City of Encinitas

Urban Forest Management Program

Administrative Manual Procedures

February 28, 2012
Second Edition

INTRODUCTION

The City of Encinitas is fortunate to have such a beautiful population of trees, including magnificent individual trees, groupings of trees and native trees which give the City a unique character. Trees are a source of shade, air conditioning and other environmental benefits, and yield both a high quality of life and economic benefits to the community, including enhanced property values.

The City is dedicated to the planting and protection of its urban forest which is recognized as one of the City's greatest natural resources. Sustaining trees in Encinitas' developed environment presents a challenge, requiring careful planning and maintenance.

The City's Tree Ordinance and Urban Forest Management Policy are the City's primary regulatory tools to provide for orderly protection of trees, to promote the health, safety, welfare, and quality of life for the residents of the City, to protect property values and to avoid significant negative impacts on adjacent properties. By assuring preservation and protection through regulations and standards of care, these resources will remain significant contributions to the landscape, streets and parks, and continue to help define Encinitas.

This Manual is issued by the City Manager, through the Departments of Building and Planning, Engineering Services, Parks and Recreation and Public Works to establish specific technical standards and specifications necessary to implement the policy. Terms defined in Section 1.00 Definitions appear *italicized* throughout this Manual.

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SECTION 1.00 - DEFINITIONS

For the purpose of this Manual and interpretation of regulations, the following definitions shall apply:

Basal Flare means that portion of a tree where there is a rapid increase in diameter at the confluence of the trunk and rootcrown.

Building Area means the area of a parcel that (1) upon which, under applicable zoning regulations, a structure may be built without a variance or; (2) is necessary for the construction of primary access to structures located on the parcel, where there exists no feasible means of access which would avoid protected trees. On single-family residential parcels, the portion of the parcel deemed to be the *Building Area* access shall not exceed twelve (12) feet in width or sixteen (16) feet if required by the Fire Department.

Building Footprint means the two-dimensional configuration of a building's perimeter boundaries measured on a horizontal plane at grade level.

Certified Arborist is a professional arborist who has an ISA certification credential, has a minimum of three years' full-time experience working in the professional tree care industry and who has passed an extensive examination covering all facets of arboriculture.

City Arborist means the person(s) designated as such by the City of Encinitas.

City Tree any tree growing within the City street right-of-way, on City property or within City easements.

Compaction means compression of the soil structure or texture as described by the latest edition of the Standard Specifications for Public Works Construction (Greenbook). *Compaction* is injurious to roots and the health of a tree.

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.*

Diameter at Breast Height (DBH) is a standard method of expressing the diameter of the trunk of a standing tree by measuring the trunk at four and one-half feet (or 54 inches) above natural grade level.

Discretionary Development Approval means an approval granted by the Planning and Building Director, Planning Commission, and/or City Council for applications including but not limited to coastal development permits, use permits, variances, subdivisions, and design reviews.

Dripline Area means the area from the trunk of a tree to the outermost edge of the tree canopy.

Excessive Pruning means removing more branches, stems, and roots necessary to accomplish the desired objective. Typically no more than twenty-five (25) percent should be removed in any single year. Pruning in excess of twenty-five (25) percent can injure a tree and is prohibited unless approved by the *City Arborist.*

Hazardous Tree is an imminent hazard or threat to the safety of persons or property. 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*.

Heritage Tree is a tree designated by the process outline in Section 9.00 of this Manual that is one of the oldest or largest of its species located in the City and has historic significance due to an association with an historic building, site, street, person or event or it is a defining landmark or significant outstanding feature of a neighborhood.

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 TPZ of a tree. *Injury* shall include bruising, scarring, tearing, or breaking of roots, bark, trunk, branches or foliage, poisoning, or any other action leading to the death or permanent damage of the tree.

Landscape Architect means a person licensed in the planning, design and oversight of landscape or space.

Project Arborist means a *Certified Arborist* retained by a property owner or development applicant for the purpose of overseeing on-site activity involving the welfare of the trees. The *Project Arborist* shall be responsible for all reports, tree preservation plans, or inspections as required.

Protective Tree Fencing means a temporary enclosure erected around a tree to protect the tree from damage. The fence services three primary functions:

- **A.** to keep the foliage crown, branch structure and trunk clear from direct contact and damage by people, equipment or materials;
- **B.** to preserve roots and soil in an non-compacted state; and
- **C.** to identify the TPZ in which no soil disturbance is permitted and activities are restricted.

Public Nuisance means either an individual tree on any private property or on any street, public property, or a type or species apt to destroy, impair or otherwise interfere with any street improvements, sidewalks, curbs, gutters, sewers, or other public improvements, including above and below ground utilities.

Removal means the complete removal of a tree; such as cutting to the ground.

Root Buffer means a temporary layer of material to protect the soil, texture and roots.

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 and/or retained. *Site Plan*s shall include the following minimum information that may impact trees:

- **A.** Surveyed tree locations, species, size (height, width, DBH). *Dripline Area* (including trees located on neighboring property that overhang or within 50 feet of the project site) and *City Tree*s adjacent to the project site;
- **B.** Paving, concrete, *Trenching*, or grade change (including the limits of over-excavation) located within the *Tree Protection Zone*;
- **C.** Existing and proposed utility easements;
- **D.** Surface and subsurface drainage and aeration systems to be used;
- **E.** Walls, tree wells, retaining walls and grade change barriers, both temporary and permanent;
- **F.** Landscaping, irrigation and lighting within dripline of trees, including all lines and valves.

Soil Fracturing means the loosening of hard or compacted soil around a tree that cracks, loosens, or expands the soil to improve the root growing environment.

Structural Defect means any structural weakness or deformity of a tree or its parts.

Target is a term used to include people, vehicles, structures or something subject to damage if a tree or part of a tree fails.

Topping is an inappropriate technique to reduce tree size that cuts through a stem more than two years old at an indiscriminate location; a type of pruning cut that serves to initiate discoloration and perhaps decay in the cut stem.

Tree means any woody perennial plant having one or several main stems commonly achieving ten or more feet in height and capable of being pruned and shaped to develop a branch-free trunk at least nine feet in height.

Tree Protection and Preservation Plan means a plan prepared by a *Certified Arborist* that outlines measures to protect and preserve trees on a project. This plan shall include requirements for preconstruction; treatments during demolition and/or construction; establishment of a *Tree Protection Zone;* tree monitoring and inspection schedule; and provide for continued maintenance of those trees after construction according to the requirements in this Manual.

Tree Protection Zone (TPZ) means the area around the tree that is temporarily fenced off to help protect the tree from damage. The TPZ is a restricted activity zone where no soil disturbance is permitted, unless otherwise approved by the *Project Arborist.*

Tree Report means a report submitted to the City for review that is prepared by a *Project Arborist* retained by the property owner or agent.

Trenching means any excavation to provide irrigation, install foundations, utility lines, services, pipe, drainage or other 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 outlines in this Manual.

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.) An initial inspection of protective fencing and written verification must be submitted to the *City Arborist* prior to demolition, grading and/or building permit issuance.

Vertical Mulching means creating 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 appropriate material.

SECTION 2.00 - PROTECTION OF TREES DURING CONSTRUCTION

Introduction

Land development and infrastructure construction is a complex process and is even more challenging when trees are involved. The objective of this section is to reduce the negative affects of construction on trees to a less than significant level.

One long-term goal of the City of Encinitas is urban forest sustainability. This describes the maintenance of social, recreational, ecological and economic functions of trees and their benefits over time. Stewardship of naturally occurring and planted trees is a central element in urban forest sustainability. Concerns about tree health and structure, preservation during development and other construction activities, species and site selection, quality of planting stock, standards of performance, maintenance practices, and recycling are integral to a sustainable urban forest.

Tree protection should begin before construction starts. If preservation measures are delayed or ignored until construction begins, the trees may be destined to fail. In many cases, construction affects to trees cannot be completely eliminated. Therefore, the City's goal is to keep *Injury* to trees to a minimum and allow construction projects to proceed at the same time.

Successful tree preservation occurs when designers, construction personnel, and project managers are committed to tree preservation. All members of the project team must be familiar with the rudimentary aspects of tree growth and development in order to understand the relationship between tree survival and construction practices. Utilization of a *Certified Arborist* will facilitate everyone's understanding of the needs regarding trees.

For example, above ground parts of trees are not a "mirror" of what lies below ground. In actuality, typically four to eleven large roots radiate from the base of a tree's trunk. These "buttress" roots extend from the root crown and sometimes are visible when the trunk flares away from the root crown or collar. These large roots decrease in taper rapidly and branch repeatedly.

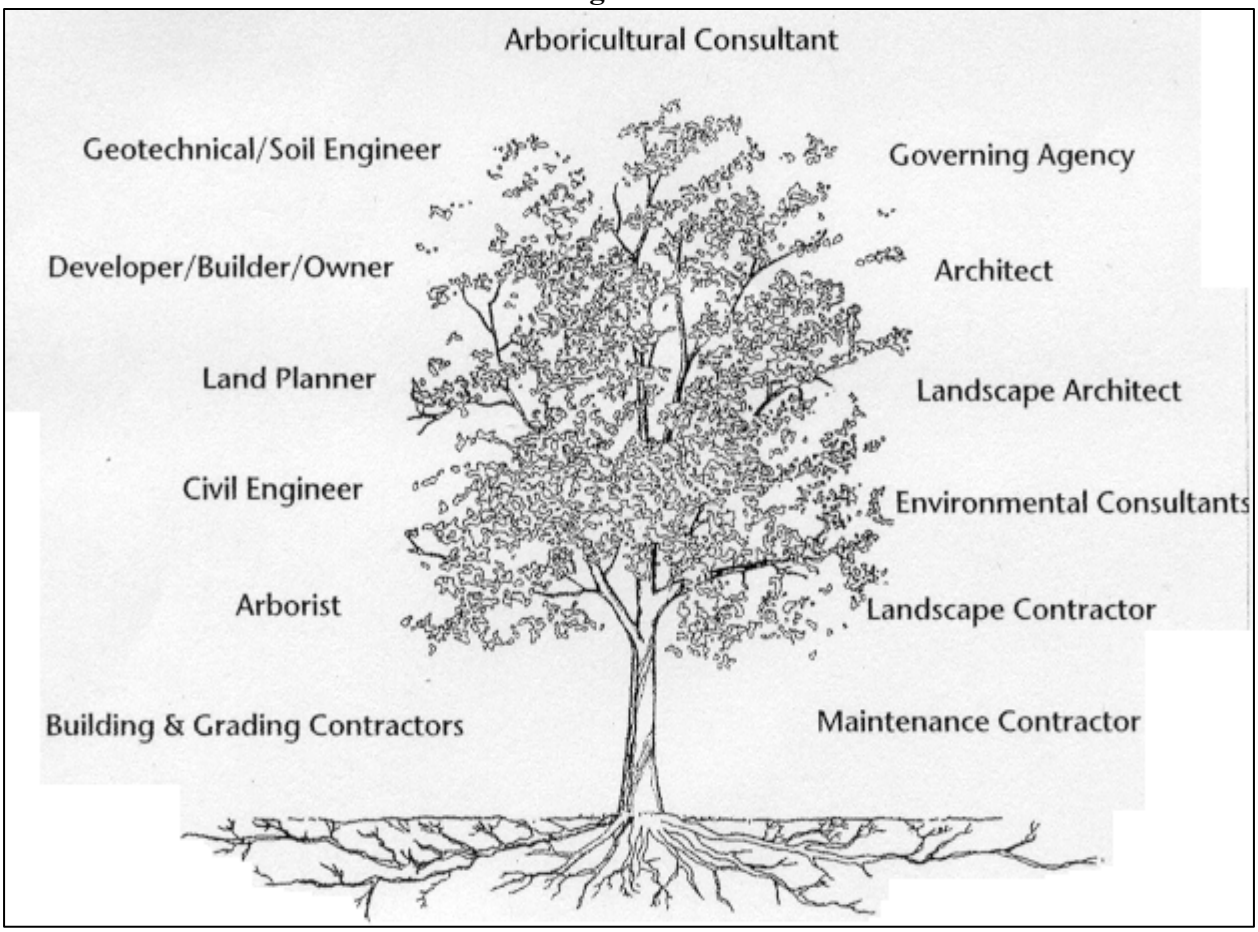
These roots grow horizontally through the soil and depending on the tree can extend 40 feet or more beyond the branch tips. These smaller roots are primarily responsible for water and mineral absorption. There can be hundreds of roots in a cubic inch of soil—thus any *Removal* of soil or root severance forces a tree to compromise its physiological processes to sustain the loss.

All trees cannot and should not be preserved. Trees that are structurally unstable, dead, in poor health, or unable to survive effects of construction become a liability to the project and may have to be removed. A realistic tree preservation program acknowledges that conflicts between trees and development or other construction projects will exist at times and may sometimes result in the *Removal* of some trees or *Removal* of some tree roots and recognizes the detrimental effect to the project and community when trees die after construction is completed.

Successful tree preservation occurs when construction impacts to trees are considered during the design process and can then be minimized. The challenge is to determine when impacts will be

too severe for the tree to survive, not only in the short term, but also in the long term. There are no quantitative methods to calculate this critical level. Determining the optimum *TPZ* provides a guideline, although trees often survive and flourish with smaller protection areas.

Figure 2.0



Matheny, N.P. and Clark, J.R. 1998. *Trees and Development*

Tree Preservation during development requires the commitment of everyone involved in the project's planning, design, construction, and management as shown above (figure 2.0)

The following are the three guiding principles for tree preservation:

A. Tree preservation cannot be the responsibility of the City of Encinitas staff alone. Each development participant must understand that his or her activities and decisions influence the success of tree preservation efforts.

B. The ability to cure construction *Injury* is very limited, so the focus of preservation efforts is the *prevention* of damage to trees. This process starts during the planning and start of design of the project.

C. The acknowledgement that not all trees are in excellent health or have good structural stability.

Following the above principles will increase the chance for success and reduce the possibility that trees will be injured to the point that they will die during construction.

Efforts at preservation must include acknowledgement of the tree and its ecological support system.

2.10 Planning for All Projects

The City considers trees as important assets and requires plotting tree locations and the *TPZ* on the plans for all projects whether they are private development, City capital improvement projects, or private utility company projects. All private development projects or private utility company projects shall have a *Project Arborist* who will work with the project manager on developing *TPZ*s and tree protection strategies. On all City capital improvement projects, a *Certified Arborist* from the City's Department of Parks and Recreation (i.e. City Arborist) shall be assigned to each project and will work with the Project Manager on developing *TPZ*s and tree protection strategies.

2.10.1 Planning and Designing for Private Development and Capital Improvement Projects

Projects are designed by in-house design staff and by outside design firms. Either design team should be given set of guidelines defining the City's *Tree Preservation Policy* (Appendix A) and *Tree Protection Guidelines* (Appendix B and Appendix D), to assure that trees are accounted for from project initiation forward.

A. Survey before Planning
The survey must accurately plot the trunk locations within the project site. Include construction staging areas and delivery routes.

B. Plan and Design with Knowledge of Trees
The health and structural confirmation of the surveyed trees must be evaluated by the *Project Arborist* in order to anticipate how well they will respond to development. The evaluation must describe the character of trees and their suitability for preservation at a level of detail appropriate for the project and phase of planning. The *Project Arborist* must make this evaluation.

C. Plan with a Vision
Disruption of any tree by construction activities may negatively affect its physiological processes, and cause depletion of energy reserves and decline in vigor, often resulting in tree death. Typically this does not manifest until many years after the tree is disrupted. Preservation of mature trees during construction has significant benefits to the success of a project.

When new trees are planted, consideration should be given to species diversity and appropriateness of location. To prevent destructive clearance pruning in future years, keep in mind the ultimate canopy and root spread.

D. Plan for all Aspects and Entire Duration of Project
Construction projects are multi-level and often require participation of various construction trades and subcontractors. It is important to plan for tree protection with an understanding of construction site dynamics. Trees must be protected in the staging area, construction employee parking area, adjacent properties, as well as on the actual construction site.

2.10.2 Managing In-House Construction Projects
The in-house construction team should be given a set of guidelines that define the City's *Tree Preservation Policy* (Appendix A) and *Tree Protection Guidelines* (Appendix B and Appendix D), and to assure that trees are accounted for from the project's initiation forward.

A. Survey before Planning
For all in-house projects, contact the *City Arborist* for an accurate evaluation of trees on the job site that is to be included in the survey.

B. Plan and Design with Knowledge of Trees
In order to better understand the condition of the affected trees, *City Arborist* will make available the results of the tree evaluation. This evaluation will provide you with knowledge of the resources and the anticipated construction tolerance of the affected trees.

C. Plan with a Vision
Obtain information about trees and minimize negative impacts on the urban forest. Conduct all projects with tree preservation in mind.

D. Plan for all Aspects and for the Entire Duration of the Project
Trees must be protected in the staging area, construction employee parking area, and during demolition and grading. Arrange with the Maintenance Supervisor from the City's Department of Parks and Recreation for trees to be watered and for the soil to be protected from *Compaction*.

2.20 Pre-Construction Requirements - *Tree Protection and Preservation Plan*

Prior to the commencement of a private development or City Capital Improvement project, the Project Manager (for either private development or City Capital Improvement project) and appropriate City staff from the Department of Parks and Recreation, Department of Planning and Building, Department of Public Works, and the Department of Engineering Services must be assured that if any activity of the project is within the dripline of *City Tree or heritage tree(s),* a site specific tree protection plan is prepared. The following six steps shall be incorporated as part of the *Tree Protection and Preservation Plan*:

2.20.1 *Site Plan*

For all projects, *Site Plan*s must indicate accurately plotted trunk locations and the TPZ of all trees or group of trees to be preserved within the development area. Additionally, for all *Protected Trees,* the plans shall accurately show the trunk diameter, dripline and clearly identify the TPZ. The type of protective fencing shall be specified and indicated with a bold dashed line.

*Site Plan*s shall also include the following minimum information:

- **A.** Surveyed tree locations, species, size (height, width, DBH). *Dripline Area* (including trees located on neighboring property that overhang or within 50 feet of the project site) and *City Tree*s adjacent to the project site;
- **B.** Paving, concrete, *Trenching*, or grade change (including the limits of over-excavation) located within the *Tree Protection Zone*;
- **C.** Existing and proposed utility easements;
- **D.** Surface and subsurface drainage and aeration systems to be used;
- **E.** Walls, tree wells, retaining walls and grade change barriers, both temporary and permanent;
- **F.** Landscaping, irrigation and lighting within dripline of trees, including all lines, valves, etc;

2.20.2 *Protective Tree Fencing* for all categories of *Protected Trees*

Fenced enclosures shall be erected around trees to be protected. This will achieve three primary goals, (1) to keep crowns and branching structure clear from contact by equipment, materials, and activities; (2) to preserve roots and soil condition in an intact and non-compacted state and; (3) to identify the TPZ in which no soil disturbance is permitted and activities are restricted unless otherwise approved by the *City Arborist* or either the Director of Public Works, Director of Engineering Services Services, Director of Parks and Recreation, or Director of Planning and Building.

All trees to be preserved shall be protected with five foot to six foot high chain link fences. Fences are to be mounted on two-inch galvanized iron posts, driven into the ground to a depth of at least two feet and at no more than ten-foot centers. A two-foot wide access gate for tree maintenance shall be installed. Tree fences shall be erected before demolition, grading, or construction begins and remain until final inspection of the project. "Warning" sign shall be prominently displayed on each protective fence. The sign shall be a minimum of 8.5 inches x 11 inches and clearly state the following:

ENTRY PROHIBITED

TREE PROTECTION ZONE
This Fence Shall Not be Removed

All work within the TPZ requires approval of either the *Certified Arborist*, the Director of Engineering Services Services, the Director of Public Works, the Director of Parks and Recreation, or Director of Planning and Building.

A Type I Tree Protection Fence is for trees to be preserved throughout the duration of the .project. The fences shall enclose the entire area under the canopy dripline or *TPZ,* if specified by the *Certified Arborist*. If fencing must be located on paving or concrete that will not be demolished, an appropriate grade level concrete base may support the posts.

B. Type II Tree Protection Fence is for trees situated in small planting areas, where only the planting area is enclosed with the required chain link protective fencing. The walkways and traffic areas are left open to the public.

C. Type III Tree Protection Fence is for trees in small tree wells, building site planters or sidewalk planters. Trees shall be wrapped with 2 inches of orange plastic fencing from the ground to the first branch and overlaid with 2-inch thick wooden slats that are bound securely (slats shall not be allowed to dig into the bark). During installation of the plastic fencing, caution shall be used to avoid damaging branches. Major scaffold limbs may also require plastic fencing as directed by the *Certified Arborist*.

No storage of material, topsoil, vehicles, or equipment shall be permitted within the fenced area throughout the entire duration of the construction project.

2.20.3 Pre-construction meeting

The *Certified Arborist* shall attend all pre-construction meetings to assure that everyone fully understands previously reviewed procedures and tree protective measures concerning the project site, staging areas, hauling routes, watering, contacts, etc.

2.20.4 *Tree Protection Zone*

During the design phase of the project the *Certified Arborist* and the Project Manager will work together on developing the TPZ for each tree impacted by the project. If an unresolved disagreement arises between the *Certified Arborist* and the project manager on the size of a TPZ for a particular tree, the dispute shall be brought to the Director of Engineering Services, the Director of Public Works or the Director of Parks and Recreation, who will render a final decision on the size of the TPZ.

Each tree to be retained shall have a designated TPZ identifying the area sufficiently large enough to protect it and its roots. The TPZ shall be shown on all *Site Plan*s including, Demolition, Grading, Irrigation, Electrical, Landscape, etc. Improvements or activities such as paving, utility and irrigation *Trenching* including other ancillary activities shall occur outside the TPZ*,* unless otherwise specified. The protection fence shall serve as the TPZ.

A. Activities prohibited within the *Tree Protection Zone* include:

1. Parking vehicles or equipment, storage of building materials, refuse, or excavated soils, or dumping poisonous material on or around trees and roots. Poisonous materials include, but are not limited to paint, petroleum products, concrete, stucco mix, dirty water or any material that may be harmful to tree health/
2. The use of tree trunks as a backstop, winch support, anchorage, as a temporary power pole, signpost or other similar function.

3. Cutting of tree roots by utility *Trenching*, foundation digging, placement of curbs and trenches, or other miscellaneous excavations without prior approval of the *Certified Arborist.*
4. Soil disturbance or grade change.
5. Drainage changes.

B. Activities permitted or required within the *Tree Protective Zone* include:

1. Mulch: During construction, wood chips may be spread within the TPZ to a four to six inch depth, leaving the trunk clear of mulch. This will aid in inadvertent soil *Compaction* and moisture loss. Mulch shall be 2-inch unpainted, untreated shredded wood or approved material.
2. *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 the final grading stage. The protective buffer shall consist of material approved in advance by the *Project Arborist.*
3. Irrigation, Aeration, fertilization, or other beneficial practices that have been specifically approved for use within the TPZ.

C Erosion Control:

If a tree is adjacent to or in the immediate proximity to a grade slope of 8% or more, approved erosion control or silt barriers shall be installed outside the TPZ to prevent siltation and/or erosion within the zone.

2.20.5 *Verification of Tree Protection*

The project contractor shall verify in writing that all pre-construction tree preservation conditions have been met as follows:

A. Tree fencing installed;
B. Erosion control secured;
C. Tree pruning completed;
D. Soil *Compaction* preventive measures installed;
E. Tree maintenance schedule established and the responsible party designated; and
F. Tree Protection Zone (TPZ).

The Project Manager, the *City Arborist*, City's construction inspector, and the contractor must sign this verification.

2.20.6 Tree Pruning and *Removal*

Prior to construction, various trees may need to be pruned away from structures or proposed construction activity. ***Construction or contractor personnel shall not attempt pruning***. Only personnel approved by the *Project Arborist* can perform pruning operations.

Removal of trees adjacent to trees that are to remain requires a great deal of care. Only personnel approved by the *Project Arborist* shall engage in tree *Removal*. *Removal* of trees that extend into branches or roots of protected trees shall not be attempted by the demolition or construction crew, or by grading or other heavy equipment. Before removing tree stumps, the project

manager shall determine if roots are entangled with trees that are to remain. If so, these stumps shall have their roots severed before extracting them.

2.30 Activities During Construction and Demolition Near Trees

Soil disturbance or other damaging activities within the *TPZ* is prohibited unless approved by the *Certified Arborist* and mitigation for specific injuries is implemented. No encroachment within 5 feet of a trunk will be permitted under any circumstances.

2.30.1 Soil *Compaction*

Soil *Compaction* is the largest single factor responsible for the decline of trees on construction sites. The degree of *Compaction* depends on several factors: amount and type of pressure applied, presence and depth of surface organic litter, soil texture and structure, and soil moisture level.

The greatest increase in soil density occurs during the first few equipment passes over the soil, which underscores the importance of implementing protective measures before the project begins and equipment arrives at the site. To dispense traffic weight, mulch and temporarily *Root Buffer*s can be used.

The following techniques can lessen *Compaction*: *Vertical Mulching*, *Soil Fracturing*, core venting, and radial *Trenching*. Do not compact soil to higher density then needed: to 95% Proctor density (moisture – density) in improved areas for asphalt or concrete pavements, and in unimproved areas to the density required by the inspector.

2.30.2 Grading Limitations within the *TPZ*

Lowering the grade around trees can have an immediate and long-term effect on trees. Typically, most roots are within the top 3 feet of soil, and most of the fine roots active in water and nutrient absorption are in the top 12 inches.

A. Grade changes within the TPZ are not permitted.

B. Grade changes outside the TPZ shall not significantly alter drainage.

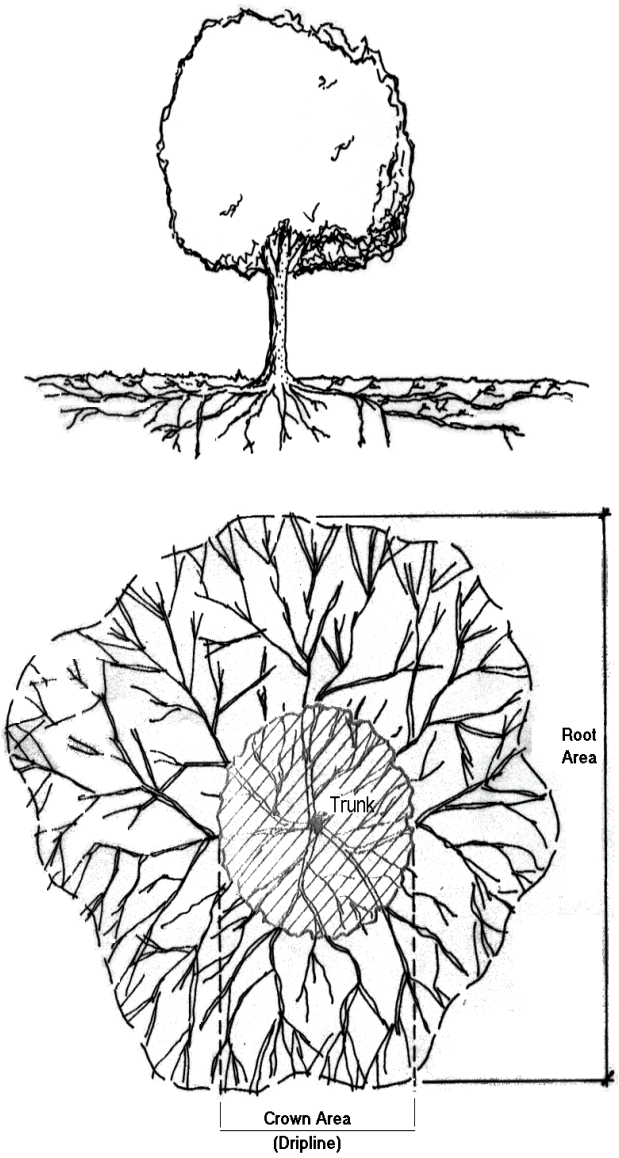
C. Grade changes under specifically approved circumstances shall not allow more than 6 inches of fill soil or allow more than 4 inches of existing soil to be removed from natural grade, unless mitigated.

D. Grade fills over 6 inches or impervious overlay shall incorporate an approved permanent aeration system, permeable material, or other approved mitigation.

E. Grade cuts exceeding 4 inches shall incorporate retaining walls or an appropriate transition equivalent.

The figures below illustrate the pattern of tree root development and areas where encroachments may have an adverse effect on tree health.

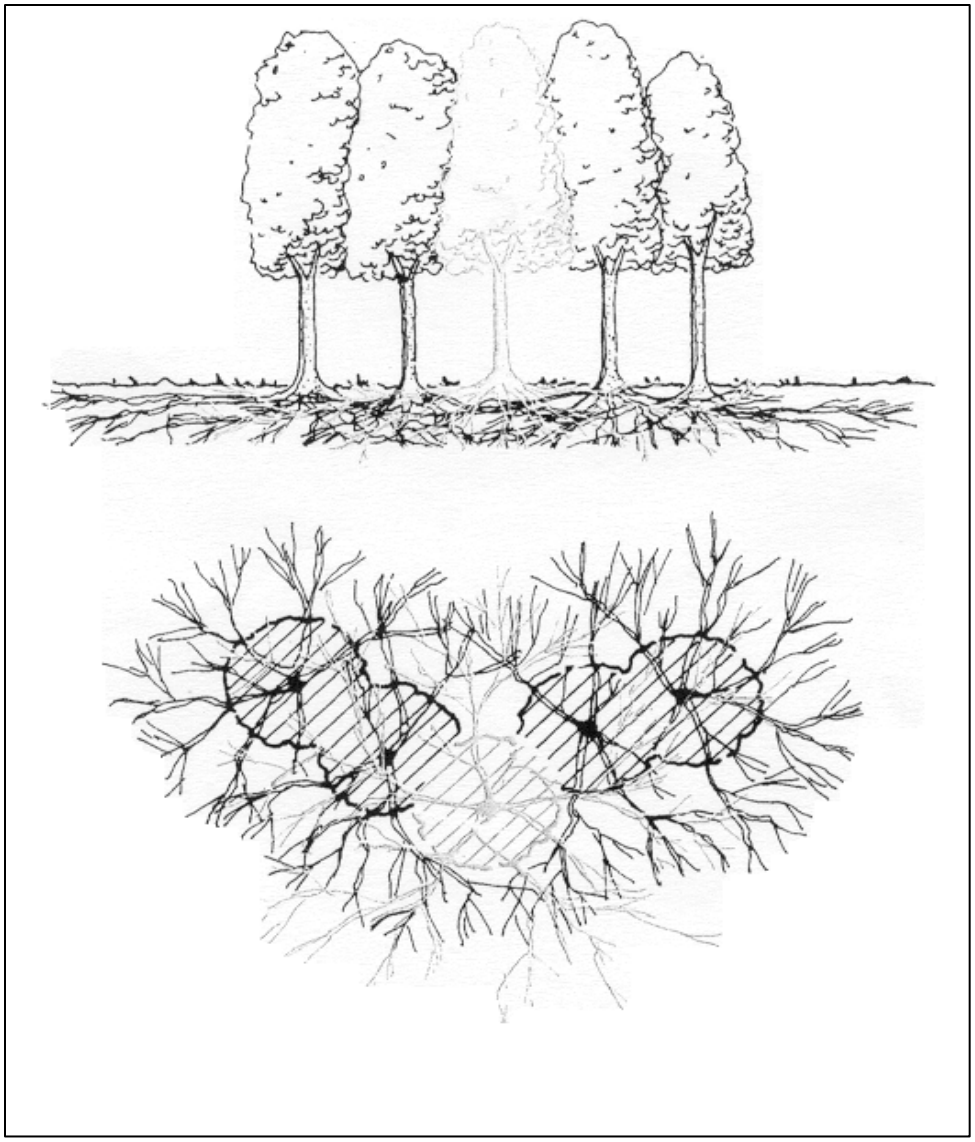
Figure 2.1



Matheny, N.P. and Clark, J.R. 1998. *Trees and Development*

Tree root system of a tree can be described as shallow and widespread, extending far beyond the edge of the canopy.

Figure 2.2



In many parks where trees grow closely together, root systems of individual trees overlap and intertwine, forming a dense mat of roots.

2.30.3 Trenching, Excavation and Equipment Use

Trenching, excavation or boring within the TPZ shall be limited to activities approved by the *Certified Arborist* or either the Director of Engineering Services, Director of Public Works, the Director of Parks and Recreation, or Director of Planning and Building. Explore alternatives for *Trenching* outside the root zone. Avoid exposing roots during hot, dry weather. Backfill trenches

as soon as possible with soil and soak with water the same day. Small roots can die in 10 to 15 minutes and large roots may not survive an hour of exposure. If the trench must be left open all roots must be kept moist by wrapping them in peat moss and burlap.

If *Trenching* is unavoidable, the following distances should be maintained:

TRUNK DIAMETER (measured at 4.5 feet above natural grade)	DISTANCE FROM BOTH SIDES OF THE TRUNK
Up to 6 inches	5 feet
6-9 inches	5 feet
10-14 inches	10 feet
15-19 inches	12 feet
over 19 inches	15 feet

A. Root Severance. No roots greater than 2 inches in diameter shall be cut without approval of either the *Certified Arborist*, Director of Engineering Services, Director of Public Works, Director of Planning and Building, or the Director of Parks and Recreation. Tunneling under roots is the approved alternative. Prior to excavation for foundation/footing/walls, or grading or *Trenching* within the TPZ, roots shall be severed cleanly one-foot outside the TPZ to the depth of the planned excavation. When roots must be cut, they shall be cut cleanly with a sharp saw to sound wood and flush with the trench side.

B. Excavation. Any approved excavation, demolition, or extraction of material shall be performed with equipment that is placed outside the TPZ. Hand digging, hydraulic, or pneumatic excavation are permitted methods for excavation within the TPZ.

C. Heavy Equipment. Use of backhoes, Ditch-Witches, steal tread tractors or other heavy vehicles within the TPZ is prohibited unless approved by the *Certified Arborist*, Director of Engineering Services, Director of Public Works, Director of Parks and Recreation, or Director of Planning and Building. If allowed, a protective *Root Buffer* is required.

2.30.4 Tunneling and Directional Drilling

Approved *Trenching* or pipe installation within the TPZ shall be either cut by hand, air-spade, or by mechanically boring a tunnel under the roots with a horizontal directional drill using hydraulic or pneumatic air excavation technology. In all cases, install the utility pipe immediately, backfill with soil and soak with water within the same day. Tunneling under the root system can greatly reduce both damage to the tree and the cost to repair landscape and other features destroyed in the *Trenching* process. There are times, such as when working in rocky soils and slopes, when tunneling is not a reasonable alternative.

The following recommendations for tunneling depths should be observed:

TRUNK DIAMETER	MINIMUM TUNNEL DEPTH (DBH)
Less than 12 inches	24 inches
12 inches or more	36 inches

2.30.5 Alternative Methods for Hardscape to Prevent Root Cutting
The following remedies should be considered as an alternative to severing tree roots:

A. Grinding a raised walkway or concrete pad;
B. Ramping the walkway surface over the roots or lifted slab with pliable paving;
C. Routing the walkway around tree roots;
D. Permeable paving materials (e.g., decomposed granite), interlocking pavers, or flagstone walkways on sand foundations; and
E. Root bridging.

2.30.6 Using Alternative Base Course Materials
Engineered structural soil mix is an alternative material for hardscape areas near trees. More information can be found at www.amereq.com.

2.40 Tree Maintenance During Construction

Providing adequate maintenance can mitigate stressful changes that occur to a tree's environment during construction. To remain vigorous, the tree needs to maintain stored carbohydrates and preserve the effectiveness of its growth regulators. It is recommended that large projects provide:

2.40.1 Irrigation
Providing supplemental irrigation for trees under water stress may be the single most important treatment. Irrigation should be designed to wet the soil within the TPZ to the depth of the root zone and to replace that water once it is depleted. Light, frequent irrigation should be avoided. Create a six-inch berm around trees at the edge of the TPZ and fill with no more than six inches of mulch. Fill the basin with water. Irrigation should wet the top two to three feet of soil to replicate similar volumes and normal seasonal distribution.

2.40.2 Soil *Compaction* Mitigation
To prevent negligent encroachment into the TPZ, trees to be preserved during construction must have the specified type of protection fences in place at all times. *Removal* of fences, even temporarily, to allow deliveries or equipment access is not allowed unless approved by the *Certified Arborist* and a *Root Buffer* is installed. The *Root Buffer* components: mulch, gravel and plywood, must be maintained continually to assure its effectiveness against soil *Compaction*.

2.40.3 Dust Control
During periods of extended drought, wind or grading, trunks, limbs and foliage should be sprayed with water to remove accumulated construction dust.

2.50 Damage to Trees

2.50.1 Reporting *Injury* to Trees
Any damage or *Injury* to trees shall be reported as soon as possible to the Project Manager or Construction Inspector, and always to the *City Arborist*. The *City Arborist* needs to be aware of an injured tree in order to monitor its recovery or progress. Injuries to roots and branches must be repaired immediately using ISA Best Management Practices.

2.50.2 Contractor Subject to Penalties
If a tree designated to remain is removed or irreversibly damaged as determined by the *City Arborist*, a contractor designated by the *City Arborist* may be required to install a replacement tree matching in size, quality and variety. If an acceptable replacement tree is not available, the contractor may be required to pay damages to the City for the value of the damaged tree in accordance with the guidelines set forth in the Guide for Plant Appraisal, current edition, using the Trunk Formula Method.

2.50.3 Employees Subject to Discipline
In the event of damage to above- or below-ground parts of park trees, the Construction Supervisor or Park Maintenance Supervisor shall conduct an investigation to determine the cause of the damage. If it is found that damage was caused due to the error, negligence, or willfulness of a City employee, then that employee may be subject to appropriate disciplinary action.

2.60 Documents to be Included in all Projects

2.60.1 Model Tree Protection Specifications for Designers and Project Managers (Appendix B). This document should be distributed to the Planning and Construction Designers, Project Managers, City Inspectors, bidding contractors, and contracted designing firms.

2.60.2 Tree Protection Summary and Instructions on How to Prevent Damage to Trees During Construction (Appendix D). This document should be distributed to the Construction and Maintenance staff for implementation during all in-house projects.

2.70 Right-of-Entry Permits and Documents to be included with every permit

In order to sustain a healthy urban forest, it is imperative that all Department staff understands the need to protect trees. Every individual, organization or agency issued a Right-of-Entry, permit or agreement to enter City property, should be in compliance with City policies concerning protecting trees and be given documentation the will help to ensure tree protection during the permitted activity. The document titled Instructions on How to Prevent Damage to Trees During Construction (Appendix D) shall be distributed to every permittee and the permittee shall comply with these instructions.

SECTION 3.00 – REMOVAL OF TREES

Introduction

A 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 warranted and to prevent unnecessary tree *Removal*. In most cases, a removed tree must be replaced (although not necessarily in the same location).

3.10 Tree Removal

A. Allowable *Removal*

A written permit is required to remove a *City Tree*, except in emergency situations outlined in Section 6.00, Hazardous Tree. *Removal* of *Trees* is allowed if:

1. A tree is determined to be dead, dying, diseased, hazardous (*see Hazardous trees, Section 6.00*), a detriment to or crowding an adjacent tree or a *Public Nuisance* (*see Section 1.00*).

2. A tree trunk is touching or the *Basal Flare* is under the *Building Footprint* of an existing building (for example, uplifting foundation, contact or damage to eaves, gutters, etc.).

In the case of *City Tree*s, the Department responsible for managing the tree, either the Public Works Department or the Park and Recreation Department will issue a written permit approving the *Removal* of the tree.

In the case of a *Heritage Tree* shown on previously approved site or landscape plans, the Planning Commission must approve the *Removal* before the Director of Planning and Building will issue a written permit approving the *Removal* of the tree (*see Heritage Trees, Section 9.10.G*); unless deemed an emergency (see section 6.20).

B. Permit Application

Tree *Removal* Applications are available at the City of Encinitas, Engineering Services Department Counter at 505 S. Vulcan Ave, Encinitas, CA. 92024. 760-633-2770.

The following is a checklist of items necessary for City review for tree *Removal*. Additional information may be required by the reviewing staff. Response will generally be mailed to the applicant within 10 days. The *Removal* permit must be on site during the *Removal*.

Tree *Removal* Checklist

1. Completed City of Encinitas Tree *Removal* Application available at the City of Encinitas, Engineering Services Department Counter at 505 S. Vulcan Ave, Encinitas, CA. 92024. 760-633-2770.

2. Payment of $145.00 review process fee ($125 Schedule Fee and $20 Records Management).
3. Arborist report from a *Certified Arborist* on company letterhead to include the following information for each tree:
   a. A written narrative describing the tree species (common and scientific);
   b. Location (in relation to street, structures and property line);
   c. Size (DBH, height & crown spread);
   d. Condition (foliage, vigor, structural integrity); and
   e. Life expectancy and prognosis (is the tree *hazardous*, in severe decline, causing property damage?).

C. Hazardous Trees

To remove a tree that is not subject to a permit and has been verified as *hazardous*, as defined by these procedures, written approval from the *City Arborist* is required and must be available on site when the tree is being removed, unless emergency conditions exit (*see Emergency Removal Conditions, Section 6.20*).

D. Notification Requirements

When the City has scheduled a tree for removal the following shall apply:

1. Notice shall be provided to residents in the immediate area at least three (3) working days prior to the removal (notification may be such means as direct mail and/or door hangers);
2. Notice shall be provided to all formally recognized community organizations, i.e. Town Councils, DEMA and the Chamber of Commerce in the immediate area at least three (3) working days prior to the removal.
3. The tree to be removed must be clearly marked at least three (3) working days prior to scheduled removal.
4. The City will post the upcoming removal on the City's website.

   In cases when a *Certified Arborist* has determined that a tree or trees are an imminent threat to public safety (Hazardous Trees), the City will attempt to notify the public as appropriate.

SECTION 4.00 - TREE REPLACEMENT

4.10 When Tree Replacement is Required

Certain conditions determine whether or not a tree must be replaced. In summary, they are:

A. *City Tree*s

1. If the City authorizes *Removal* of a *City Tree* in connection with a development project, it shall specify the replacement requirements in the permit authorizing *Removal*.
2. If a tree is determined to be dead, dying, diseased, hazardous *(see Hazardous trees, Section 6.00)*, a detriment to or crowding an adjacent tree or a *Public Nuisance (see Section 1.00).*
3. A tree trunk is touching or the *Basal Flare* is under the *Building Footprint* of an existing building (for example, uplifting foundation, contact or damage to eaves, gutters, etc.) a replacement may be required.

B. *Heritage Tree*s

If the City authorizes *Removal* of a *Heritage Tree* because it is dead, dying, diseased, hazardous, or a nuisance, a tree replacement may be required. In all other cases, the tree must be replaced.

4.20 Tree Canopy Replacement Standards

When a tree is to be replaced, the following standards apply:

A. Species

The replacement trees shall be a species determined by the *Arborist* who shall follow the City's established tree list. Factors to be considered include the long term health of the tree in the location and its compatibility with the adjacent uses as well as design considerations.

B. Location

The location of the replacement tree shall be approved by the *City Arborist*. If it is not possible or desirable to replace the tree on site, the *City Arborist* shall consider the distribution of trees so that diversity and age are considered. Section 5.00 *(Tree Planting)* will apply.

C. Size and Number

Each tree removed requires 1 x 15 gallon tree as replacement or as directed by the *City Arborist* until all vacant acceptable sites are planted.

* When replacement trees are required within an area designated as Very High Fire Hazard Severity Zone (VHFHSZ) by fire department maps, the type, replacement ratio and planting location of trees in these areas will be determined by current fire and wildland codes.

4.30 Tree Value Replacement Standard

When the value of a tree needs to be determined for establishing the amount of security required, or for any other purpose, the 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.

4.40 Security Deposits

As a condition of a development approval, the City may require that the developer post security of between 25% and 100% of the value of the trees to be preserved, as determined by using the *Guide for Plant Appraisal* published by the Council of Tree and Landscape Appraisers. 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 City Attorney. 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 provide off site trees and/or landscaping.

SECTION 5.00 - TREE PLANTING

5.10 Introduction

Planting specifications apply for trees that are: 1) planted as a replacement, 2) to be planted as a *City Tree,* within the right-of-way or other public land; or 3) planted as part of a landscape plan subject to *Discretionary Development Approval.* Using the following specifications will result in consistent city-wide plantings and superior tree growth and vitality. To achieve this in development projects, the *Landscape Architect* shall incorporate these items into their specifications and the *City Arborist* will review and approve all plantings. All trees planted in the City of Encinitas shall conform to approved tree palettes identified in all City and Community Master Plans, General Plans and Specific Plans. In no case shall a tree on a City approved invasive tree list be planted in the City of Encinitas.

5.20 Planting Stock and Materials

A. Quality

It is the contractor's responsibility to supply stock that meets ANSI Standards.

1. All trees installed within the City of Encinitas shall conform to American Association of Standards, ANSI Z60.1, *Specifications for Acceptance of Nursery Trees at the Time of Delivery*, in all ways.
2. All trees shall be sound, healthy, vigorous, and free of plant disease and insect pests and their eggs.
3. 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.
4. Trees shall not have been topped or headed.
5. *Landscape Architect* shall inspect and verify, in writing, that all tree material to be installed on a development site meets the above standards and is acceptable. The *City Arborist* will inspect all other plantings of *City Tree*s (e.g. right-of-way, public land, etc.)
6. The written verification shall be forwarded to the City Planning Department within one week of acceptance.
7. Inspection shall occur after delivery of stock to the project site.
8. Trees with broken tops, branches or injured trunks shall also be rejected.

B. Miscellaneous Materials

The following materials shall be used unless otherwise specified:

1. Tree stakes. Support stakes shall be treated 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.
2. Tree Ties. 'V.I.T' Tree Supports (recommended) or equivalent, twist brace, fabric-reinforced rubber (3/8-inch minimum), or equivalent approved by the City of Encinitas shall be used and installed in a figure eight fashion to support the tree to the stakes.

3. Mulch. Screened untreated wood chips 1/2- to 1- inches in size, spread to a 2-inch depth out to the edge of the root ball. The mulch should be kept at least two inches away from the trunk and shall be applied to each tree (*see Mulching, Section 3.45-G*).
4. Root Control Barriers. Use along all public sidewalks, and indicate on approved plans and drawings. 18-inch Linear Barrier LB18-2 root control barrier shall be used. Unless specified otherwise, a 10-foot length shall be placed on center with the tree and on the sidewalk side only. Root barrier boxes are not approved.
5. Tree Grates. Where sidewalk width is less than 8-feet and new trees will be installed in a tree well, metal tree grates shall be used and approved by the City. Minimum size grates shall be 4' x 4' unless specified otherwise. All tree grates shall be mounted in frames; frames inset into a concrete foundation within the sidewalk or surface material and shall be flush with the surrounding surface.

5.30 Planting Site Preparation

A. Soil Preparation and Conditioning

1. 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 7.50*). All underground digging requires a call to Underground Service Alert, a.k.s DigAlert prior to starting.

B. Planter Pit

1. Trees in a confined planter pit or sidewalk area: The planting hole shall be excavated to a minimum of 30-inches deep x the width of the exposed area. Scarify the sides of the pit *(see Planting the Tree, Section 5.40)*. Soil beneath the root ball shall be compacted to prevent settling.
2. Trees in all other areas: Excavate the hole's width a minimum of three 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.
3. The height of the container root ball should be 1-2-inches higher than grade level *(see Planting the Tree, Section 5.40),* except when structural urban tree soil mix is used (*see Alternative Base Course Materials, Section 2.30.6*), in which case the tree may be planted at level grade.

C. Drainage

1. Poor drainage - 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 the *City Arborist* or *Landscape Architect* prior to plant installation. One or more of the following mitigations are required for locations with poor drainage.
   a. Mitigation for locations with poor drainage:
      i. Install french drain. The trench shall radiate away 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.
      ii. Install drain tiles or perforated pipe directing water away from the tree.
      iii. Install a drain chimney at the bottom of the planting pit, a minimum of 4-inches in diameter and filled with medium sand or fine gravel to ensure

percolation of all water from the filled planter pit. Auger bore drain holes to penetrate hard pan or clay a minimum of 12-inches into undisturbed pervious soil. Angle the boring as close to vertical as possible.

2. Planting Percolation Test. A minimum of one test per development site is required. Additional tests may be needed as required by *Landscape Architect* or *City Arborist*. Fill planting hole with water and insure drainage that is greater than 2-inches per hour. If percolation is less, one or more of the mitigation measures outlined in *Section 7.50 Soil Improvement*, must be implemented.

5.40 Planting the Tree

A. 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 5.30 C*).

B. 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.

C. Placing the Tree
Locate the tree in the hole, and if the tree is located near a street right-of-way, rotate the tree to direct the main branches away from the street side.

D. Filling the Hole
Fill the hole halfway up with original soil or amended soil when approved, 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.

E. 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. 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.

F. 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 1 to 2-inches of mulch or bark over root ball and berm, keeping the mulch away from the trunk a minimum of 2-inches. Fill the berm with water to capacity (*see Watering Schedule, 7.45*).

5.50 Planting in Difficult Soil Conditions

A. Turf Areas

In turf areas that receive regular watering, the watering berm may be eliminated after a few weeks to ensure the tree is receiving adequate water. The turf shall be removed a minimum of one foot from the new tree, and mulch placed shall be placed on top of the root ball. The mulch shall not be touching the tree.

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.

1. 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 2.30.6*).

SECTION 6.00 - HAZARDOUS TREES

Introduction

The health and safety of a tree are two distinct and separate 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 the tree determined to be "*hazardous"* as defined in this section. This must be verified in writing by the *City Arborist* before the tree can be *removed*.

6.10 Tree Hazards

A. Tree Hazard Responsibility

1. City owned trees on City property that may be a public safety hazard should be reported to the City of Encinitas, Public Works Department at (760) 633-2850.
2. On private property, it is the responsibility of the property owner to mitigate or abate a known hazardous condition of a *heritage tree* that may be of questionable structure or deemed as hazardous. Most tree hazards can be prevented with regular checkups by a tree care professional and timely maintenance action by the property owner. The City does not require advance permission for removal of *heritage trees* in emergencies. However, it does require documentation of the situation after the fact. This is to avoid the unlawful removal of sound trees on the grounds that they are hazardous. If there is no immediate danger, and the structural deficiency can be corrected, it should be. If the City determines that there was no reasonable basis for believing there was an emergency, the property owner may face penalties for violating City law (Ordinance).

B. Recognizing Tree Hazards

Determining whether or not a tree's defect/s constitutes a condition that presents an imminent hazard to an area requires a high degree of knowledge and experience. Hazard tree assessment should only be evaluated by an arborist who is familiar with tree physiology and can interpret the external signs of weaknesses; that can perform internal checks if necessary and recommend mitigation.

6.20 Emergency Removal Conditions

A. Abatement

When a *City Tree* or *Heritage Tree* has partially failed (or it is apparent it is about to fail), and persons or properties are threatened, the tree may be removed without City review or approval. The City does not require an arborist report before the *Removal* in this instance.

B. Authorization

Such cases must be substantiated after the fact by the property owner and tree professional with photographs, abatement information, insurance claim or other relevant information and completion of a Tree *Removal* Application. The information is to be submitted to the City's Planning Department within five days of emergency *Removal*. All

other authorizations are subject to the standard procedure outlined in *Removal of City Trees or Heritage Trees, Section 3.00.*

6.30 Criteria Used by the City to Determine if a Tree is Hazardous

A. Definition of Hazardous

City of Encinitas defines *'Hazardous'* as: an imminent hazard or threat to the safety of persons or property. 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 6.40*). This form, or an approved equivalent, must be completed by a *Certified Arborist*. The *City Arborist* retains discretionary right to approve, request in writing a second opinion of a rating, in writing, or recommend action that may reduce the condition to a less-than significant level of hazard.

C. Authorization

If the *hazardous* condition or *Target* cannot be mitigated or reduced to a less than significant level (*see Hazard Reduction and Prevention, Section 6.60*) then removal of the tree shall be authorized by the City, with the exception of an emergency as outline in section 6.20.

6.40 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 Encinitas.

International Society of Arboriculture (ISA) – Hazard Rating Formula.

TABLE 4-1 Hazard Rating Formula

ISA – Hazard Rating Formula			
Failure Potential	+ Target	+ Additional Factors/Size of Part	= Hazard Rating
1 = Low	1 = Low	1 = Low	3 = Low
4= Severe	4 = Severs	4 = Severe	12 = Severe
Note: the above factors are combined to quantify a hazard rating. For example, a minimum rating of 3 shows a low predicable hazard, and the maximum rating of 12 shows a high predictable hazard. Further details regarding this formula can be found in the ISA – Hazard Evaluation Form 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 if necessary, shall employ the use of 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 *Target*s shall include people, vehicles, structures or something subject to damage if a tree or part of a tree fails. Property use shall consider what structures or activities are under or around the tree (e.g. building, parking, pedestrian, recreational, utility lines, hardscape, etc.). Occupancy shall consider frequency of the use (occasional, intermittent, frequent or constant), and whether the *Target* is likely to be present when failure occurs.

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

2. 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 vs. the entire tree uprooting); significant potential of fire, utility line contact or catastrophic effects, etc.

6.50 Tree Evaluation Checklist

This Section is intended to further help understand tree defects and how they may be interpreted by an arborist. Many tree defects are not readily apparent because decay or structural damage may be internal. Also, poor tree health may not reflect poor tree structure. *Hazardous* trees must be carefully evaluated. The following checklist of criteria that is typically used by professionals may indicate potential or current tree hazards. The checklist is not meant to be a comprehensive guide, however, it is an outline of indicators that may help to indentify potential hazards and suggest action to avert a tree failure and liability.

A. Hazard Evaluation Questionnaire

<u>Target</u>: If the tree fails and people, vehicles, structures or something subject to damage than immediate action may be necessary.

<u>Dead Branches</u>: Are there dead tops or branches? Is the tree dead?

Cracks: Are there deep, open cracks in the trunk or branches? These are major starting points for trunk and branch failure.

Crotch Cracks: Are there deep, open cracks below joining trunks or stems?

Tree Architecture: Has the tree grown beyond its species specific shape into a hazardous form? Is the tree leaning?

History: Has the tree recently lost large branches?

Edge Tree: Were neighboring trees recently removed, leaving tall trees exposed at the edge that may be subject to unexpected wind dynamics and blow-over?

Living Branches: Do live branches bend abruptly upward or downward where tips of large branches were cut off? These may pull out of trunks that are weakened by rot or cracks. Beware of large branches on rotten or cracked trunks.

Topping: Are large branches growing rapidly from *Topping* cuts? These sprouts have weak attachments and may weaken further as they grow. Is there decay below *Topping* cuts?

Storm *Injury:* Are there broken branches, split trunks, or injured roots? Are branches close to power lines?

Root Rot: Are there fungus fruit bodies (mushrooms) on roots or near the trunk? Were roots injured by construction?

Rots and Cankers: Are there hollows or cankers (dead spots) in the trunk or major branches, some with fungus fruit bodies?

Construction *Injury*: Have roots, trunk, or branches been injured?

New Lawn: Is there a new lawn or garden over injured roots? The added fertilizer may stimulate the growth of fungi that will rot the supporting roots while the top gets heavier. A moderate storm could cause the tree to fall.

Guying of Trees: Staking and guying of small to medium size trees may benefit from the additional support. Discretion must be exercised that the guying does not hide weaknesses, such as toppling over, that result from poor quality nursery stock or girdling roots.

6.60 Hazard Reduction and Prevention

City staff shall review the following list to reduce hazardous conditions.

A. Plant trees that are not problematic and that fit the site.

B. 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.

C. The risk of a hazard tree may be reduced by removing dead and broken branches, reducing branch end weights, by mechanically supporting weak branches from below, or by cabling and bracing. In some cases, *Targets* may be removed such as by moving picnic tables or other items beneath a precarious tree, fencing to prevent access to such trees, or rerouting pedestrian or vehicular traffic.

D. If there are no other options to abate the hazard, the tree may need to be removed entirely.

SECTION 7.00 - TREE MAINTENANCE GUIDELINES

Introduction

This section establishes the minimum standard of care and maintenance of trees for which the City of Encinitas is responsible. These standards apply to all persons who own or are engaged in the business of repairing, maintaining, or preserving these trees. The following standards of care are set forth for pruning (including utility, fire and traffic encroachment), planting, watering, soil and nutrient requirements, insect, disease, and fruit control.

7.10 Care of Trees

All owners of *City Tree*s and *Heritage Tree*s are to follow the required maintenance standards set forth in this Manual. If special pruning or situations require a variance from these standards, it is the responsibility of the *Project Arborist,* property owner or other City staff to clarify why the changes are needed and review them with the *City Arborist*.

In addition to following standards for care, the City will maintain an electronic inventory of all *City trees* and *Heritage trees*. The inventory will document, at a minimum, the tree species (both botanical and common name), location, and maintenance records.

7.15 Prohibited Acts

Improper maintenance of *City Trees* and *Heritage Trees* may constitute a prohibited act as defined by the City of Encinitas Municipal Code Chapters 15.04 and 15.08 and may constitute a violation which may be subject to penalty.

The following prohibited maintenance practices for *City Tree*s and *Heritage Tree*s apply.

A. *Excessive Pruning*
Except for clearance pruning of utility lines, or abating a *Public Nuisance, Excessive Pruning* shall be considered a prohibited act.

B. *Topping*
Topping shall be considered a prohibited act. Seek alternatives to *Topping.*

C. Other prohibited actions
Taking any action foreseeable leading to the death of a tree or permanent damage to its health, including but not limited to *Excessive Pruning*, cutting, girdling, poisoning, over watering, unauthorized relocation or transportation of a tree, posting signs or other objects on a tree, unless authorized through an approved construction permit that includes a *Tree Protection and Preservation Plan.* No t*renching*, excavating, altering the grade, or paving within the *Dripline Area* of a tree shall be permitted without prior approval of the *City Arborist.*

7.20 Standards for Pruning Trees

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

A. Specifications
All specifications for working on *City Tree*s and *Heritage Tree*s shall be written and shall be administered by a qualified arborist, and shall be designed to promote the preservation of tree structure and health.

B. Industry Standards
All work on trees shall be in accordance with the most current edition of the ANSI standards including: ANSI A300; ANSI Z133.1, Safety Standards. (*(see ISA Pruning Standards, Appendix E)*.

7.25 Pruning Mature Trees

There are six types of pruning that may be required for use on mature trees *(see ISA Pruning Guidelines, Appendix E)*. Prior to entering the tree, the tree worker is required to be familiar with these types of pruning as stated in the ANSI, A300. 'Species-specific' pruning promotes the shape of the trees.

A. Types of Pruning
1. Crown Cleaning;
2. Crown Thinning;
3. Crown Raising;
4. Crown Restoration;
5. Crown Reduction; and
6. Utility Pruning.

B. Tree *Injury*
Climbing and pruning practices shall not injure the tree except for the pruning cuts.

7.30 Reduce, Reuse, Recycle Green Waste

As a part of standard tree maintenance and care, tree trimmings, wood and other material are generated. This material should be reused or recycled whenever possible. Some beneficial uses for this material can be mulch, chippings and furniture.

7.35 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 Soil disturbance

If a tree has been damaged by *Injury* or soil 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.

7.40 Pruning Young Trees

The life expectancy for trees growing in harsh urban conditions varies considerably. 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 shall be pruned in the following way:

A. 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 Pruning Standards ASI – A300* (*see Appendix F*).

B. Do not top the main leader except to position the lowest main branch. Other main branches should be spaced at least 18-inches apart to alleviate a tight grouping branches.

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

7.45 Fertilizing Standards

This section outlines performance standards for fertilizing, and applies only if fertilizing is specified by the *City Arborist*. Fertilizing mature trees is generally not necessary. Fertilizing may be specified for trees that will be impacted by upcoming soil disturbance, grade changes or a modified environment. Benefits gained from the increase stored resources may aid the tree in overcoming the stress. Refer to ANSI A300 Standard.

A. Specifications
Fertilizing, if specified, shall be performed to the following standards:

1. Method of application: The method shall be subsurface injection, on approximate 3-foot centers (within the root ball on young trees; 2-feet out on older trees) and out to the approximate *Dripline* perimeter. Specific situations may justify other variations such as vertical mulch, soil-fracture or surface-broadcast methods.

2. Material and Rates: Unless specified otherwise, fertilizer formula shall be a slow-release, complete fertilizer with chelate trace elements (e.g. 22-14-14 or 20-20-20) and mixed at label rates not to exceed 4-pounds nitrogen per 100-gallons of water. Extraordinary cases may require soil and tissue sampling to correct *Target* deficiencies.

3. Amount: Unless specified otherwise, volume shall be determined by mixing 10-gallons of water per inch of trunk diameter when measured at 54-inches above natural grade.

4. Timing: Timing should not be detrimental to tree health. Best results are derived from applications made during the prior growing season. Apply fertilizer between May through September for best results.

7.50 Watering Schedule

Newly installed trees planted, including drought tolerant species, are dependent upon supplemental irrigation until established, typically for two years. 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, heat, wind, planted in turf or ground cover, periods of abnormal rainfall or in poorly drained soils (*see Drainage, Section 5.30*). The watering of 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 is to be submitted at the preconstruction meeting for tress planted as part of a development project. The schedule is to include altering frequency and quantity. The minimum standards shall be as follows:

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

B. Mature trees

1. Most species: 1 time per month during irrigation season (usually March through September).
2. Other trees that require deep water should be done in May and September, do not water during other months.

C. Watering Methods

The following options shall fulfill the watering requirements. One or more of the following may be utilized dependent upon unique circumstances subject of the *City Arborist* determination. The options are as follows:

1. Automated Watering Systems. All new *City Trees* planted within the right-of-way shall be provided with one of the following automatic watering systems. Other city maintained systems shall be per the *City Arborist*'s approval.
2. Bubbler heads (Preferred). One or two bubbler heads mounted on notes: flexible tubing are to be placed adjacent to or on top of the root ball. The placement of bubbler within an aeration tube is not allowed.
3. Drip Loop system. A continuous loop of drip tubing circling around the trunk at a point two-thirds out from the trunk to the edge of the root ball (for new trees 36-inch

box size and greater, a second loop of drip tubing is required at a point just beyond the root ball on native soil).

4. Hand watering systems. Recommended for trees that are part of a development project that must be watered to insure tree survival during the course of construction until automatic irrigation is installed.

5. Flood watering. Newly installed trees must be 'flood or basin watered' on top of the root ball to allow the water to infiltrate through the root zone.

6. Subsurface injections using a hydraulic spray pump (practical for use in hard, compacted soils or steep hillsides).

7. Soaker hose. Slow, deep watering using a garden type soaker hose.

8. Wetting agent. A root ball that has been allowed to dry out beyond the wilting point shall require the addition of a wetting agent to the water (such as Aqua-grow or equivalent).

D. Amount

Unless otherwise specified, the volume of water applied at each irrigation site should be in the range of 10-gallons per inch of trunk diameter when measured at 54-inches above natural grade. The final decision of whether to water or not should be based on accurate soil probe samples that are taken from the root ball.

7.55 Soil Improvement

During development, *Compaction* of the soil is the largest single factor responsible for the decline of oaks and older trees. Ninety percent of the damage to the upper eighteen inches of soil occurs during the first pass of heavy equipment and cannot be reversed. Every effort to avoid *Compaction* of soil porosity within the *TPZ* shall be taken at all times. When required by the conditions of *Discretionary Development Approval* for a project or as mitigate on 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 a tree shall be loosened or aerated to promote root growth and enhance tree vitality. One of the following aeration methods shall be specified an in effort to correct compacted soil conditions:

1. *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.
2. 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.
3. *Soil-fracturing* with a pneumatic air-driven device.

4. 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)*.

1. French drain, a minimum of three feet in depth.
2. Drain tiles or lines beneath the trees.
3. 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.

7.60 Insect and Disease Control

Generally, insect populations do not threaten tree health to the point of mortality. More often, when their populations become too great they create a nuisance. For example, scale on tulips or aphids feeding on purple leaf plums produce sticky honeydew that may be a nuisance if dripping on cars or at a storefront entry. Occasionally, pests such as Oak or Tussock Moth larvae can defoliate and severely damage a tree. If action is warranted, Integrated Pest Management (I.P.M.) suggests that the pest source be identified and *Target*ed with a specific and timely treatment. If insects or disease can lead to the death of a tree, then it is the responsibility of the owner 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 to control leaf-chewing insects.

B. Disease and Decay - above ground

Disease such as heart-rot decay that erodes the health or weakens the structure of a tree may compromise the safety of people or property. It is the owner'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

Soilborne diseases, such as Oak Root Fungus (*Armillaria mellea*) or Root Rot (*Phytophthora sp.*), can be present in 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:

1. 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 to cause the decline and eventual death of the tree. This decline can be slow and may not be evident for many years.

2. Landscape Design:
When planning landscaping around a 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 landscaping will contribute to decline, permanent damage or render it hazardous, it is the obligation of the property owner to take reasonable measures to reduce or eliminate the conditions that may cause the decline of the tree.

3. To identify cultural conditions that may lead to diseases such as Oak Root Fungus, Verticillium, Phytophthora or other soilborne fungi, review the Sunset Western Garden Book or consult with a *Certified Arborist.*

D. Foliar disease
Leaf spot or galls may be chronic or reoccur during specific seasons. Though many of these diseases destroy leaf tissue and become unsightly, they may not significantly reduce the trees health and therefore need not be treated.

7.65 Fruit Control

While all 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 and will thus justify control measures. 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.

SECTION 8.00 - TREE REPORTS

Introduction

An arborist report is needed for; development projects, tree *Removal* permits requested by private property owners and when tree removals are recommended by the City staff. The report must be prepared by a *Certified Arborist* for the applicant and submitted to the City for the purpose of providing accurate information and opinions regarding the condition, welfare, maintenance, preservation or value of tree.

8.10 When a Written Report is Required

Generally, there are three circumstances in which *Tree Report*s are required: 1) When a tree *removal* permit is sought by a private property owner to remove a *City Tree* or a *heritage tree*, and 2) to complete and verify a *Site Plan*, assess tree impacts and establish tree protection for property development within the drip line of a *City Tree* or *heritage tree,* and 3) When the City has determined that a *City Tree* needs to be removed. The types of report formats are: Letter Report, Tree Survey, *Tree Protection and Preservation Plan* and *Tree Appraisal*.

8.20 Who May Prepare the Report

Reports are to be prepared by a *Certified Arborist* retained by the applicant, property owner or the City. This person shall possess a current ISA certification credential.

8.30 Reports for Individual Tree Removal Permit

A. Tree *Removal* Permit
The procedure involves three steps which must be completed and approved to remove a *City Tree* or a *heritage tree*. The information contained within the application will be reviewed by the *City Arborist* for written response.

B. Submittals
For this purpose, the following information is to be submitted to the City for review:

1.Application: A completed application for the *Tree Removal;*
2.Filling Fee: A filing fee of $145 (Application fee - $125, records management $20); and
3. Arborist Report: An arborist report prepared by a *Certified Arborist.*

C. Written authorization
To remove a *City Tree* (on city land or in the street right-of-way), the property owner shall first have obtained written permission from Public Works Department or *City Arborist*. For a *Heritage Tree* on private property, the permit from the Planning Division must be on site when the tree is being removed. For a trees removed as part of a development project, the approved plans serve as the approval and no separate written permit is needed.

8.40 Types of Reports

A. Letter Report

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

a. *Removal*:
If for a tree *Removal* (i.e., an application request for *Removal* only, not in connection with a property development), the report shall provide information and determination whether the tree/s are dead, hazardous or constitutes a nuisance.

b. Development:
If for development on a single family residential lot (not a subdivision), the report shall also clearly indicate whether or not any *Heritage Tree*/s or *City Tree* is so close to the '*Building Area* or *Building Footprint*' that it will be killed or permanently injured. 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.

B. Letter Report Submittals

1. 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 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; interface with utility services; conclusion and recommendation(s), photographs (encouraged) and Tree Protection Instructions (if needed).

2. 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 and any other supporting information, photographs, diagrams, etc. that may be necessary.

C. Tree Survey Report

1. Tree Survey Report Format
A more extensive 'Tree Survey Report' is required for all development projects except those identified above. The report shall inventory all trees that are greater

than 4-inches in diameter (measured at 12-inches above natural grade) on site, including trees to be removed, relocated and retained on the property (including trees on neighboring properties that overhang the project site) and all publicly owned trees in the right-of-way within 30-feet of the project site. In addition to information required in a letter report, the Tree Survey Report shall include an inventory of the trees, Site Plan, picture of the trees, appraised value of the trees and any other information pertinent to the project.

2. Tree Survey Report Submittals

a. Items to include

All Tree Survey Reports shall contain the following information: Arborist name and certification number; cover letter; title page; table of contents (if necessary); purpose of the report and for whom; site address; date of the inspection(s); Site Plan (showing each tree location by number that correlates with the tree inventory on plans; tree inventory data (include tree species, size, health, structure, etc. for all trees on the project site, including those to be removed (tables may be used); condition of the trees (include information with respect to health, structure, decay, imminent danger of falling, existing property lines, structures and utility services) conclusion, recommendation(s) and rated for suitability for preservation. The report shall include a separate list of all *Heritage Trees* with location numbers. If necessary, other supporting information, photographs, diagrams, etc. may be required or provided.

b. Appraised Value

The monetary value that each tree contributes to the real estate value of the property shall be determined and listed separately within the Tree Survey Report. The formula used should be noted. *(Section 8.60 Tree Appraisals).*

8.50 Tree Protection and Preservation Report

All publicly owned or *Heritage Tree*s 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 and Building Department is required when trees to be saved may be injured. The tree preservation plan shall assume compliance with standards in Section 2.00 of this Manual (*see Protection of Trees During Construction, Section 2.00*). 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 *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*. The tree protection plan shall include the following Site Plan elements:

8.60 Site Plan

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 drip line of any neighboring trees that may overhang the site and publicly owned trees that are within 30-feet on each side of the project. Failure to show a tree on the plans and later 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 *TPZ* 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 drip line 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 drip line 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 Plan*s submitted for demolition, grading, construction, building permit or any other aspects that are relevant to the project.

8.70 Tree Appraisal

Landscape value typically contributes to the value of a property. An individual tree has an inherent value to the property that can be determined by an appraisal prepared by a *Certified Arborist*. An appraisal is a process for determining a monetary opinion of the value of a tree as it relates to the property, a group of trees and/or the immediate community. A qualified *Certified 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, based upon the size and availability of the replacement tree or, (2) the Trunk Formula Method, if the tree cannot be replaced (e.g. not

sufficient room on site or it is too large to replace). In all cases, the type of formula used must be identified.

8.80 Appraisal Methods

The *Certified Arborist* must prepare the appraisal by using the most current edition of (1) the *'Guide for Plant Appraisal'*, published by the Council of Tree and Landscape Appraisers, and (2) the most recent *'Form for Northern California'* established by the International Society of Arboriculture.

A. The Replacement Cost Method
This method applies to smaller trees with a trunk size up to 4-inches in diameter or, 48-inch box size trees (replaceable.) 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 notes:
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 for Northern California 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.

SECTION 9.00 - HERITAGE TREES

9.10 Designation of *Heritage Tree*s

A. Upon nomination by any person or agency and with the written consent of the property owner(s), a tree or trees may be designated as a *Heritage Tree or* trees. *Heritage Tree*s may be located on City or private property.

B. Nominations for a *Heritage Tree* shall be reviewed by the Environmental Advisory Commission (EAC) and the EAC shall make a recommendation on *Heritage Tree* nominations to the Planning Commission.

C. The Planning Commission may designate a tree as a *Heritage Tree* upon a finding that it is unique and of importance to the community due to any of the following factors:

1. It is one of the oldest and largest of its species located in Encinitas;

2. It is a tree of unique form or species;

3. It has historic significance due to an association with an historic building, site, street, person or event; or

4. It is a defining landmark or significant outstanding feature of a neighborhood.

D. Upon Planning Commission approval, the tree(s) shall be designated as a *Heritage Tree*(s). Any work on or in the vicinity of a designated *Heritage Tree* shall be done in accordance with this Manual and under the provisions of a City-issued permit. The requirement for a permit may be waived in cases of hazardous trees or other cases where immediate action must be taken for public health or safety reasons.

E. After Planning Commission approval of a *Heritage Tree* designation, the City shall notify the property owner(s) in writing. A listing of trees so designated, including the specific locations thereof, shall be kept by the City.

F. It shall be the responsibility of any private property owner whose property contains a *Heritage Tree* to insure that any future owners, successors, heirs, personal representatives, transferees and/or assigns of said property owner knows of the designated *Heritage Tree*(s) and the requirements that come with this designation.

G. Once designated, a *Heritage Tree* shall be subject to the provisions of this Manual unless removed from the list of *Heritage Tree*s by action of the Planning Commission. The Planning Commission may remove a tree from the list upon its own motion or upon written request by the property owner. Request for such action must originate in the same manner and proceed through the same process as nomination for *Heritage Tree* designation.

H. Any person may appeal the designation of a tree or trees as a *Heritage Tree*(s), or the *Removal* of such designation, in accordance with the procedures set forth in Chapter 1.12 of the Municipal Code (Appeals).

SECTION 10.00 – DEVELOPMENT AND PERMIT APPLICATIONS

10.10 Disclosure of Information Regarding Existing Trees

A. Any application for discretionary development approval, or for a building or demolition permit where no discretionary development approval is required, shall be accompanied by a statement by the property owner or authorized agent which discloses whether any *City Tree or Heritage Tree* exist on the property which is the subject of the application, and describing each such tree, its species, size, *Dripline* area, and location. This requirement shall be met by including the information on plans submitted in connection with the application.

B. In addition, the location of all other trees on the site and in the adjacent public right of way which are within thirty feet of the area proposed for development, and trees located on adjacent property with canopies overhanging the project site, shall be shown on the plans, identified by species.

C. The Director of Planning and Building may require submittal of such other information as is necessary to further the purposes of this section including but not limited to photographs.

D. Disclosure of information pursuant to this section shall not be required when the development for which the approval or permit is sought does not involve any change in *Building Footprint* nor any grading or paving.

E. Knowingly or negligently providing false or misleading information in response to this disclosure requirement shall constitute a violation of this Manual.

10.20 Development Conditions of Approval

A. *Discretionary Development Approvals* for property containing *City Trees or Heritage Tree*s shall include appropriate conditions providing for the protection of such trees during construction and for maintenance of the trees thereafter.

B. *Discretionary Development Approvals* for projects for which a landscape plan is required shall include appropriate conditions providing for the protection of all existing trees to remain on the project site during construction and the protection and maintenance of all existing and newly planted trees thereafter.

C. All trees included in a required landscape plan for a project with a *Discretionary Development Approval* shall be protected and maintained in accordance with the standards and regulations contained within this Manual.

D. Any modifications to a landscape plan of a project with a *Discretionary Development Approval* shall require the submittal of an application for substantial conformance with the original permit for minor modifications to the landscape plan consistent with the original approval or the submittal of an application for modification of the original permit for major modifications to the landscape plan.

E. It shall be a violation of the Urban Forest Management Program policy for any property owner or agent of the owner to fail to comply with any development approval condition concerning preservation, protection, and maintenance of any tree, including but not limited to *City Trees or Heritage Tree*s.

SECTION 11.00 – ENFORCEMENT

11.10 Prohibited acts

It shall be a violation of the Urban Forest Management Program policy for anyone to remove or cause to be removed a *City Tree* or a *Heritage Tree*, except as allowed in this section:

A. In the absence of development, *City Trees* or *Heritage Tree*s shall not be removed unless determined by the Director of Public Works, on the basis of a *Tree Report* prepared by a *Certified Arborist* for the applicant and other relevant information, that the tree should be removed because it is dead, is hazardous, is a detriment to or crowding an adjacent *City Tree or Heritage Tree* or constitutes a *Public Nuisance* as defined in this Manual, except when an emergency removal is needed (Section 6.20).

B. In the case of development on a single-family residential lot, other than in connection with a subdivision:

1. *City Trees* or *Heritage Tree*s shall not be removed unless the trunk or *Basal Flare* of the tree is touching or within the *Building Footprint*, or the Director of Planning and Building has determined, on the basis of a *Tree Report* prepared by a *Certified Arborist* for the applicant and other relevant information, that the tree should be removed because it is dead, is hazardous, is a detriment to or crowding an adjacent trees, or constitutes a *Public Nuisance* as defined in this Manual.

2. If no *Building Footprint* exists, *City Trees or Heritage Trees* shall not be removed unless the trunk of the tree is located in the *Building Area*, or the Director of Engineering Services has determined, on the basis of a *Tree Report* prepared by a *Certified Arborist* for the applicant and other relevant information, that the tree should be removed because it is dead, is hazardous, is a detriment to or crowding an adjacent *City Trees or Heritage Trees*, or constitutes a *Public Nuisance* as defined in this Manual.

3. If *Removal* is allowed because the tree trunk is located in the *Building Footprint*, or the trunk or *Basal Flare* is in the *Building Area*, or because the Director of Engineering Services has determined that the tree is so close to the *Building Area* that construction would result in the death of the tree, the tree removed shall be replaced in accordance with the standards in the this Manual.

C. In connection with a proposed subdivision of land into two or more parcels, no *City Trees or Heritage Trees* shall be removed unless *Removal* is unavoidable due to restricted access to the property or deemed necessary to repair a geologic hazard (landslide, repairs, etc.). The tree removed shall be replaced in accordance with the standards in this Manual. Tree preservation and protection measures for any lot that is created by a proposed subdivision of land shall comply with the regulations of this Manual.

D. In all circumstances other than those described in paragraphs A, B and C of this section, *City Trees or Heritage Trees* shall not be removed unless one of the following applies:

1. The Director of Engineering Services, the Director of Parks and Recreation or the Director of Public Works has determined, on the basis of a *Tree Report* prepared by a *Certified Arborist* for the applicant and other relevant information, that the tree should be removed because it is dead, dangerous or constitutes a *Public Nuisance* as defined in this Manual. In such cases, the *Dripline* area of the removed tree, or an

equivalent area on the site, shall be preserved from development of any structure unless *Removal* would have been permitted under paragraph (2), and tree replacement in accordance with the standards in this Manual shall be required.

2. *Removal* is permitted as part of a discretionary development approval. In such a case, the approval shall be conditioned upon replacement in accordance with the standards in this Manual.

11.20 No Limitation of Authority Under Title 30

Nothing in this Manual limits or modifies the existing authority of the City under Title 30 (Zoning Ordinance) to require trees and other plants not covered by this Manual to be identified, retained, protected, and/or planted as conditions of the approval of development. In the event of conflict between provisions of this Manual and conditions of any permit or other approval granted pursuant to Title 30, the more protective requirements shall prevail.

11.30 Care Of *City Trees or Heritage Tree*s

A. All owners of property containing *City Trees or Heritage Tree*s shall follow the maintenance standards in this Manual.

B. The standards for protection of trees during construction contained in this Manual shall be followed during any development on property that contains, is adjacent to, or impacts in any way *City Trees or Heritage Tree*s.

11.40 Responsibility for Enforcement

The following designated employee positions may enforce the provisions of the Urban Forest Management Program policy by the issuance of citations: Building Official, Assistant Building Official and Code Enforcement Officer.

11.50 Enforcement - Remedies for Violation

In addition to all other remedies set forth in this code or otherwise provided by law, the following remedies shall be available to the city for violation of the Urban Forest Management Program policy:

A. Stop Work - Temporary Moratorium.

1. If a violation occurs during development, the city may issue a stop work order suspending and prohibiting further activity on the property pursuant to the grading, demolition, and/or building permit(s) (including construction, inspection, and issuance of certificates of occupancy) until a mitigation plan has been filed with and approved by the Director of Planning and Building, agreed to in writing by the property owner(s), and either implemented or guaranteed by the posting of adequate security. The mitigation plan shall include measures for protection of any remaining trees on the property, and shall provide for replacement of each tree removed on the property or at locations approved by the Director of Planning and Building or by the Director of Public Works, if replacement is to occur on public property. The replacement ratio

shall be in accordance with the standards set forth in this Manual and shall be at a greater ratio than that required where tree *Removal* is permitted pursuant to the provisions of this Manual.

2. If a violation occurs in the absence of development, or while an application for a building permit or discretionary development approval for the lot upon which the tree is located is pending, the Director of Planning and Building may issue a temporary moratorium on development of the subject property, not to exceed eighteen months from the date the violation occurred. The purpose of the moratorium is to provide the city an opportunity to study and determine appropriate mitigation measures for the tree *Removal*, and to ensure measures are incorporated into any future development approvals for the property. Mitigation measures as determined by the Director of Planning and Building shall be imposed as a condition of any subsequent permits for development on the subject property.

B. Civil Penalties.

1. As part of a civil action brought by the city, a court may assess against any person who commits, allows, or maintains a violation of any provision of this Manual a civil penalty in an amount not to exceed five thousand dollars ($5,000.00) per violation.
2. Where the violation has resulted in *Removal* of a tree, the civil penalty shall be in an amount not to exceed five thousand dollars ($5,000.00) per tree unlawfully removed, or the replacement value of each such tree, whichever amount is higher. Such amount shall be payable to the city. Replacement value for the purposes of this section shall be determined utilizing the most recent edition of the *Guide for Plant Appraisal*, published by the Council of Tree and Landscape Appraisers.

C. Injunctive Relief. A civil action may be commenced to abate, enjoin, or otherwise compel the cessation of such violation.

D. Costs. In any civil action brought pursuant to this Manual in which the city prevails, the court shall award to the city all costs of investigation and preparation for trial, the costs of trial, reasonable expenses including overhead and administrative costs incurred in prosecuting the action, and reasonable attorney fees.

11.60 Fees

*Tree Report*s required to be submitted to the city for review and evaluation pursuant to this Manual shall be accompanied by the fee prescribed therefor in the municipal fee schedule.

11.70 Severability

If any provision of this Manual or the application thereof to any person or circumstance is held to be invalid by a court of competent jurisdiction, such invalidity shall not affect any other provision of this Manual which can be given effect without the invalid provision or application, and to this end the provisions of this Manual are declared to be severable.

11.80 Appeals

Any person seeking the director's approval to remove a *City Trees or Heritage Tree*s pursuant to the regulations in this Manual who is aggrieved by a decision of the Director of Planning and

Building or the Director of Public Works may appeal such decision in accordance with the procedures set forth in Municipal Code Chapter 1.12 (Appeals).

SECTION 12.00 – EDUCATION AND OUTREACH

12.10 Introduction

Education is an integral and primary element of the Urban Forest Management Program. Education tempers the use of regulations by empowering citizens. The City believes citizens will act responsibly if given the information they need to make sound decisions.

Distinct educational strategies can be developed to reach a wide range of affected people, including the general public, the development community (property owners, architects, realtors, investors, builders and contractors), public agencies, and educational institutions. The common factor in educating these groups is to provide them with information about how proper tree planting, maintenance, and protection can contribute to and enrich the quality of life.

The most important point is not the method of knowledge distribution but knowledge distribution itself. Information circulation places trees and their care in front of the public and allows them to learn, understand, and relate to the City's forest management program. However public tree and community forest knowledge is raised, whether through the Tree City USA celebrations, presentations, press releases, handouts, or conversations, raising the tree awareness of Encinitas citizens will have a significant positive affect on the community forest at large.

12.20 Public Relations

There are several effective methods available for raising the awareness of Encinitas citizens in terms of tree care. Many citizens are unaware that there are resources for information regarding proper tree selection, planting, and maintenance. The City will employ the following methods to educate our citizens and our staff.

A. Direct Public Relations are practiced when any city employee discusses tree care or tree issues with members of the public. All employees who have contact with the public concerning urban forest management issues will be trained to answer questions properly. Staff will carry International Society of Arboriculture handouts describing common tree issues and proper practices that can be easily distributed. Staff will also participate in regional activities.

B. Indirect Public Relations are no less important than direct public relations and can often reach a larger audience. The City will provide news releases when appropriate, hold Arbor Day celebrations, provide exhibits in local fairs and provide educational programs and material to schools.

12.30 Distribution of Education Material

The City will develop and provide education material to be used as handouts and displays. The City will develop an approach to educating its customers and provide some of the following education material: flyers, newsletters, fact sheets, brochures and informational signs. In addition, the City will develop a section dedicated to the Urban Forest Management program on its website which will include links to maintenance schedules, removal notices, heritage tree

nomination forms and protected tree lists, educational materials, contact information and general tree care information.

12.40 Tree City USA

The City will become a Tree City USA. There are many benefits to becoming designated as a Tree City USA that has immediate benefits for our customers. This includes a framework for community forest standards; it elevates the public image of the City and of citizen pride, provides access to urban forestry related financial assistance and provides opportunities for good direct public relations.

To qualify as a Tree City USA community, a town or city must meet four standards established by The Arbor Day Foundation and the National Association of State Foresters.

These standards were established to ensure that every qualifying community would have a viable tree management plan and program.

1. A Tree Board or Department
2. A Tree Care Ordinance
3. A Community Forestry Program With an Annual Budget of at Least $2 Per Capita
4. An Arbor Day Observance and Proclamation

Appendix A

TREE PRESERVATION POLICY

Purpose

The purpose of the Tree Preservation Policy is to establish a regulatory tool to provide orderly protection of specified trees, protect their value, and avoid significant negative impacts to the ecosystem. The Policy regulates protection of trees in two categories: *City Trees* and *Heritage Tree.*

Heritage Trees:

Heritage trees are individual trees of any size or species that are specifically designated as heritage because of their historical, commemorative, or horticultural significance. The list of designated Heritage Trees remains open for new designations and provides useful information to the City of Encinitas staff regarding the importance of their actions while planning activities near heritage trees. Since Heritage Trees are protected trees, recommendations from the City Arborists must be obtained before any alterations to the protected trees is made that may cause the trees to become damaged, relocated, or removed. The City Arborist, Director of Engineering, Director of Parks and Recreation, Director of Public Works, or Director of Planning and Building must approve the recommendation before any action proceeds. Pruning also can cause irreversible damage to the tree and must be in compliance with the ISA Tree Pruning Guidelines. Pruning must be performed under supervision of an ISA certified staff only. If the tree poses an immediate threat to life or public safety, the City Arborist may compromise the process, if proper documentation, including digital photographs, is kept. Heritage trees identified as dead by the City Arborist will be removed and recorded into the designated Heritage Trees list. The Heritage Trees list can be obtained from the City of Encinitas Department of Parks and Recreation.

City Trees

Most City trees have great value beyond the shade they provide. They are a scenic resource to surrounding neighborhoods and their removal or disfigurement by extreme pruning for construction clearance or other reasons diminishes the value of the urban forest and often provokes public protest. Some trees have not been designated under a protected group of trees but still provide aesthetic, sentimental, economical, and environmental value. The large number of trees in our City has a significant cooling effect on the urban environment in Encinitas. Every tree in our City is recognized as a valuable asset. This Manual provides guidelines for protecting trees during construction and offers suggestions and alternative technical solutions to avoid damages to trees. The City is responsible for seeing that the Maintenance, Park and Recreation, and Construction staff follows and implements tree preservation and protection practices outlined in this Manual.

Appendix B

TREE PROTECTION GUIDELINES

Model Tree Preservation Specifications

These specifications shall be made a part of all construction documents. They were developed in order to protect all trees that have either direct or indirect encroachment into their driplines during construction within City parks. The City Arborist shall be invited to the job start meeting and also notified 48-hours prior to start of construction. They may be contacted at (760) 633-2740.

General Requirements

1. No equipment is to be operated or parked under a tree, nor is any material to be stored within the dripline of a tree or leaned against a tree trunk. Do not pile or compact soil within a dripline.
2. In areas of construction, protect soil surface from traffic compaction with 3" of mulch or overlapping 3/4" plywood sheets.
3. No surface irrigation shall be installed within the dripline of a tree.
4. All work shall be in accordance with the City of Encinitas Tree Preservation Policy.
5. No chemical herbicides are to be used within 100 ft. of a tree's dripline.
6. Do not nail grade stakes or anything else to trees.
7. Encroachment from paving or structures within the dripline of a tree shall be permitted only with written authorization from the City Arborist.
8. Do not strip topsoil around trees. Any vegetation to be removed should be removed by cutting at ground level rather than pulling out by equipment.
9. Use a pneumatic drill to excavate under woody roots larger than 2" in diameter. Do not cut any root larger than 2" diameter without prior approval of the *City Arborist*. If roots must be severed, cuts are to be made by a Certified Arborist and soil backfilled immediately.

Typical Work Procedures

These procedures have been developed to minimize the impacts to each tree and protect them from unscheduled damage. All work around any existing tree to remain and to be protected shall follow these work procedures.

1. All work within a tree's root zone shall follow this Manual.
2. The extent of all work affecting any protected tree shall be staked by field survey and reviewed with the Parks and Recreation Arborist prior to construction.
3. The *City Arborist* shall approve any pruning of protected trees prior to the start of construction.
4. Hand dig the vertical trench at the final cut line and to the final grade; cleanly cut roots behind torn ends. There is no need to apply any kind of pruning seal, since roots will form their own internal barriers to decay.

5. Type I, II, or III tree protection fencing shall be constructed at the limit of approved work to protect the trees from unauthorized damage. It shall remain in place until landscape work commences.
6. No further work within the root zone shall be done beyond that which was approved without obtaining written approval form the City Arborist, prior to proceeding.
7. The area within the chain link fence shall not be used for material or equipment storage, or parking during construction.
8. During construction, the impacted trees should be closely monitored for symptoms of shock. The contractor should be prepared to provide temporary water to irrigate and if needed, wash dust from foliage. Irrigation should wet the top 2-3 feet of soil to replicate similar volumes and normal seasonal distribution. Contact the City Arborist if a decline in tree condition is noted.
9. Contact (760)633-2740 for any general questions regarding trees in parks.

Damages
If a tree designated to remain is removed or irreversibly damaged as determined by the City Arborist, a contractor may be required to install a replacement tree matching in size, quality and variety, using a contractor designated by the City Arborist. If an acceptable replacement tree is not available, the contractor may be required to pay damages to the City for the value of the damaged tree in accordance with the guidelines set forth in the Guide for Plant Appraisal, 9th Edition, using the Trunk Formula Method.

Implementation
Please direct questions about construction adjacent to Heritage trees to the *City Arborist.*

Appendix C

MAJOR CONSTRUCTION IMPACTS AND METHODS TO MINIMIZE DAMAGE

The City of Encinitas recommends the following technical guide to help minimize construction impacts and damage to trees:

Matheny, N.P. and Clark, J.R. 1998. *Trees and Development. A Technical Guide to Preservation of Trees During Land Development.* International Society of Arboriculture. Champaign, IL. Exponent Publisher Inc. Hagerstown, IN.

The publication can be obtained from the:

International Society of Arboriculture (ISA),
P.O. BOX3129, Champaign, IL 61826-3129
Phone: (217)355-9411, Fax: (217)355-9516
Order toll-free 1-888-ISA-TREE
www.isa-arbor.com

Appendix D

HOW TO PREVENT DAMAGE TO TREES DURING CONSTRUCTION

Introduction

Land development and capital improvement projects are a complex process and even more challenging when trees are involved. Construction is one of the greatest causes of tree decline and death in urban areas. The long-term goal of the City of Encinitas is urban forest sustainability. The City seeks to maintain social, recreational, ecological and economic functions of trees and their benefits over time. Stewardship of naturally occurring and planted trees is a central element in forest sustainability. Concerns integral to a sustainable urban forest are tree health and structure, preservation during development and redevelopment, species and site selection, quality of planting stock, standards of performance, maintenance practices in our parks, and recycling.

Tree protection should not begin subsequent to construction. If preservation measures are delayed or ignored until construction begins, the trees may be destined to fail. Since in most cases construction affects to trees cannot be completely eliminated, the goal for planners and designers is to keep injury to trees to a minimum and allow building projects to proceed at the same time. Successful tree preservation occurs when designers, construction personnel, and project managers are committed to tree preservation. All members of the project team must be familiar with the rudimentary aspects of tree growth and development in order to understand the relationship between tree survival and construction practices.

There are many myths about how trees grow. For example, above ground parts of trees is not a "mirror" of what lies below ground. In actuality, typically four to eleven large roots radiate from the base of a tree's trunk. These "buttress" roots extend from the root crown and sometimes are visible when the trunk flares away from the root crown or collar. These roots grow horizontally through the soil and depending on the tree can extend 40 feet or more beyond the branch tips. These smaller roots are primarily responsible for water and mineral absorption. There can be hundreds of roots in a cubic inch of soil— thus any removal of soil or root severance forces a tree to compromise its physiological processes to sustain the loss. All trees cannot and should not be preserved. Trees that are structurally unstable, in poor health, or unable to survive effects of construction become a liability to the project and should be removed. A realistic tree preservation program acknowledges that conflicts between trees and development may sometimes result in the removal of some trees and recognizes the detrimental effect to the project and community when trees die after construction is completed.

Successful tree preservation occurs when construction impacts to trees are minimized or avoided altogether. The challenge is to determine when impacts will be too severe for the tree to survive, not only in the short term, but also in the long term. There are no quantitative methods to calculate this critical level. Determining the optimum tree protection zone provides a guideline, although trees often survive and flourish with smaller protection areas. The following are the three guiding principles for tree preservation:

- The acknowledgement that not all trees are in excellent health or have good structural stability.
- Tree preservation cannot be the responsibility of the City of Encinitas staff alone. Each development participant must understand that his or her activities and decisions influence the success of tree preservation efforts.
- The ability of a Certified Arborist to cure construction injury is very limited, so the focus of preservation efforts is the *prevention* of damage.

Instructions
An arborist should be called in as a consultant to the construction site before any work is started. The arborist will recommend the removal of trees that are not likely to survive construction activities regardless of the scope of work. In general, the contractor is responsible for preventing trees from damage. The construction and maintenance staff must make the best effort to avoid unnecessary activities within the dripline of trees.

• **Fences -** Construction fences shall be erected around trees that are to remain. The fences should be placed as far from the trunk as possible in order to protect the above ground portion of the trees as well as the root system.

• **Storing and Piling -** Leaning objects against tree trunks and piling soil over the root zone is prohibited.

• **Pruning -** Pruning for vertical clearance of buildings, traffic, and construction equipment shall be performed by an arborist only, and not by construction or maintenance personnel.

• **Compaction -** Driving equipment and walking within the dripline causes soil compaction and is a serious cause of tree decline and death, and usually manifests long after construction is complete. Fences around trees reduce unnecessary traffic. If traffic cannot be avoided, it is recommended to spread a 6-12 inch thick layer of mulch to reduce compaction. As an added precaution, placing large plywood sheets over the mulch can disperse weight.

• **Excavation -** Excavation causes major damage to trees. Digging and trenching should be planned ahead to minimize the root loss. When roots must be severed, clean cuts shall be made and sealed by an arborist. The soil shall then be backfilled immediately to minimize drying of the roots.

• **Tree Maintenance -** Abruptly terminating regular tree maintenance is another cause for tree decline. Provide supplemental irrigation to replicate similar volumes and normal season distribution.

Appendix E

ANSI A300 PRUNING STANDARDS

ANSI A300: The American National Standard Institute standard for pruning tress.

The publication can be obtained from the International Society of Arboriculture
(ISA), P.O. BOX3129, Champaign, IL 61826-3129
Phone: (217)355-9411, Fax: (217)355-9516
Order toll-free 1-888-ISA-TREE
www.isa-arbor.com

ANSI Z133.1: The American National Standard Institute standards for arboricultural operations.

The publication can be obtained from the International Society of Arboriculture
(ISA), P.O. BOX3129, Champaign, IL 61826-3129
Phone: (217) 355-9411, Fax: (217) 355-9516
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