D. Tunneling & Directional Drilling

If trenching or pipe installation has been approved within the TPZ, then the trench shall be either cut by hand, air-spade, hydraulic vac-on excavation, or by mechanically boring the tunnel under the roots with a horizontal directional drill and hydraulic or pneumatic air excavation technology. In all cases, install the utility pipe immediately, backfill with soil and soak within the same day.

E. Injury Mitigation

A mitigation program is required if the approved development will cause drought stress, dust accumulation or soil compaction to trees that are to be saved. To help reduce impact injury, one or more of the following mitigation measures shall be implemented and supervised by the project arborist as follows:

1. Irrigation Program. Irrigate to wet the soil within the TPZ to a depth of 12-inches to 18-inches or apply sub-surface irrigation at regular specified intervals by injecting on approximate 3-foot centers, 10-gallons of water per inch trunk diameter within the TPZ. Duration shall be until project completion or monthly until seasonal rainfall totals at least 8-inches of rain, unless specified otherwise by the project arborist.

2. Dust Control Program. During periods of extended drought, wind, or grading; spray wash trunk, limbs and foliage to remove accumulated construction dust.

3. Soil Compaction Damage. Compaction of the soil is the largest killer of trees on construction sites due to suffocation of roots and ensuing decline of tree health. If a compaction event to the upper 12-inch soil horizon within the Tree Protection Zone has or will occur by any means, then one or more of the following mitigation measures shall be implemented *(see Compaction and Grade Change, Section 5.20-A&B and Soil Improvement, Section 2.50).*

   - Type I Mitigation. If an approved paving, hardscape or other compromising material encroaches within the TPZ, an aeration system shall be designed by the project arborist and used within this area (subject to approval by the City Arborist).

   - Type II Mitigation. If inadvertent compaction of the soil has occurred within the TPZ, the soil shall be loosened by one or more of the following methods to promote favorable root conditions: vertical mulching, soil fracturing, core-venting, radial trenching or other method approved by the City Arborist *(see Soil Improvement, Section 2.50).*

   - Type III Mitigation. For City-owned improvements in the right-of-way, areas within the TPZ that will be improved (e.g., asphalt, concrete, or pavement) soil shall be compacted to 95% proctor density. Unimproved soil areas (e.g., grass, open landscape strip, etc.) in the TPZ shall not exceed 85% by water jet compaction.

F. Security Deposits

As a condition of a development approval, the Director may require that the developer post security of between 25% and 100% of the value of the trees to be preserved, as determined under *Section 6.40(B)*. The security may be a cash deposit, letter of credit, or surety bond and shall be filed with the Finance Department. It shall be in a form satisfactory to the Finance Director. The security shall be posted before issuance of any grading or building permits. The guarantee period shall be specified; in general, it shall be at least two years after expected completion of construction. If the trees fail to survive, the developer shall replace them; if the developer fails to do so, the City may use the security to: (1) provide additional trees elsewhere on the site; (2) to add or replace street trees or other public landscaping in the vicinity; or (3) to add trees or other landscaping to other City property.

5.25 DAMAGE TO TREES

A. Reporting

Any damage or injury to trees shall be reported within 6-hours to the project arborist and job superintendent or City Arborist so that mitigation can take place. All mechanical or chemical injury to branches, trunk or roots over 2-inches in diameter shall be reported in the monthly inspection report. In the event of injury, the following mitigation and damage control measures shall apply:

1. Root injury: If trenches are cut and tree roots 2-inches or larger are encountered they must be cleanly cut back to a sound wood lateral root. All exposed root areas within the TPZ shall be backfilled or covered within one hour. Exposed roots may be kept from drying out by temporarily covering the roots and draping layered burlap or carpeting over the upper 3-feet of trench walls. The materials must be kept wet until backfilled to reduce evaporation from the trench walls.

2. Bark or trunk wounding: Current bark tracing and treatment methods shall be performed by a qualified tree care specialist within two days.

3. Scaffold branch or leaf canopy injury: Remove broken or torn branches back to an appropriate branch capable of resuming terminal growth within five days. If leaves are heat scorched from equipment exhaust pipes, consult the project arborist within 6 hours.

5.30 INSPECTION SCHEDULE

The project arborist or landscape Architect retained by the applicant shall conduct the following required observations of construction sites containing protected and designated trees. Observations shall verify that the type of tree protection and/or plantings is consistent with the standards outlined within this Manual and Conditions of Approval for discretionary projects. For each required observation or meeting, a written summary of the changing tree related conditions, actions taken, and condition of trees shall be provided to the City of Del Mar. Monthly Inspection Reports shall be faxed to the Project Planner at (858) 755-2794.

TABLE 5-1

INSPECTION SCHEDULE

A. Inspection of Protective Tree Fencing. The Project Planner shall be in receipt of a written statement from the applicant or project arborist verifying that he has conducted a field inspection of the trees and that the protective tree fencing is in place prior to issuance of a demolition, grading, or building permit, unless otherwise approved (*see Verification of Tree Protection, Section 1.35*).

B. Pre-Construction Meeting. Prior to commencement of construction, the applicant or contractor shall conduct a pre-construction meeting to discuss tree protection with the job site superintendent, grading equipment operators, project arborist, Project Planner, and, if a city maintained irrigation system exists, the Public Works Superintendent.

C. Inspection of Rough Grading. The project arborist shall perform an inspection during the course of rough grading adjacent to the TPZ to ensure trees will not be injured by compaction, cut or fill, drainage or trenching, and if required, inspect aeration systems, tree wells, drains and special paving. The contractor shall provide the project arborist at least 48 hours advance notice of such activity.

D. Monthly Inspections. The project arborist shall perform monthly inspections to monitor changing conditions and tree health. The Project Planner shall be in receipt of an inspection summary during the first week of each calendar month or, immediately if there are any changes to the approved plans or protection measures.

E. Special activity within the Tree Protection Zone. Work in this area (TPZ) requires the direct onsite supervision of the project arborist.

5.40 PAVEMENT AND HARDSCAPE CONFLICTS WITH TREE ROOTS

Conflicts may occur when tree roots grow adjacent to paving, foundations, sidewalks or curbs (hardscape). Improper or careless extraction of these elements can cause severe injury to the roots and instability or even death of the trees. The following alternatives must first be considered before root pruning within TPZ of a Regulated Tree.

A. Removal and Replacement of Pavement or Sidewalk

- Removal of existing pavement over tree roots shall include the following precautions:
  - Break hardscape into manageable pieces with a jackhammer or pick and hand load the pieces onto a loader.
  - The loader must remain on undisturbed pavement or off exposed roots.
  - Do not remove base rock that has been exploited by established absorbing roots.
  - Apply untreated wood chips over the exposed area within one hour, then wet the chips and base rock and keep moist until overlay surface is applied.

- Replacement of pavement or sidewalk shall include the following precautions:

- An alternative to the severance of roots greater than 2-inches in diameter should be considered before cutting roots. If an alternative is not feasible, remove the sidewalk, grind roots only as approved by the City Arborist and replace sidewalk using #3 dowels at the expansion joint if within 10-feet of a street tree.
- Replacement paving shall be unit pavers on structural soil base or concrete with rebar reinforcement if within 10-feet of the trunk of a protected or street tree. Install root barriers along the tree side of the hardscape edge in accordance with Section 3.30-B.

**Note: Any (private) work in the right-of-way requires a City of Del Mar Encroachment Permit.

B. Alternative Methods to Prevent Root Cutting

The following remedies should be considered before cutting tree roots that may result in tree instability or decline:

- Grinding a raised sidewalk edge.
- Ramping the walking surface over the roots or lifted slab with pliable paving.
- Routing the sidewalk around the tree roots.
- Installing flexible paving or rubberized sections.
- On private property, new sidewalk or driveway design should consider alternatives to conventional pavement and sidewalk materials. Substitute permeable materials for typical asphalt or concrete overlay. Sub-base or footings to consider are: permeable paving materials (such as ECO-Stone or RIMA pavers), interlocking pavers, flexible paving, wooden walkways, porches elevated on posts and brick or flagstone walkways on sand foundations.

C. Avoiding Conflict

Conflicts and associated costs can be avoided or reduced by the following planting practices:

- Plant trees that are known to be non-invasive.
- Over soil that shrinks and swells, install a sidewalk with higher strength that has steel reinforcing and/or expansion slip joint dowel reinforcement.
- Follow soil loosening planting techniques to promote proper rooting.
- Install root barrier only along the hardscape area of the tree (but allow roots to use open lawn or planter strip areas).
- Dedicate at least 10-linear feet of planting space for the growth of each tree.

D. Alternative Base Course Materials

When designing hardscape areas near trees, the project architect or engineer should consider the use of recommended base course material such as an engineered structural soil mix. The City of Del Mar approved structural soil mix will allow a long term cost effective tree and infrastructure compatibility that is particularly suited for the following types development projects: repair or replacement of sidewalk greater than 40-feet in length; subdivisions with new street tree plantings; planting areas that are designed over structures or parking garages; or confined parking lot medians and islands or other specialized conditions as warranted.

SECTION 6.00 TREE REPORTS

INTRODUCTION
An arborist report may be needed for development projects and tree removal permits. If required, report must be prepared by a certified arborist for the applicant and submitted to the City for the purpose of providing accurate information and opinion regarding the condition, welfare, maintenance, preservation or value of a protected tree.

A. When a written report is required?
Generally, there are two circumstances in which tree reports are required:

1) When a tree removal permit is sought, and
2) To assess tree impacts and establish tree protection from approved property development.

Types of report formats are: Letter Report, Tree Protection and Preservation Plan and Tree Appraisal.

B. Who may prepare the report?
The tree report is to be prepared by a certified arborist retained by the applicant or property owner. This person shall possess a current ISA certification (*see Certified Arborist, Section 1.1*); be a member of the American Society of Consulting Arborists; or a member of good standing in another nationally recognized tree research, care, and preservation organization.

6.05 TYPE OF REPORT - LETTER FORMAT

A. Letter Report
A brief format is acceptable for (1) and (2) below, and can generally be used for assessing one or two trees. The report is to be on letterhead stationery of the individual preparing the report, including their ISA Certification number.

1. Removal
If for a tree removal (i.e., an application request for a single tree removal only, not in connection with a property development), the report shall provide information as to how each tree meets the criteria for removal listed in DMMC 23.50.080.

2. Development
If for development on a single family residential lot (not a subdivision), the report shall also clearly indicate whether or not a Protected Tree is so close to the 'building area or building footprint' that it will be killed or permanently injured by disturbance. The report must make specific recommendations to protect and preserve the tree during the course of construction that are consistent with the specifications within this Manual *(see Tree Protection & Presentation Report, Section 6.30)*.

6.15 LETTER REPORT – SUBMITTALS

A. Standard information

All letter reports shall contain the following information: Arborist name and certification number; purpose of the report and for whom; site address; date of the inspection(s); a to-scale plan diagram of the tree(s) location, accurate size of the trunk diameter (measurement taken at 54-inches above natural grade); perimeter of leaf canopy; proximity to structures; condition of the tree health (and/or decay presence), condition of the tree structure, imminent danger of failing (ISA Hazard Rating, *see Appendix C*); interface with utility services; conclusion and recommendation(s), photographs (encouraged) and Tree Protection Instructions (if needed).

B. Specific situations

Other conditions may require the following additional information on an as needed basis if requested by the reviewing City staff: tree protection plans; appraised value (*see Tree Appraisal, Section 6.40*); and any other supporting information, photographs, diagrams, etc. that may be necessary.

6.30 TREE PROTECTION AND PRESERVATION REPORT

All protected or designated trees to be retained on a development site shall be shown on approved sets of civil, building and landscape plans and shall be protected during the construction process. A Tree Protection and Preservation Plan submitted for review by the Planning Departments is required when trees to be saved may be injured by disturbance. The tree preservation plan shall assume compliance with standards in Section 5.00 of this Manual (*see Protection of Trees During Construction, Section 5.00*). In addition, the following submittal information must be included in the report:

A. Scope & Construction Phasing

The tree protection and preservation plan shall identify, but not be limited to, written recommendations for the health and long-term welfare of trees that are to be followed during the following distinct phases and conditions: preconstruction; during construction, post construction, demolition activities; methods of avoiding injury, damage treatment and inspections. Schedules shall be included.

B. Tree Protection Zone

The tree protection and preservation plan shall establish a tree protection zone (TPZ) for each tree to be fenced and clearly outline site-specific measures for protection of the trees during construction and describe a plan for continued maintenance of those trees after construction. After project approval, any changes to the protection measures must be approved in writing, by the City Arborist.

6.35 SITE PLAN

The tree protection plan shall include the following site plan elements:

A. Disclosure of all trees on and near the site

The property owner or designee shall provide accurate information to the project arborist to develop the tree protection measures and to enable accurate recommendations to insure their survival. This site plan shall accurately show the surveyed location, species, size of trunk and leaf canopy; show the dripline of any neighboring trees that may overhang the site and street trees that are within 30-feet on each side of the project (*see Tree Disclosure Statement, Appendix I*). Failure to show a tree on the plans that later is determined to be affected by construction may require the work to stop until mitigation can be agreed upon by the property owner and the City.

B. Plans submitted to the City

In addition to the above information, final improvement plans shall include and show the following information: show the tree protection zone of any tree to be retained and denote a 5-foot chain link type fencing around the protected zone of each tree or group of trees (to be clearly identified as such on all plans as a bold-dashed line); permeable paving located within the dripline area; approved utility pathways; grade changes; surface and subsurface drainage and aeration systems to be used; walls, tree wells, retaining walls and grade change barriers, both temporary and permanent; landscaping and irrigation within dripline of trees.

C. Plans must show tree protection

Protective tree fencing identified within the arborist report, both written and diagrammatic, shall be clearly shown as a bold, dashed line on the approved site plans submitted for demolition, grading, construction, building permit or any other aspects that are relevant to the project.

6.40 TREE APPRAISAL

An appraisal is a process for determining a monetary opinion of the value of a tree as it relates to either the arborist is required to determine this value, and must exercise good and fair judgment by adjusting the basic value by the tree's condition and location. There are two methods to determine tree value; 1) the Replacement Method and 2) the Trunk Formula Method.

A. The Replacement Cost Method

Applies to trees removed in accordance with DMMC Section 23.50.090A-2. For this method, the appraised value shall be determined by combining: price quote + transportation + planting + other costs and applying the condition and location value to the tree. The sum of these is the appraised replacement cost.

B. The Trunk Formula Method

Applies to trees that are too large for practical replacement (transplanting) and shall be appraised by: determining the basic tree value and adjusting this value by a condition and location ratings. The appraised value shall be determined by using the most recent edition of the 'Guide for Plant Appraisal', published by the Council of Tree and Landscape Appraisers. The Trunk Formula or Replacement Method Forms established by the International Society of Arboriculture must be used to compute the appraised value. All trees with a stem larger than 4-inches in diameter when measured at 12-inches above natural grade shall be calculated in this manner.

APPENDIX A

For the Tree Policy Manual dated October 2003

CHAPTER 23.50

TREES

23.50.010 Purpose.

A. The City of Del Mar Community Plan has as one of its major goals the preservation of the unique village-like atmosphere of the City of Del Mar and specifically references the preservation of natural vegetation, including tree species. [Ord. 683]

B. In the interest of the public health, safety and welfare, as well as general aesthetics of the community and the importance of the ecology of the area, the City of Del Mar finds it necessary to encourage conservation of trees and the application of management techniques to create a healthy, diverse urban forest, including but not limited to pruning, thinning, trimming, shaping, and selective planting and removal of trees and vegetation within the City of Del Mar on private as well as public property. [Ord. 749]

C. The species Torrey Pine, the species Monterey Cypress, and all species of trees located within the Central Commercial zone and the environmentally sensitive Open Space Overlay zone are of particular significance to the City, and should therefore be protected to conserve the environmental qualities of the City.

23.50.020 Definitions. For the purposes of this Chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section: [Ord. 749]

A. "Accessory Structure". A portion of the main building or a detached subordinate building located on the same lot or premises which is devoted exclusively to an accessory use, and which is used exclusively by the occupants of the main building.

A. "Certified Arborist" shall mean "Certified Arborist" as that term is determined by the International Society of Arboriculture.

B. "Permit" shall mean Tree Removal Permit.

C. "Primary Structure" shall mean a building used for living quarters.

D. "Protected Tree" shall mean:

1. A tree of the species *Cupressus macrocarpa* (Monterey Cypress);

2. A tree of the species *Pinus torreyana* (Torrey Pine);

3. A tree of any species and located on property within the Central Commercial, Open Space Overlay Zones of the City, within a public right-of-way, or on public or City-owned property; or

4. Any tree planted as a result of required mitigation for the removal of another Protected Tree(s).

E. "Tree" shall mean any perennial plant growing on public or private property having a self-supporting woody main stem or trunk.

23.50.030 Prohibitions, Penalties. [Ord. 729, 749]

A. It shall be unlawful, subject to enforcement pursuant to Chapter 1 of this Code as a misdemeanor or infraction, for any person to plant, trim, or remove any vegetation within the public right-of-way without first having obtained an Encroachment Permit under the provisions of this Code.

B. It shall be unlawful, subject to enforcement pursuant to Chapter 1 of this Code as a misdemeanor or infraction, for any person to cut down, remove, destroy, or move a Protected Tree without first having obtained a Tree Removal Permit in accordance with this Chapter unless exempt as set forth in this Chapter.

C. It shall be unlawful, subject to enforcement pursuant to Chapter 1.08 as a misdemeanor or infraction, for any person to damage or deface any vegetation within the public right-of-way or on public property, or a protective structure placed around such vegetation.

D. Any person, including but not limited to the property owner and the person performing the work, who violates any provision of this chapter or any condition imposed upon any permit issued hereunder shall remedy any damage caused by the violation. Such remediation may include, but is not limited to, the following:

1. Replacement of removed or damaged trees in accordance with Section 23.50.090 of this Chapter; and

2. Payment to the City's Tree Mitigation Fund of an amount representing the value of any removed or damaged tree, as determined using the most current International Society of Arboriculture's Guide for Plant Appraisal.

23.50.040 Removal of a Protected Tree Which Is Exempt From Permit Requirement; Notice of Intent. [Ord. 749]

A. A person desiring to cut down, remove, destroy, or move a Protected Tree that is exempt from a permit requirement pursuant to this Chapter shall file a Notice of Intent, using a form supplied by the City, with the Planning and Community Development Director two working days prior to the scheduled removal.

B. The Director or his/her representative shall, within two working days of the filing of Notice of Intent, conduct a site visit to verify that the tree(s) proposed for removal qualifies for a permit exemption.

23.50.050 Exemptions. [Ord. 749]

A. No permit is required by this Chapter for pruning or trimming of any tree on private property.

B. No permit is required by this Chapter to cut down, remove, destroy, or move a Protected Tree under any of the following circumstances. This exemption does not apply to trees within the public right-of-way.

1. When measured two feet above ground level, (a) the Protected Tree has a single trunk circumference of twenty (20) inches or less and is not a replacement tree pursuant to section 23.50.090, or (b) the Protected Tree has multi-trunks having a total circumference of thirty (30) inches or less and is not a replacement tree pursuant to section 23.50.090.

2. When measured two feet above ground level, the trunk of the Protected Tree is located no more than 12 feet from the exterior wall of any Primary Structure or Accessory Structure.

3. When both trees are measured two feet above ground level, the Protected Tree is located no more than 12 feet from another Protected Tree. Only one of the Protected Trees may be removed.

C. No permit is required by this Chapter for the emergency removal of a Protected Tree for reasons of public health, safety and welfare. The Planning and Community Development Department shall be promptly notified of emergency removal.

23.50.060 Director Powers and Duties. The Director of Planning and Community Development shall be responsible for administering and enforcing this chapter. The Director shall have the following powers and duties: [Ord. 749]

A. Grant or deny Tree Removal Permit applications pursuant to this Chapter.

B. Determine mitigation requirements for approved Tree Removal Permits.

C. Determine whether a Protected Tree proposed for removal qualifies for a permit exemption pursuant to the provisions of this Chapter.

23.50.070 Design Review Board Powers and Duties. The Design Review Board shall be responsible for administering and enforcing this chapter when a request for a Tree Removal Permit is a direct result of a concurrent development permit application reviewed by the Design Review Board. The Design Review Board shall have the following powers and duties:

A. Grant or deny Tree Removal Permit applications pursuant to this Chapter.

B. Determine mitigation requirements for approved Tree Removal Permits. [Ord. 749]

23.50.080 Processing of Permits; Standards for Permits. [Ord. 749]

A. Application. A person who desires to cut down, remove, destroy, or move a Protected Tree shall make application for a Tree Removal Permit to the Planning and Community Development Department on a form provided by the City. A processing fee, established by resolution of the City Council, shall be required. The application shall contain the number, species, and size of the trees involved, a statement on the reason for the requested action, a site plan depicting the location of tree(s) proposed for removal and other trees located in the vicinity, and any other pertinent information determined necessary by the Planning and Community Development Director or Design Review Board. This additional information may include a report from a qualified, professional arborist selected and employed by the City. The applicant shall be required to reimburse the City for the cost of such a report. [Ord. 729]

B. Noticing. A notice of the filing of an application for a Tree Removal Permit shall be mailed by the City to persons owning property adjacent to the project site. The mailed notice of application shall advise persons of the date of action and that the application is available for public review at City Hall.

C. Action. The Director or the Design Review Board shall approve or conditionally approve a Tree Removal Permit if the Protected Tree is: [Ord. 749]

1. dead, diseased or injured beyond reclamation, as certified by a tree condition report from an arborist; or

2. crowded by other healthier protected trees; thinning (removal) would promote healthier growth in the trees to remain, as certified by a tree condition report from an arborist; or

3. interfering with existing utilities and/or primary structures, as certified by a report from the public utility operator or a structural engineer; or

4. causing substantial damage to a Primary or Accessory Structure or associated utilities, as certified by a structural engineer when applicable; or

5. interfering with existing improvements, and/or is a danger to the public health, safety, or welfare in the Central Commercial, Open Space Overlay Zone, or on public property or right-of-ways; or

6. deemed a safety hazard in a tree condition report from a Certified Arborist. The report shall include a completed ISA-Hazard Evaluation Form or other methodology acceptable to the City of Del Mar, as well as the observations and opinions of the Arborist. The City reserves the right to retain a Certified Arborist, at the expense of the Applicant, when

needed to review a hazardous tree determination; or

7. deemed by the Trees, Scenic Views and Sunlight Board to be unreasonably blocking a scenic view and/or sunlight of a neighboring residence and the Board has determined that removal of the tree is the only feasible method available for restoration of the affected scenic view and/or sunlight; or

8. located within thirty feet of a Primary or Accessory Structure, when measured two feet above ground level, and the canopy of the tree cannot be reduced so as to:

(i) avoid overhanging the roof of a Primary or Accessory Structure; and
(ii) be at least ten (10) feet from the canopy of any other tree; and
(iii) be at least ten (10) feet from the chimney of any residence.

The feasibility of reducing the tree(s) canopy shall be determined by the City's Arborist and Fire Chief; or

9. voluntarily replaced in accordance with Section 23.50.090A-1. The replacement tree(s) shall be indicated in a covenant on the property on which the tree(s) are located. The replacement tree(s) shall not be eligible for removal in accordance with this Code until it has attained a circumference of at least twenty (20) inches when measured two feet above ground level; or

10. obstructing proposed improvements that cannot be reasonably designed to avoid the need for tree removal, as certified by a report from the project planner and determined by the Director of Planning and Community Development or the Design Review Board based on the following factors:

(i) Early consultation with the City,

(ii) Consideration of practical design alternatives,

(iii) Saving the Protected Tree eliminates all reasonable use of the property, or

(iv) Saving the Protected Tree requires the removal of more desirable trees.

Notwithstanding the existence of conditions 1 through 10 above, the Director of the Design Review Board may deny a Tree Removal Permit if any of the following conditions exist:

1. The tree removal will even after the imposition of permit conditions, endanger the public health, safety, peace, or welfare; or

2. The tree removal will have an adverse impact on the aesthetics of the area surrounding the proposed activity; or

3. Reasonable alternatives to a concurrent development proposal exist which would eliminate the need to remove a Protected Tree; or

4. The applicant has not agreed to perform the conditions of approval imposed by Section 23.050.090.

23.50.090 Conditions on Permit

A. The Planning and Community Development Director or Design Review Board may impose conditions on the permit to achieve the purposes of this Chapter. These conditions include without limitation one or more of the following: [Ord. 729, 749]

1. Requirement that the permittee replace the removed tree on the property. The number and species of replacement trees required shall be determined by the Planning and Community

Development Director in accordance with the Tree Mitigation Replacement Scale below and the species being removed.

Circumference of Single-Trunk Tree To be Replaced*	Replacement Ratio # of Replacement Trees/ # of Removed Trees
20" - 60"	1/1
60" - 100"	2/1
100" or Greater	3/1

Circumference of Multi-Trunk Tree To be Replaced*	Replacement Ratio # of Replacement Trees/ # of Removed Trees
30" - 70"	1/1
70" - 110"	2/1
110" or Greater	3/1

* Measured two feet above ground level

2. Payment into the City's Tree Mitigation Fund, if on-site replacement is not suitable due to site constraints such as, but not limited, to the location of existing structures and vegetation. Payment in-lieu of each required replacement tree shall be equal to the estimated cost required to buy, transport, and plant a 15-gallon, 24"- or 36"-boxed tree of a species and size to be determined by the City. Any such payment is to be used to fund the purchase of additional tree(s), for planting off-site or as approved by the City Council by resolution.

3. Requirements that will preserve surrounding trees and protect those trees from damage from the tree removal.

B. The following criteria shall be considered by the Planning and Community Development Director or Design Review Board, in consultation with the City's Arborist if necessary, when determining whether or not mitigation should be required and which method should be applied.

1. Good forestry practices, i.e., the number of healthy trees that a given parcel of land will support; and

2. The topography of the land and the positive effect that tree replacement could have on soil retention and erosion; and

3. The number, species, size, and location of existing trees in the area; and

4. Whether the replacement tree(s) would create or continue the unreasonable obstruction, as determined in accordance with DMMC 23.51, of the scenic view and/or sunlight of a neighboring residence; and

5. If a tree is to be removed from the public right-of-way, whether the replacement tree(s) would interfere with public utilities, streets, or sidewalks.

23.50.100 Appeal. The decision of the Planning and Community Development Director and the Design Review Board may be appealed to the City Council pursuant to this Code. The provisions of Section 1094.6 of the California Code of Civil Procedure are applicable to judicial review of the City of Del Mar's decisions pursuant to this Chapter. [Ord. 729]

23.50.110 Expiration. Permits will be effective ten (10) working days after approval, unless appealed, and shall be valid for a period of 180 days, subject to a 180-day renewal period at the permittee's request.

APPENDIX B

For the Tree Policy Manual dated October 2003

Recommended Tree List

The purpose of the Del Mar Street Tree List is to establish a compilation of street trees that are physically suitable to the City of Del Mar's environment and aesthetically complement the Del Mar village-like character and "established community forest". Streetscape trees provide a multitude of benefits including: softening the impacts of urban development, enhancing property values and enhancing people's sense of connection to nature. This tree list is intended as a general reference guide providing the requirements and options for proposed trees in the public right-of-way. Residents are encouraged to use this list when selecting tree species for planting on private property, as the various trees were chosen for their compatibility to Del Mar's climate, varied topography and unique mixture of architectural design.

Botanic name	Common name	Height	Type	Drought/ Fire Resistant
Agonis flexuosa	Peppermint Tree	15-40	Evergreen	
Arbutus 'Marina'		15-40	Evergreen	
Arbutus unedo	Strawberry Tree	15-40	Evergreen	Yes
Archontophoenix cunninghamiana	King Palm	Up to 50	Palm	Yes
Bauthinia Blakeana	Hong Kong Orchid Tree	Up to 20	Deciduous	
Brachychiton populneus	Bottle Tree	30-50	Evergreen	
Brahea armata	Blue Hester Palm	Up to 40	Palm	Yes
Brahea edulis	Guadalupe Palm		Palm	Yes
Callistemon citrinus	Lemon Bottlebrush	15-25	Evergreen	
Callistemon rigidus	Stiff Bottlebrush	15-25	Evergreen	
Callistemon viminalis	Weeping Bottlebrush	15-40	Evergreen	
Cassia leptophylla splendida	Golden Wonder Senna	20-25	Evergreen	
Ceanothus arboreus	Feltleaf Ceanothus			
Ceanothus 'Ray Hartman'		12-20	Evergreen	
Cedrus atlantica f.glauca	Atlas Cedar	40+	Evergreen	
Cedrus libani	Cedar of Lebanon	15-80	Evergreen	
Cercis occidentalis	Western Redbud	15-25	Deciduous	Yes
Cercocarpus betuloides minutiflorus	Mountain Mahogany	8	Evergreen	Yes
Chamaerops humilis	Mediterranean Fan Palm	6-20	Palm	
Chionanthus yetusa	Chinese fringe tree		Deciduous	
Cupressus macrocarpa	Monterey Cypress	40+	Evergreen	
Dracaena draco	Dragon Tree	20	Evergreen	
Eriobotrya deflexa	Bronze Loquat	15+	Evergreen	
Eriobotrya japonica	Loquat	15-30	Evergreen	Yes
Feijoa sellowiana	Pineapple Guava	18-25	Evergreen	
Ficus carica 'Brown Turkey'	Edible Fig	15-30	Deciduous	
Geijera parviflora	Australian Willow	25-30	Evergreen	
Juniperus chinensis 'Torulosa'	Hollywood (Twisted) Juniper	20	Evergreen	
Koelreuteria bipinnata	Chinese Flame Tree	15-30	Deciduous	
Koelreuteria paniculata	Goldenrain Tree	20-35	Deciduous	
Leptospermum laevigatum	Australian Tea Tree	15-25	Evergreen	
Leptosperum scoparium 'Ruby Glow'	Ruby Glow'	6-8	Evergreen	

Lyonothamnus floribundus	Catalina Ironwood	30-60	Evergreen	Yes
Lyonothamnus floribundus ssp. Asplenifolius	Fernwood Catalina Ironwood	30-60	Evergreen	
Magnolia grandiflora	'Samuel Sommer'	up to 80	Evergreen	
Magnolia grandiflora	'Russet'	up to 80	Evergreen	
Melaleuca armillaris	Drooping Melaleuca	15-25	Evergreen	Yes
Melaleuca elliptica		8-17	Evergreen	Yes
Melaleuca nesophila	Pink Melaleuca	15-25	Evergreen	Yes
Melaleuca styphelioides	Black Tree Tree	25-40	Evergreen	Yes
Metrosideros excelsus	New Zealand Christmas Tree	15-25	Evergreen	
Olea europaea	Olive (Fruitless ONLY)	25-30	Evergreen	
Phoenix rupicola	Cliff Date Palm	<25	Palm	
Pinus torreyana	Torrey Pine	40+	Evergreen	
Pittisporum tenaifolia tenuifolium	Kohuhu	6-15	Evergreen	
Pittosporum crassifolium	Kato	6-10	Evergreen	
Pittosporum phillyraeoides	Willow Pittosporum	15-25	Evergreen	Yes
Pittosporum rhombifolium	Queensland Pittosporum	15-35	Evergreen	
Pittosporum undulatum	Victorian Box	25-40	Evergreen	
Pittosporum viridiflorum	Cape Pittosporum	15-25	Evergreen	Yes
Podocarpus gracilior	Fern Pine	40	Evergreen	
Podocarpus macrophyllus	Yew Pine	30	Evergreen	
Prunus caroliniana	Carolina Laurel Cherry	15-40	Evergreen	Yes
Prunus cerasifera 'atropurpurea'	Purple-Leaf Plum	Up to 30	Deciduous	
Prunus ilicifolia	Hollyleaf Cherry	15-25	Evergreen	Yes
Prunus lyonii	Catalina Cherry	15-40	Evergreen	Yes
Psidium cattleinum	Strawberry Guava	10	Evergreen	
Quercus agrifolia	Coast Live Oak	40+	Evergreen	Yes
Quercus chrysolepis	Canyon Live Oak	20-40+	Evergreen	
Quercus dumosa	Scrub Oak	3-10	Evergreen	
Quercus engelmannii	Mesa Oak	40+	Evergreen	
Quercus ilex	Holly Oak	40-70	Evergreen	
Quercus suber	Cork Oak	25-40+	Evergreen	Yes
Rhamnus alaternus	Italian Buckthorn	12-20	Evergreen	
Rhaphiolepis 'Magestic Beauty'	India Hawthorne Tree			
Rhus lancea	African Sumac	3-10	Evergreen	Yes
Schinus Molle	California Pepper	25-40	Evergreen	
Tabebuia chrysotricha	T. Pulcherrima	25	Deciduous	
Tabebuia impetiginosa				
Tristania conferta	Brisbane Box	25-40	Evergreen	Yes
Washingtonia robusta	Mexican Fan Palm	100	Palm	
Zizyphus jujuba	Chinese Jujube	20-30	Deciduous	

The trees noted above have been carefully selected by the City to provide a varied selection of new or replacement species for planting in public right-of-way and on publicly owned properties. The list is not all-inclusive, trees not appearing on the list will be considered by the City on a case-by-case basis. Some trees may not be suitable for certain planting areas (e.g. sidewalk planters, under power lines) or areas or micro-climates of the City. Careful consideration should be given when selecting trees for planting near the City's canyons and open space areas and the use of fire resistent tree species and fire safe planting methods is highly recommended.

City of Del Mar
Discouraged Trees
Worksheet May 2004

Botanic name	Common name
Acacia	All
Aesculus californica	California Buckeye
Ailanthus altissima	Tree-Of-Heaven
Alnus rhombifolia	White Alder
Archostaphyles species	Manzanita
Casuarina cunninghamiana	Australian Pine
Casuarina equisetifolia	Horsetail Tree
Casuarina stricta	Beefwood
Cedrus deodara	Deodar Cedar
Erythrina Caffra	Kaffirboom Coral Tree
Escalonia bifida	White Escalonia
Eucalyptus species	All
Fremontodendron species	Flannel bush
Grevillea robusta	Silk Oak
Hakea laurina	Sea Urchin
Juglans californica	California Black Walnut
Juglans hindsii	California Black Walnut
Laurus nobilis	Sweet Bay
Lavatera assurgentiflora	Tree Mallow
Melaleuca linariifolia	Flaxleaf Paperbark
Melaleuca quinquenervia	Cajeput Tree
Myoporum spp.	All
Nerium oleander	Oleander
Photinia fraseri	
Photinia serrulata	Chinese Photinia
Pinus radiata	Monterey Pine
Pistacia chinensis	Chinese Pistache
Platanus acerifolia	London Plane Tree
Sambucus species	Elderberry
Schinus terebinthifolius	Brazilian Pepper Tree
Tamarix aphylla	Athel Tree
Zelkova serrata	Sawleaf Zelkova

APPENDIX C

For the Tree Policy Manual dated October 2003

APPENDIX D

For the Tree Policy Manual dated October 2003

"Tree Protection Plan" – Standard Notes

1. All construction traffic should be kept as far away from the trees as is possible to avoid soil compaction problems.

2. The finished grades, upon completion of the work shall be the same as the original grades of the trees. Drainage plans should be submitted for review if needed.

3. Before the start of any construction work, install a protective 6-foot-high chain link fence or wood fence around the trees at the drip line of the canopies. Organic mulch, such as chipped tree clippings, should be spread over the area inside the fence to a depth of 3" and outside the fence to the existing drip line to a depth of 6". Keep the mulch 1 '- 2' away from the trunks of the trees.

4. Approved excavation should be done by hand if it occurs within the drip line of the trees in order to minimize the damage done to the roots of the trees.

5. At any location where people will walk or use wheelbarrows or similar equipment repeatedly, an elevated-walking surface should be installed to protect the tree's roots and soil from compaction.

6. The installation of all protection devices should be inspected and verified before the start of work and maintained in place until all construction is completed on the site.

7. Do not stockpile any dirt or construction materials under the drip lines or within 25' of the trunk of any tree. Protect the trees from damage during excavations. Use appropriate techniques listed above to prevent the compaction of the soil and/or damage to roots located in the top 12" of the soil.

8. Do not park or service any equipment or vehicles under the drip line of the trees or within 25' of the trunk of any tree unless it is on an existing paved surface.

9. Do not nail or attach anything to the tree's trunks or limbs.

10. Do not spray, dump or discharge onto the soil of the site any paint, chemicals, stucco, concrete waste or similar materials. Proper and adequate disposal and cleanup locations should be provided.

11. Any roots damaged by the excavations, or roots that need to be removed shall be cut cleanly with a sharp implement; either a pruning saw, hand pruners or loppers. Any roots exposed during the excavations shall be covered by wet burlap as soon as possible to reduce the damage caused to the roots by exposure to the sun and from drying due to desiccation.

12. All excavations that have exposed tree roots, or where root pruning was performed, should be backfilled the same day, if at all possible, in order to prevent further root damage. The backfill soil shall be friable soil removed during the excavations.

13. *Upon* installation of any excavated backfill, irrigate with 2" of water applied over the entire area from the trunk to the drip line. *Upon* completion, all excavations shall be sufficiently compacted to prevent any future settling.

14. If excavations are not back-filled the same day, roots are to be kept covered with wet burlap. Excavations left open for more than one day shall be covered with plywood to prevent additional drying overnight. This is not a safety recommendation. All safety procedures required by law and good construction practice for excavations and construction are to be followed.

15. Any root pruning closer than 15' to the trunk of any tree is not recommended, due to the increased injury to the tree and the potential for infection or disease at the site of the pruning cuts. There is also an increased potential for the tree to fall from the resulting impaired anchorage.

16. Utility excavations should not be located within the drip line nor within 25' of any tree's trunk. Utility plans should be submitted for review.

17. No rototilling or soil cultivation should be performed within the drip line or within 25' of any tree's trunk.

18. No planting, except hydro seeding, should be performed either within the drip line or within fifteen feet of any tree trunk. Planting and landscape plans should be submitted for review, only drought tolerant (or local native) plants should be used around the trees.

19. Pruning should be done only during the dormant season in the winter months. There are no restrictions on the removal of dead wood. No green or living branches should be removed.

20. No more than 5% total of the live foliage should be removed from any tree in the period from pre-construction to five years after construction is completed.

21. Pruning for the five (5) years following construction should be limited to the removal of dead wood or to the removal of any branches that break due to storms or natural causes. Pruning to remove any hazardous conditions that may develop can also be performed at any time; no other living branches should be removed.

22. All pruning should be done by a certified arborist or by a certified tree worker under the direct supervision of a certified arborist.

23. All pruning shall be done in accordance with the established Pruning Standards of the Western Chapter of the International Association of Arboriculture.

24. The construction plans and landscape plans should be drafted to incorporate the information provided in this report. Include wording to alert contractors and sub-contractors to the need for tree protection and any restrictions included as part of these recommendations.

25. Apply 2" of water per month during the non-rainy seasons to the trees on an as- needed basis based on the current soil and weather conditions. Water the entire area under the existing canopy using a drip or spray system.

26. Provide for continuing normal tree maintenance during and after construction.

27. A copy of this report should be provided to any arborist, landscape architect or consultant that proposes or offers to perform any work that will have an impact on the trees on this site during the remaining lifetime of these trees.

28. A written description of any work performed on/or to the tree and the dates of any treatment and the results obtained should be maintained in a permanent file and made available to any future arborist, landscape architect or consultant.

APPENDIX E

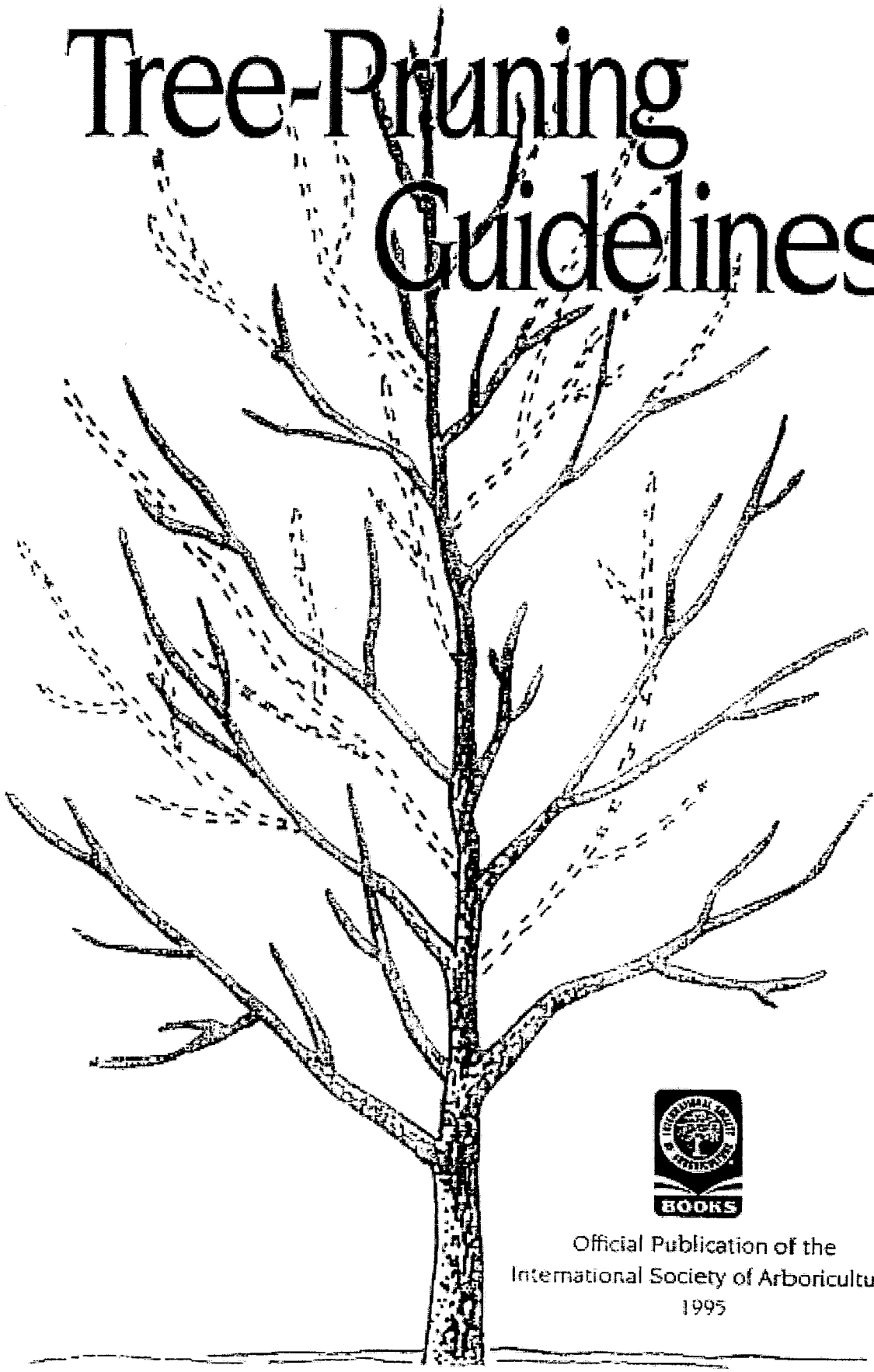
For the Tree Policy Manual dated October 2003

APPENDIX F

For the Tree Policy Manual dated October 2003

APPENDIX E

Tree-Pruning Guidelines



Official Publication of the
International Society of Arboriculture
1995

Tree-Pruning Guidelines

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Table of Contents

PURPOSE

Trees and other woody plants respond biologically in specific and predictable ways to pruning and wounding. Careful study of these responses has led to pruning practices that can best develop, preserve and enhance the beauty, structural integrity and functional value of trees.

In an effort to promote practices that encourage the development and preservation of tree structure and health, the ISA Performance-Guidelines Committee has established the following Tree-Pruning Guidelines not only for arborists but also for those who manage and employ arborists. The reader may want to refer to "Standard Practices for Tree, Shrub and Other Woody Plant Maintenance" (ANSI A300). The Guidelines are presented as a working tool, recognizing that trees are individually unique in form and structure, and that their pruning needs may not always fit strict rules. The arborist must take responsibility for special pruning practices, or regional variations, that may vary from these Guidelines.

Pruning Techniques

A plant's responses to most techniques of pruning are universal to almost all trees and situations.

Types of Pruning Cuts

An understanding of tree responses to pruning cuts leads to a more reasoned approach to pruning.

A *thinning* cut removes a branch at its point of origin or shortens it or the leader, to a lateral large enough to assume the terminal role (Figure 1). Thinning opens the foliage of a tree, reduces weight on heavy limbs, can reduce a tree's height, distributes ensuing invigoration throughout a tree and helps retain the tree's natural shape. Thinning cuts are usually the preferred method of tree pruning.

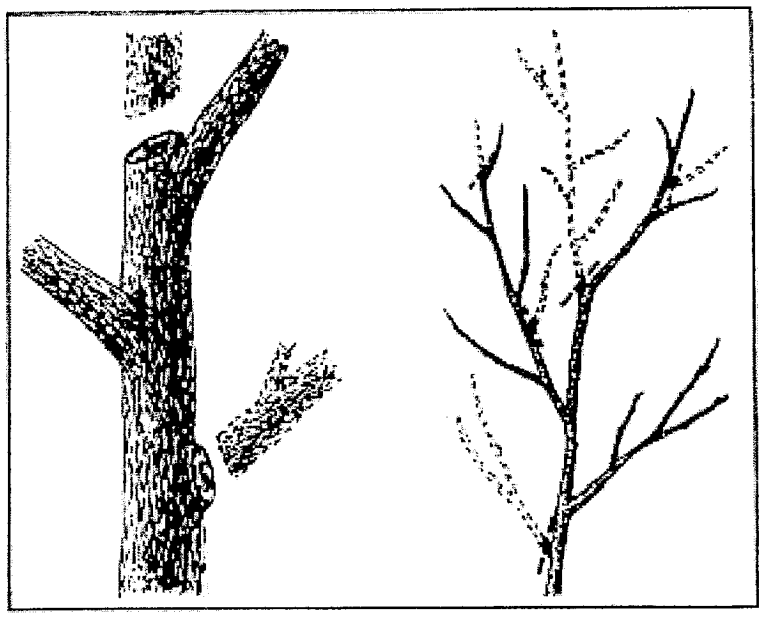

Figure 1. Thinning is removing a branch at its point of origin (lower cut on each) or shortening a branch or leader by cutting to a lateral large enough to assume the terminal role (upper cut on each), commonly called "drop-crotching" in mature trees.

Heading is cutting a currently growing or one-year-old shoot back to a bud, or cutting an older branch or stem back to a stub or lateral branch not sufficiently large enough to assume the terminal role (Figure 2). Heading cuts are appropriate for specific purposes such as:

- Reducing leaf area on an unbranched shoot when training young trees.
- Pollarding trees.
- Shaping terminal flowering plants (lilac, privet, crape myrtle, roses).
- Shearing hedges.

Heading should rarely be used in mature trees, since it forces the growth of vigorous, weakly attached upright sprouts originating just below such cuts (Figure 7), and the tree's natural form is altered. In some situations, branch stubs die back or produce sprouts with low vigor.

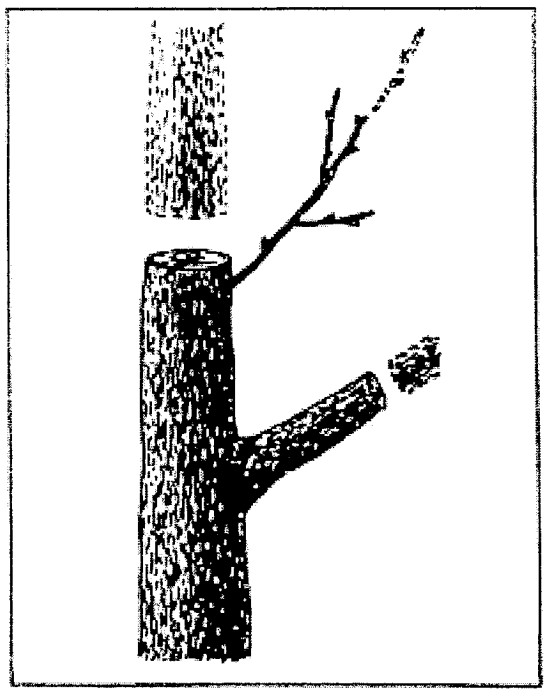

Figure 2. Heading is pruning to a stub (lower branch), a small lateral (trunk) or a bud (terminal on small lateral).

Making the Cut

When removing a live branch, pruning cuts should be made just outside the branch bark ridge and collar (Figure 3). This location of cut is in contrast to a "flush cut" which is made inside the branch bark ridge and collar. Flush cuts should be avoided because they result in a larger wound and expose trunk tissues to the possibility of decay. If no collar is visible, the angle of the cut should approximate the angle formed by the branch bark ridge and the trunk.

When removing a dead branch, the final cut should be made outside the branch bark ridge and the collar of live callus or woundwood tissue. If the collar has grown out along the branch stub, only the dead stub should be removed; the live collar should remain intact (Figure 4).

If it is necessary to reduce the length of a branch or the height of a leader, the final cut should be made just beyond (without violating) the branch bark ridge of the branch being cut to. The remaining branch should be no less than 1/3 (one third) the diameter of the branch being removed, and with enough foliage to assume the terminal role. On large trees this type of cut is commonly called drop crotching (Figure 1).

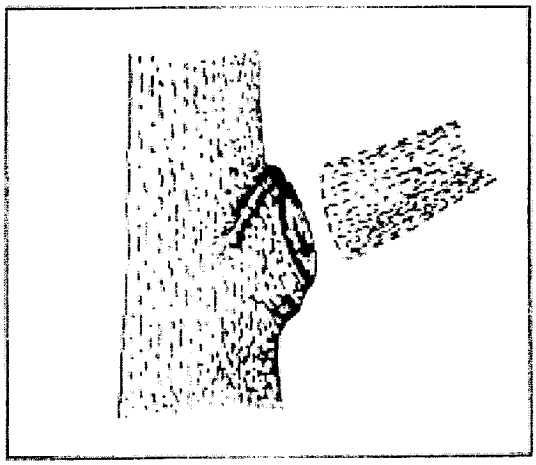

Figure 3. Pruning cuts should be made just outside the branch bark ridge (top of cut) and the collar (bottom of cut).

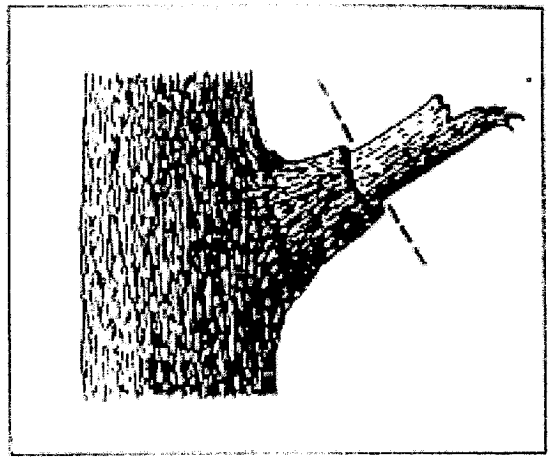

Figure 4. On a dead branch that has a collar of live wood, the final cut should be just beyond the outer edge of the collar.

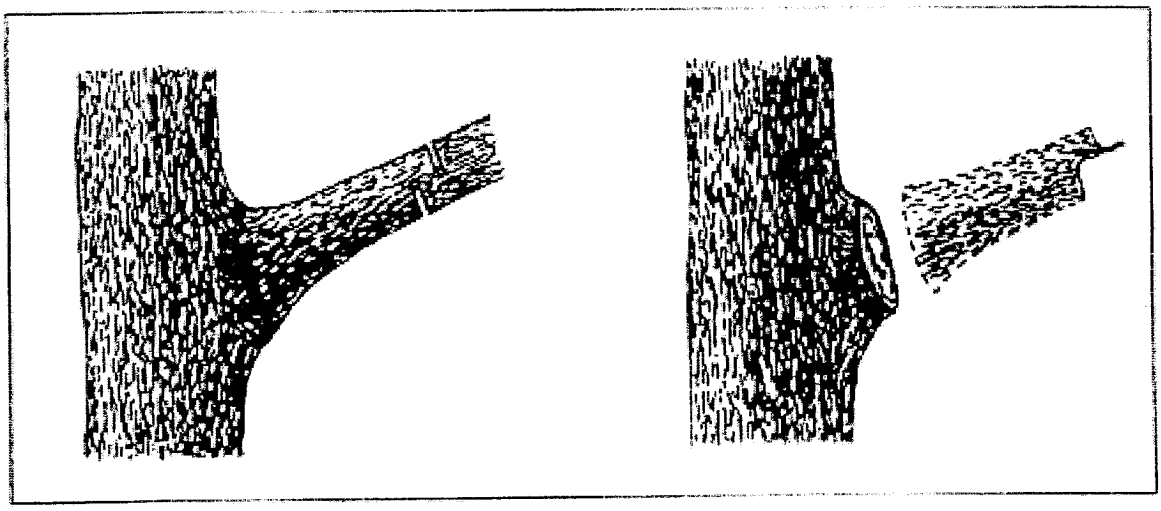

Figure 5. Remove a large limb by making three cuts. First cut on the bottom of the limb about 12 inches (30 cm) from the branch attachment (left). Make the second cut on the top about 1 inch (2-3 cm) from the under cut. The final cut is just outside the branch bark ridge and the outer portion of the collar (right).

Pruning cuts should be clean and smooth, leaving the bark at the edge of the cut firmly attached to the wood. A three-cut process will reduce chances of injury when removing large limbs (Figure 5).

Large or heavy branches that cannot be safely thrown clear, should be lowered on ropes to prevent injury to the tree or other property.

Wound dressings and tree paints have not been shown to be effective in preventing or reducing decay. They are therefore not recommended for routine use on pruning cuts unless specified for disease, borer, mistletoe or sprout control.

Size of Pruning Cuts

Pruning can be done to different levels of detail or refinement. The removal of many small branches rather than a few large branches requires more time, but produces a less-pruned appearance, forces fewer watersprouts, and helps to maintain the vitality and structure of the tree.

Designating the minimum size of undesirable branches to be removed from the tree crown, such as one-half inch, one inch or two inches (1, 2.5 or 5 cm) basal diameter, will establish the detail and extent of pruning desired.

Climbing Techniques

Special care should be taken by the climber to ensure that the tree is safe to climb before entering it. Climbing techniques can affect tree health by preventing, or creating, injuries to the tree.

Pre-Climbing Examination. A thorough inspection of the tree's structure for possible hazards should be made of every tree before climbing. A tree worker's safety inspection should also include an examination of the tree's root collar, where the roots flare out into the soil.

The tree should be inspected for potential hazards such as branch attachments with included bark, co-dominant (equal-sized) stems, trunk and branch about equal size, weakly-attached watersprouts, limbs with cracks, broken limbs and hangers. Discussion should take place with the crew as to how to avoid or reduce the hazards to the climber when such structural defects are present in the tree. Hazards of the work site should also be reviewed, such as the presence and location of all electrical conductors, especially high voltage conductors. Check for property that might be damaged by falling branches.

If no root flare is present, either the soil may have been raised over the original grade, girdling roots may be present or the tree is of a species that seldom develops root flares. In the first two cases, a potentially dangerous situation may exist, and a root-collar excavation is recommended. Likewise, if there are signs of significant injury or decay at the base of the trunk, an excavation of the root collar is recommended.

A root-collar excavation includes the removal of soil around the trunk, six to twelve inches (15-30 cm) below the original grade, to expose the major roots for inspection. These roots are then examined for signs of healthy or dead bark and/or decay.

After the examination is completed, the soil should be returned to the original grade of the tree's root collar. This can usually be determined by horizontal lines or wrinkles on the lower trunk or major buttress roots. Tree wells resulting from deep soil fills that have been removed during the root collar excavation can be covered with grates, decks or surrounded by small fences to maintain public safety.

Diseased tissue should be left exposed for one or more years, or until callus is well formed and the progress of the disease has stopped. Roots should be protected in winter months from freezing temperatures by recovering them with mulch or soil, and exposing

Climbing Practices. Climbing and pruning practices, except for pruning cuts, should not injure the tree.

Climbing spurs or gaffs should not be used when pruning a tree. They may be used to enter the tree, where the branches are more than throwline distance apart. In such cases the spurs should be removed once the climber is tied in.

Spurs may be used to reach an injured climber or when climbing to remove a tree.

Rope injury to thin-barked trees from loading out heavy limbs should be avoided by installing a block in the tree to carry the load. A block or rope guard may also be used to reduce injury to the bark from the climber's line.

Training Young Trees

Properly trained trees will develop into structurally strong trees well suited to the site and their intended landscape function. These trees will fulfill their intended function sooner and should require little corrective pruning as they mature. Young trees that reach large mature size should have a sturdy, tapered trunk with well-spaced branches that are smaller in diameter than the trunk.

These guidelines apply primarily to decurrent (round-headed) large-growing trees to develop a structure characteristic of the species or cultivar. Trees that will become decurrent seldom have lateral shoots on current-season's growth.

Trees of excurrent (central leader) growth habit usually need little or no training except to remove laterals that are too low or to control laterals that may compete with the leader.

Trunk Development

For most trees, maintain a single, straight trunk or central leader. Do not head the leader except:

- to correctly position the lowest main branch;
- to space other main branches at least 18 inches apart vertically;
- to remove a tight grouping of terminal twigs so that a more vigorous shoot will develop as the leader.

At least one half of the foliage should be on branches (temporary and permanent) arising in the lower two-thirds of a tree. Similarly, branches should have a like distribution of foliage along their lengths.This will increase trunk taper and more uniformly distribute branch weight and wind stress along the trunk.

Permanent Branch Selection

The height of the lowest permanent branch will depend on the function of the tree and local ordinance; e.g.: screen an unsightly view, provide a wind break, shade a patio or be a street tree.

Unless they are too close together or weakly attached, or the tree may not receive adequate water, remove few or no branches on a newly-planted tree. This will ensure a better selection for permanent main branches in subsequent years, promote trunk taper and early rapid growth of a tree.

Potential permanent branches can be spaced 6 to 12 inches (15-30 cm) apart by thinning. By the fifth year, these branches should be thinned to at least 18 inches (50 cm) apart, if at maturity the trunk diameter is expected to be greater than 18 inches (50 cm). Spacing can be less with an expected trunk diameter of less than 12 inches (30 cm) at maturity.

Select permanent branches to maintain an even radial distribution. Where branches are growing one directly above another, maintain at least 15-36 inches (40-100 cm) above the lower branch on small to medium-size trees, and 60 inches (150 cm) on large-growing trees.

Temporary Branches

Retain small branches along the trunk for 1 to 5 years to increase lower-trunk size and taper and to protect the trunk from injury by the sun and vandals. It is more important to have temporary branches below the lowest permanent branch than above.

Preferred vertical spacing of temporary branches is 4 to 6 inches (10-15 cm), with none within 6 inches (15 cm) of potential main branches. Select the least vigorous shoots for temporary branches. If larger-than-desired branches need to be kept as temporaries, head them

back to 2 or 3 buds. It is important to have some on the side of the trunk facing the afternoon sun. Attachment angle of temporary branches is not important since they will be removed.

Temporary branches should be kept short to provide clearance for walks, etc. and to increase height growth of the leader. These branches may need more than one pruning during a growing season, depending on tree vigor.

During the first dormant season, prune to thin the temporary branches. Leave about 3/4 (three fourths) of those left the first year. Leave them uniformly spaced, remove the largest or cut them back to 2 or 3 buds.

During the next dormant season, reduce the number of temporary branches by 1/5 (one fifth) to 1/4 (one fourth) of those present the first year. In most situations, by the fifth dormant season, all of the temporary branches should be removed.

Developing Strong-Branch Structure

The relative size of a branch in relation to the trunk is more important for strength of branch attachment than is the angle of attachment. Branches should be 1/2 (one half) or less of the diameter of the trunk immediately above the branch.

No permanent branch attachments should have included bark.

Retain lateral branches along limbs, but each should be less than 1/2 (one half) the diameter of the limb at its attachment. Permanent lateral branches along limbs should be at least 2 feet (60 cm) out from the trunk.

As trees grow to maturity, pruning should focus on maintaining or improving structure, and directing the tree's growth.

A goal of structural pruning is to maintain the size of permanent lateral branches to less than 1/2 (one half) the diameter of the parent branch or trunk. If a scaffold branch is too large in relation to the leader or another scaffold, thin the competing scaffold's laterals particularly near its terminal. Thin the leader and other scaffolds less, if at all. Thinning laterals from a branch will reduce the weight of the branch, slow its total growth and develop a stronger branch attachment. If pruning the competing scaffold is not appropriate, it should be removed.

On large-growing trees, except for whorl-branching conifers, branches that are more than one-third the diameter of the trunk should be spaced along the trunk at least 18 inches (50 cm) apart, on center. If this is not possible, because of the present size of the tree, such branches should have their foliage thinned, particularly near their terminals.

Pruning Mature Trees (Maintenance Pruning)

As trees mature, their need for structural pruning should decrease. Pruning should then focus on maintaining tree structure, form, health and appearance by:

- removing dead branches
- thinning to reduce weight and/or the windsail effect of large laterals, and
- maintaining inner branches.

Pruning such as crown reduction, or shaping, is sometimes necessary if tree branches of foliage begin to interfere with surrounding improvements, such as buildings, utility wires or paths. The types of pruning generally used in the industry are described below.

Crown Cleaning

Crown cleaning, or cleaning out, is the removal of dead, dying, diseased, crowded, weakly attached, low-vigor branches, and watersprouts from a tree's crown.

Crown Thinning

Crown thinning is the selective removal of branches to increase light penetration and air movement through the crown. Thinning opens the foliage of a tree, reduces weight on heavy limbs, distributes ensuing invigoration throughout a tree and helps retain the tree's natural shape. Thinning cuts are usually the preferred method of tree pruning. When thinning the crown of mature trees you should seldom remove more than 1/4 (one fourth) of the live foliage.

At least 1/2 (one half) of the foliage should be on branches that arise in the lower 2/3 (two thirds) of the tree. Likewise, when thinning laterals from a limb, an effort should be made to retain well-spaced inner lateral branches with foliage. Trees and branches so pruned will have mechanical stress more evenly distributed along a branch and throughout the tree.

Caution must be taken not to create "lion-tailing," which is caused by removing all or most of the inner foliage. This places foliar weight at the ends of the branches and may result in sunburn, watersprouts, weakened branch structure and limb breakage.

Crown Raising

Crown raising removes the lower branches of a tree in order to provide clearance for buildings, vehicles, pedestrians and vistas. It is important that a developing tree have at least 1/2 (one half) of its foliage on branches that originate in the lower 2/3 (two-thirds) of the tree. Similarly, branches should have even distribution of foliage along their lengths. This will ensure a well-formed, tapered structure and to uniformly distribute stress within a tree. In some cases, this may not be possible because local ordinances require removal of low branches for clearance.

When pruning for view, it is preferable to develop spaces between branches, or "windows" through the foliage of the tree, rather than to severely raise or reduce the crown.

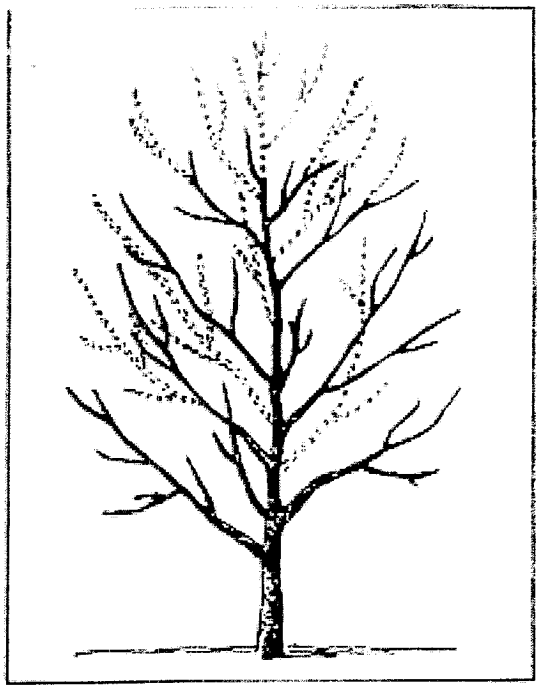

Figure 6. The height and spread of a tree can usually be reduced and still maintain its natural shape. Branches that have been removed by thinning cuts are outlined by broken lines.

Crown Reduction

If a tree has grown too large for its allotted space, either:

- Remove the tree, particularly if it has a central-leader growth habit;
- Thin branches to reduce tree height and/or spread by pruning back leaders to lateral branches (Figure 6); or
- Head branches to reduce the height and/or spread of the tree crown. This is the least desirable of the three alternatives.

Thinning cuts to reduce the size of the crown results in fewer sprouts and can maintain the structural integrity and natural form of the tree, delaying the need to re-prune. The lateral to which a branch or leader is cut should be at least 1/3 (one third) the diameter of the branch being removed.

A tree pruned by the crown reduction method appears more natural and lasts longer if confined to relatively small thinning cuts. This is the preferred method of crown reduction. The removal of a large limb or leader to a large lateral, or shorter vertical, is commonly called drop crotching or drop-crotch pruning. Pruning the leader of a central-leader tree to a large lateral is inappropriate. Even though large wounds may lead to decay, drop-crotch pruning is preferred to making heading cuts.

Occasionally, on vigorous small diameter trees with broken or damaged tops the crown can be reduced in height and/or spread by heading cuts leaving a stub containing buds or a lateral branch that is not large enough to assume the terminal role. Heading cuts, however, should seldom be used for crown reduction on large trees because vigorous, weakly attached, upright sprouts are forced just below such cuts (Figure 7) the tree's natural form is altered and the heading cuts are more subject to decay.

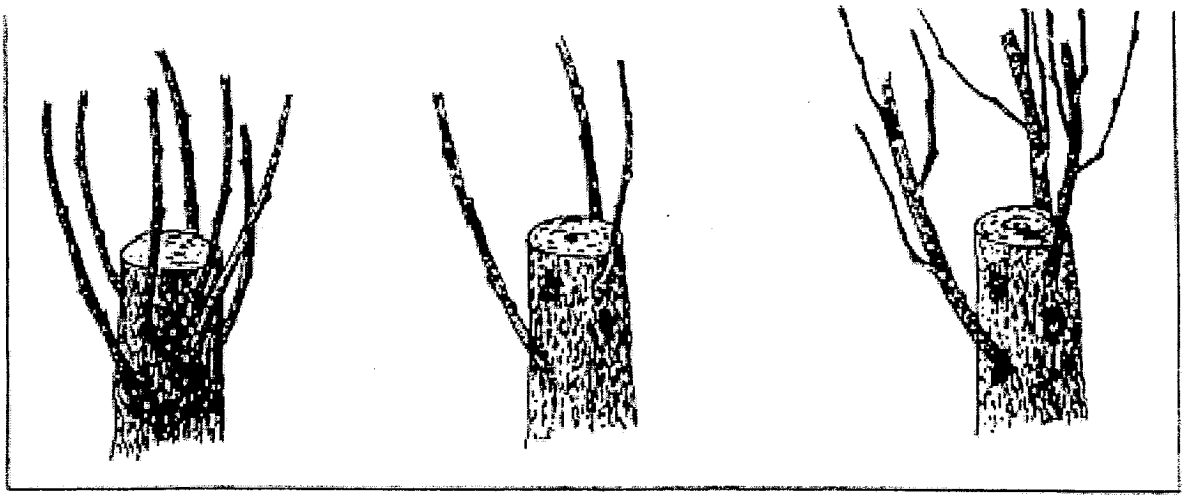

Figure 7. Numerous watersprouts resulted from the heading cut the previous winter of this leader or large upright branch (left). The one-year-old watersprouts have been thinned to three to begin to rebuild the tree (center). The number of sprouts left depends on the size of the branch and number of branches in the tree. Laterals on the sprouts the folowing season (right) may need to be thinned to reduce weight and wind-sail effects that could break sprout attachment. If such a heading cut is made, it is preferable to cut at an angle with the high side towards the afternoon sun. (The full length of the sprouts and laterals are not shown.)

Crown Restoration

Crown restoration is intended to improve the structure and appearance of trees that have sprouted vigorously after being broken, topped or severely pruned using heading cuts. One to three sprouts, on main branch stubs, should be selected to form a natural appearing crown. The more vigorous sprouts may need to be thinned, cut to a lateral, or even headed, to control length growth or ensure adequate attachment for the size of the sprout. Crown restoration may require several prunings over a number of years (Figure 7).

Utility Pruning

Line-clearance tree workers should be trained to work safely around high voltage conductors. The United States Occupational Safety and Health Act (O.S.H.A.) and The American National Standards Institute (A.N.S.I.) have established minimum distances to be maintained by tree workers from electrical conductors. The following guidelines are designed to maintain the required clearance of trees from high voltage transmission lines with a minimum of resprouting and fewer pruning cycles. The guidelines are based on known tree responses to various pruning techniques. In no sense should the guidelines take precedence over safe work practices.

Utility pruning may vary in urban and rural areas. The quality of care given a tree should balance with the landscape setting. The pruning of high-value trees in urban landscaped areas should more closely follow the preceding Tree Pruning Guidelines. Public pressure in some areas may require leaving more branches inside the canopy, which may potentially contact the conductor. This practice will be more costly as it requires more frequent pruning cycles.

It is important to prevent bark injuries on large and high-value trees by controlled lowering of heavy limbs being removed and by not climbing with gaffs. Urban trees often sustain injuries to the lower bole which open sites for decay. All trees should be carefully examined for structural problems before climbing.

Lateral or Directional Pruning. A tree's growth under utility lines is most economically managed by lateral or directional pruning (thinning cuts). Directional pruning is the removal of a branch to the trunk or a significant lateral branch growing away from the conductor. Heading cuts (topping), on the other hand, encourage vigorous sprouting and increases the frequency of pruning cycles and the cost of maintenance.

All trees should be examined for hazards before climbing. Hangers and large dead branches should be removed. The root collar should be examined for signs of decay or root rot which would make the tree unstable.

Where possible, the tree should be allowed to attain normal height with crown development maturing away from high-voltage conductors.

To achieve clearance, pruning should be restricted to removal of branches at crotches within the crown.

As few cuts as are reasonable should be used to achieve the required clearances.

When the pruning of a branch will result in the loss of more than 1/2 (one half) of the foliage on the branch, it should be removed to the parent stem.

Precautions shall be taken to pre-cut large limbs to avoid stripping or tearing the bark, and minimize unnecessary wounding. Heavy limbs should be lowered on ropes to avoid damaging bark on limbs and trunks below.

The placement of pruning cuts shall be determined by anatomy, structure and branching habit. Limbs should not be arbitrarily cut off based on a pre-established clearing limit.

Final drop-crotch cuts should be made outside the branch bark ridge on the main stem or lateral branch. The remaining branch shall be no smaller than 1/3 (one third) the diameter of the portion being removed. The remaining should be pruned to direct the growth away from conductors.

The use of multiple, small-diameter shaping cuts to create an artificially uniform crown form, commonly known as a "roundover", or a hedged side-wall effect is not cost effective nor consistent with proper pruning practice.

Severe crown reduction pruning should be practiced only where trees are located under lines. Topping of tall-growing species directly under utility lines should be discouraged in favor of the removal and replacement with a species that matures at a lower height.

Climbing spurs, gaffs, climbing irons or hooks shall not be used except for tree removal or where branches are more than a throw-line distance apart or for emergency rescue.

Mechanical Utility Pruning. Appropriate for remote sites where trees occur in wooded areas or forest stands.

To the extent possible, the placement of pruning cuts should be determined by crown structure and branching habit.

The minimum number of cuts should be utilized to achieve required clearances.

Cuts should be made as reasonably close to the main stem as possible or to a lateral branch 1/3 (one third) the diameter of the removed branch that will direct future growth away from conductors.

Pruning cuts are to be made outside the branch collar, leaving as small a stub as possible (see Figure 3).

Precautions shall be taken to avoid excessive wounding and stripping or tearing of bark.

Severed limbs shall be removed from the crown of the tree.

GLOSSARY OF TERMS

(Page number corresponding with first use of term.)

Arborist: A person possessing the technical competence through experience and related training to provide for or supervise the management of trees and other woody plants in the residential, commercial and public landscape. (pg. 1)

Branch: A secondary shoot or stem arising from the main stem or trunk. (pg. 2)

Branch Collar: Trunk tissue that forms around the base of a branch between the main stem and the branch or a branch and a lateral. As a branch decreases in vigor or begins to die, the collar usually becomes more pronounced and more completely encircles the branch. (pg. 3)

Branch Bark Ridge: A ridge of bark in a branch crotch that marks where branch and trunk tissues meet and often extends down the trunk. (pg. 3)

Callus: Undifferentiated tissue initially formed by the cambium around and over a wound. (See woundwood.) (pg. 3)

Climbing Spurs: Sharp-pointed devices affixed to a climber's legs used to assist in climbing trees (a.k.a. gaffs, hooks, spurs, spikes, climbers). (pg. 5)

Crotch: The angle formed at the attachment between a branch and another branch, leader or trunk of a woody plant. (pg. 10)

Crown: The leaves and branches of a tree or shrub; the upper portion of a tree from the lowest branch on the trunk to the top. (pg. 8)

Decurrent: Round-headed or spreading plant with no main leader to the top of the plant. (See excurrent.) (pg. 6)

Drop Crotching or Drop-Crotch Pruning: A thinning cut which removes the terminal portion of a large branch or leader back to a lateral large enough to assume the terminal role. (pg. 2)

Excurrent: Tree with cone-shaped crown with a central leader that outgrows and subdues lateral branches. (See decurrent.) (pg. 6)

Flush Cut: A pruning cut made inside the branch collar and branch bark ridge. (pg. 3)

Heading: Pruning a currently growing or one-year-old shoot back to a bud, or cutting an older branch or stem back to a stub or lateral branch not sufficiently large enough to assume the terminal role. (pg. 2)

Included Bark: Bark that occurs in a crotch between branch and trunk or between codominant stems. Included bark usually prevents the trunk from growing around a branch. (pg. 4)

Lateral: A branch or twig growing from a parent branch or stem. (pg. 2)

Leader: A dominant upright stem, usually the main trunk. (pg. 2)

Limb: Same as branch, but usually larger and more prominent. (pg. 2)

Parent Branch or Stem: the tree trunk; or, the larger limb from which lesser branches are growing. (pg. 7)

Root Collar: The junction between the root of a plant and its stem, often indicated by the trunk flare. (pg. 4)

Scaffold: A large limb that is or will be part of the permanent branch structure of a tree. (pg. 7)

Thinning: The removal of a branch at its origin or cutting it or the lateral large enough to assume the terminal role to open up or reduce the crown. (pg. 2)

Wound: An opening that is created when the tree's protective bark covering is penetrated, cut, or removed, injuring or destroying living tissue. Pruning a live branch creates a wound, even when the cut is properly made. (pg. 3)

Woundwood: Differentiated woody tissue which forms after initial callus has formed around the margins of a wound. Wounds are closed primarily by woundwood. (See callus - pg. 3)

Other Sources of Information

ANSI Z133.1. 1988. Safety Standards. American National Standard for Tree Care Operators. Washington, D.C.: American National Standards Institute.

—— A300. Standard Practices for Tree, Shrub and Other Woody Plant Maintenance. Washington, D.C.: American National Standards Institute. (in press).

Brown, G.E. 1972. The Pruning of Trees, Shrubs and Conifers. London: Faber and Faber.

Harris, R.W. 1992. Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines. 2nd ed. Englewood Cliffs, NJ: Prentice Hall.

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Pirone, P.P. and others. 1988. Tree Maintenance, 6th ed. New York: Oxford University Press.

Shigo, A.L. 1989. Tree Pruning: A Worldwide Photo Guide. Durham, NH: Shigo and Trees, Associates.

APPENDIX G

For the Tree Policy Manual dated October 2003

ANSI A300-1995 American National Standards Institute Standard For Tree Care Operations-- Pruning, Trimming, Repairing, Maintaining and Removing Trees, and Cutting Brush--Standard Practices

Reference Source

Publication can be obtained from the International Society of Arboriculture (ISA), P. O. Box 3129, Champaign, IL 61826-3129

Phone: (217) 355-9411 Fax: (217) 355-9516

www.ag.uiuc.edu/~isa

APPENDIX H

For the Tree Policy Manual dated October 2003

ANSI Z133.1-1994 American National Standards Institute Standard For Tree Care Operations-- Pruning, Trimming, Repairing, Maintaining and Removing Trees, and Cutting Brush--Safety Requirements

Reference Source

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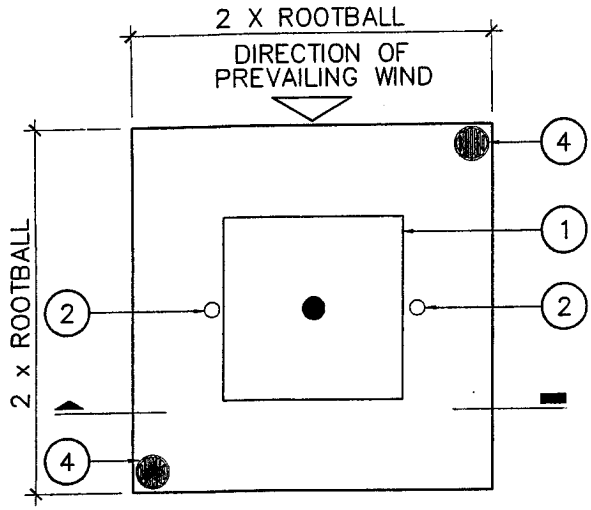
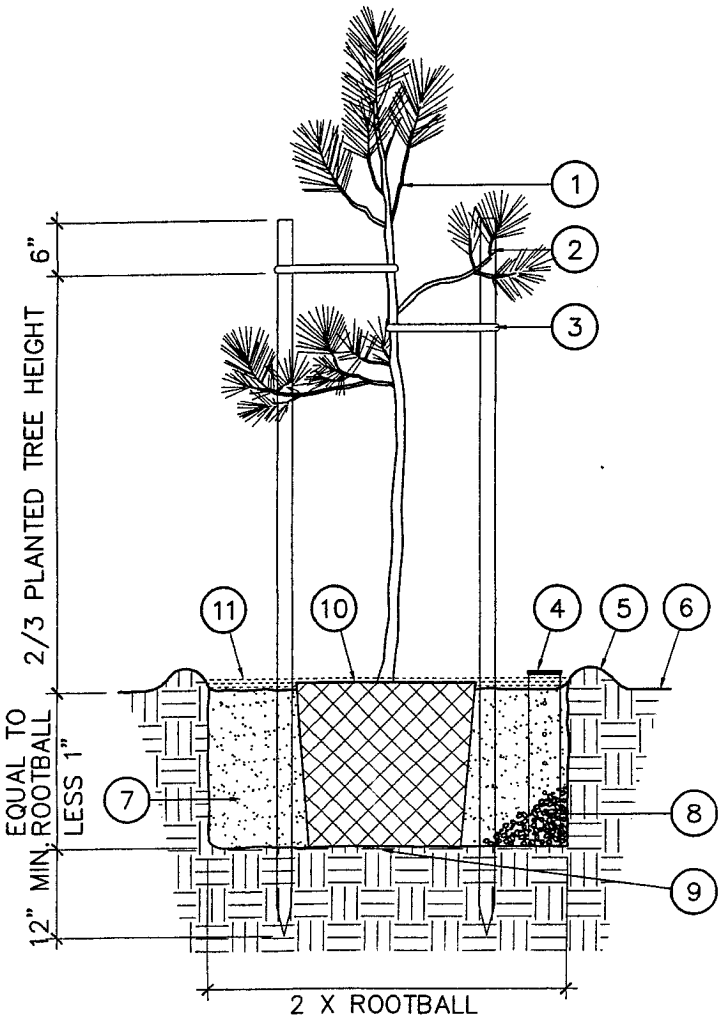
APPENDIX I

For the Tree Policy Manual dated October 2003



PLAN VIEW



SECTION

(1) TREE AND ROOTBALL. TREE SHOULD BE REMOVED FROM CONTAINERS IN A MANNER TO MINIMIZE ROOT BALL DISTURBANCE. TREES WITH CIRCLING AND/OR GIRDLING ROOTS ARE NOT ACCEPTABLE. THE TREE'S TRUNK SHOULD BE TAPERED AND LATERAL BRANCHED AREA TO REMAIN ON THE TRUNK.

(2) REMOVE NURSERY STAKE AND LODGE POLE PINE TREE STAKES, (2) FOR 15 GAL. AND 24" BOX, OMIT AT 5 GAL. TREE STAKES TO ARE TO BE REMOVED AFTER INTERIM PERIOD

(3) "CINCH-TIE" TREE TIES TO BE ATTACHED TO THE POLE AT THE TREE'S BENDING POINT ONLY. TIES ARE TO BE INSTALLED USING A FIGURE EIGHT AND THE TREE TO HAVE 6 TO 8 INCHES OF LATERAL MOVEMENT

(4) 4" DIA. AERATION / BREATHER TUBES WITH GRATE: (1) PER 5 AND 15 GAL. TREE, (2) PER 24" BOX TREE. TUBES TO HAVE SILT SOCKS INSTALLED, TIED OFF AT ENDS.

(5) 6" HIGH EARTH BERM, 4" HIGH AT 5 AND 15 GAL.

(6) FINISHED GRADE

(7) BACKFILL MIX: 100% ON SITE NATIVE SOIL, TILLED WITH 25 LB./CUBIC YARD AGRICULTURAL GYPSUM. COMPACT TO 85% IN 6" LIFTS.

(8) 1/2 CU. FT. CRUSHED AGGREGATE AT BASE OF TUBE.

(9) IMPORTANT: SET THE ROOTBALL DIRECTLY ON UNDISTURBED / COMPACTED SOIL

(10) SET ROOTBALL 1"-2" ABOVE FINISH GRADE

(11) WEED-FREE RECYCLED WOOD BARK MULCH

NOTE:
ALL REPRESENTATIVE TREE LOCATIONS SHALL HAVE A PERCOLATION TEST. REMOVE ALL LOOSE MATERIAL IN TREE PIT AND FILL WITH 6" OF WATER. AFTER 12 HOURS REFILL WITH THE SAME AMOUNT OF WATER. SIX HOURS AFTER THE SECOND FILLING, INSPECT THE PITS. IF WATER REMAINS IN PIT NOTIFY THE OWNER REPRESENTATIVE FOR DIRECTION ON IMPROVING PERCOLATION.

SPURLOCK POIRIER LANDSCAPE ARCHITECTS
MAY 2003

DEL MAR TORREY PINE PLANTING DETAIL

Worksheet for Estimating Landscape Water Needs

Del Mar Torrey Pines, May 2003

Step 1: Calculate the Landscape Coefficient (K_L)

K_L formula: $K_L = k_s \times k_d \times k_{mc}$

k_s = species factor k_d = density factor k_{mc} = microclimate factor

k_s = 0.2 (range = 0.1-0.9) Torrey Pine tree - "LOW" water needs

k_d = 1.2 (range = 0.5-1.3) assuming high density planting

k_{mc} = 1.0 (range = 0.5-1.4) assuming average microclimate

K_L = 0.2 (k_s) x 1.2 (k_d) x 1.0 (k_{mc}) = **0.24**

Step 2: Calculate Landscape Evapotranspiration (ET_L)

ET_L formula: $ET_L = K_L \times ET_O$

K_L = landscape coefficient ET_O = reference evapotranspiration

K_L = 0.24 (calculated in Step 1)

ET_O = 5.0 inches (based on July in Del Mar)

ET_L = 0.24 (K_L) x 5.0 (ET_O) = **1.2** inches

Step 3: Calculate the Total Water to Apply (TWA)

TWA formula: $TWA = ET_L / IE$

ET_L = landscape evapotranspiration   TWA = inches per unit of area

IE = irrigation efficiency   TWA in gallons per sq. ft. of planting area = # inches x 0.62

A. Scenario 1: (established planting, average spray/bubbler irrigation)

ET_L = 1.2 (calculated in Step 2)

IE = 0.70 (average spray/bubbler irrigation system efficiency, not new system)

$TWA = \frac{ET_L}{IE}$ = 1.71 inches ≈ 1.1 gallons/sq.ft

B. Scenario 2: (high efficiency - slow, no run-off hand watering or drip irrigation)

ET_L = 1.2 (calculated in Step 2)

IE = 0.85 (high efficiency - slow, no run-off hand watering or drip irrigation system)

$TWA = \frac{ET_L}{IE}$ = 1.41 inches ≈ 0.9 gallons/sq.ft

C. Scenario 3: (low efficiency bubbler or spray sprinkler and new planting where all water doesn't reach rootball efficiently)

ET_L = 1.2 (calculated in Step 2)

IE = 0.20 (low efficiency / new plantings)

$TWA = \frac{ET_L}{IE}$ = 6 inches ≈ 3.7 gallons/sq.ft

APPENDIX J

For the Tree Policy Manual dated October 2003

General Tree Planting Guidelines

1. PERFORM PERCOLATION TEST

If the soil is dry, add a few inches of water in the hole. Let it drain before planting the tree *(see Percolation Test, Section 3.40* C).

2. DEPTH

To check the proper depth of the root ball, place the tree in the hole and lay a pole or shovel across the original grade - the top of the root ball should be 1 to 2-inches higher *(see notes on depth, Section 3.40* B).

3. CONTAINER AND ROOTS

Remove tree from the container and trim the root ball in the following way:

- Thick circling roots: straighten and/or cut cleanly
- Thin roots: make three to four vertical cuts 1/2-inch deep around root ball, spread the bottom out if necessary.
-

4. PLACING THE TREE

Locate the tree in the hole, and rotate the tree to direct the main branches away from the street side, if possible.

5. FILLING THE HOLE

Place the aeration tubes, fill the hole halfway up with original soil and gently tamp out air pockets with a pole or shovel handle. Add about 1-inch of water, and let drain. Fill the rest of the hole to grade, water the fill soil, and let drain. Amend native soil only in the top 12" layer, if required to amend adverse soil problems. Add no amendment to the backfill of native trees, such as coat live oaks and Torrey pines.

6. STAKING

Place the stakes at the edge of the root ball (drive them 2-feet into undisturbed ground), and avoid contact with the branches. If in a windy area, set the stakes in a plane at right angles to the wind. Remove the nursery stake and fill soil into the void left when removing the nursery stake. Loosely place two ties in a figure eight around the trunk, as low as needed to hold the tree upright and nail to the stake. Stakes shall be trimmed so that the branches clear the top of the stake. Do not install a cross-brace.

7. BERM, MULCH AND WATER

In non-turf areas, form a soil berm 3 to 4-inches high at the outermost edge of the root ball. Place 2-inches of mulch or bark over the berm and extending to the edge of the dripline, keeping the mulch away from the trunk a minimum of 6-inches. Fill the berm with water to capacity *(see Watering 2.45, Section* A). Berm may be omitted if the tree is irrigated by drip-irrigation.