Tree Technical Manual Petaluma

Standards and Specifications

Heritage Oak Tree behind Petaluma Historic Museum

Updated December 2021

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PETALUMA
TREE TECHNICAL MANUAL
STANDARDS AND SPECIFICATIONS

INTRODUCTION

The City of Petaluma contains a variety of both native and non-native trees. These trees are a source of great beauty, provide shade and other environmental benefits, enhance property values, create community identity, and generally enhance the quality of life. Trees also serve to mitigate some of the known effects of global warming and climate change. The City is committed to planting new trees, as well as protecting existing trees to the greatest extent possible.

The purpose of the Tree Technical Manual is to establish procedures and standards for the preservation, protection, and maintenance of trees within the City of Petaluma. This manual supplements and supports the Petaluma Implementing Zoning Ordinance Chapter 17 - Tree Protection. It is expected that all tree activities will follow the standards (ANSI A300) set by the American National Standards Institute (ASI) and International Society of Arboriculture. It is a living document under the auspices of the Tree Advisory Committee with recommendations from City Staff, Council, and Committee Members.

The manual regulates the following:

REGULATED TREES:

1. Protected Trees:
   Trees that have been identified within Petaluma Zoning Ordinance as Protected Trees, Ordinance 17.040. A protected tree is any of the following:
   - Black Oak (Quercus kelloggii) four inches DBH* or greater
   - Valley Oak (Quercus lobata) four inches DBH or greater
   - Blue Oak (Quercus douglasii) four inches DBH or greater
   - Interior Live Oak (Quercus wislizenii) four inches DBH or greater
   - Coast Live Oak (Quercus agrifolia) four inches DBH or greater
   - Oracle Oak (Quercus x morehus) four inches DBH or greater
   - Oregon Oak (Quercus garryana) four inches DBH or greater
   - Other native California Oak four inches DBH or greater
   - California Buckeye (Aesculus, californica) six-inch DBH or greater
   - California Bay (Umbellularia, californica) twelve-inch DBH or greater
   - California or Coast Redwood (Sequoia) eighteen inches DBH or greater
   - Significant groves or stands of trees.
   - Trees located in riparian corridors.
   - Any tree required to be planted or preserved as an environmental mitigation or condition of approval for a discretionary development application or other development permit. Trees listed on landscape plans are “Designated

Trees" and become "Protected Trees" when required to be preserved.

*Size is trunk diameter measured at a height of 4.5 feet or diameter at breast height (DBH) from surrounding grade. Multiple trunk trees must possess at least one trunk with the above diameter (based on species) to be considered protected. Smaller trees may also be protected under special circumstances and shall be considered on a case-by-case basis during the development review process.

2. Street Trees and Trees on Publicly Owned Property:
   All trees growing within the public right-of-way, publicly owned parcels, and within private parkway strips. Rights-of-way include streets, sidewalks, and pedestrian and bicycle pathways.

3. Heritage/Landmark Trees:
   Trees that have been designated by the City Council per Title 8.28 of the Petaluma Municipal Code to be saved or protected on public or private property. These trees are subject to discretionary review. Designation to the register shall be based upon one or more of the following findings:

   A. Heritage Trees:

      1. Indigenous species of historic, cultural or environmental significance to the community, or

      2. Commemorative planting by a group of citizens or the city in recognition of a significant community member or event.

   B. Landmark Trees:

      1. Exceptional size/age as relates to generally accepted horticultural standards for the species, or

      2. Unusual or distinctive form, character, function or visual impact as related to the species and setting, or

      3. Association with a historically significant person, structure, or event, or

      4. Groves or stands of trees which collectively meet one or more of the criteria set forth in subsection B 1 through 3 above. (Ord. 1855 NCS §l (part), 1991.)

TREE REPORTS

An arborist report is needed for development projects and tree removal permits. 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 opinion regarding the condition, welfare, maintenance, preservation or value of a Regulated Tree.

A. When a written report is required

Generally, there are two circumstances in which tree reports are required:
1) when a tree removal permit is sought, and 2) to complete and verify a site plan, assess tree impacts and establish tree protection for property development when within the dripline of a regulated tree. Types of report formats are: Letter Report, Tree Survey, Tree Protection and Preservation Plan and Tree Appraisal.

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

DEFINITIONS
This document contains terminology that is unique to the arboricultural or construction industry. These terms are defined under Section 9.00 - Definition and Terminology at the back of the manual.

ASSUMPTIONS AND LIMITING CONDITIONS
- No responsibility is assumed by the City, for matters legal in character, related to this manual. Any legal description that may be provided is assumed to be correct.
- Care has been taken to obtain reasonable information from reliable sources for this manual.
- Any visual aids that may be contained within this document (sketches, diagrams, tables, etc.) should not be construed as engineered data for construction.
- This manual has been prepared to conform to current standards for the best care, management practices, evaluation and appraisal procedures, reporting, and sound arboricultural practices referenced in the manual.

SECTION 1.00 SITE PLAN

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 ensure their survival. The site plan shall accurately show the surveyed location, species, size of trunk and leaf canopy; show the dripline of any neighboring trees that may overhang the site and street trees that are within 30-feet on each side of the project. A "Tree Disclosure Statement" (see Section 10.00 for copy of form) must be completed prior to obtaining any type of permit. 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 of Petaluma.

Plans submitted to the City
In addition to the above information, final improvement plans shall include and show the following information: show the tree protection zone of any tree to be retained and denote the required fencing around the protected zone of each tree or group of trees (to be clearly identified as such on all plans as a bold-dashed line); permeable paving located within the dripline area; approved utility pathways; grade changes; surface and subsurface drainage and aeration systems

to be used; walls, tree wells, retaining walls and grade change barriers, both temporary and permanent; landscaping and irrigation within dripline of trees.

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

1.10 EVALUATION PROCESS SINGLE RESIDENTIAL LOTS

When a single developed residential lot applies for a permit for an addition, remodel, pool, or other exterior modification that would impact a Regulated Tree or trees, an arborist report will be required. The report may be prepared by the applicant's certified arborist and may be subject to peer review or the applicant may deposit a fee for preparation of the report by a City arborist.

Applicants are strongly encouraged to consider alternate designs that minimize the impacts to regulated trees. Permits may be denied if removal is suggested. Review and decisions for removal of a regulated tree will be at the Planning Director's discretion. These permits are not subject to provisions related to security deposits. However, the applicant may be requested to plant an equivalent tree of the same species on-site to mitigate removal of a regulated tree.

1.20 PRE-APPLICATION - PROPOSED DEVELOPMENT

It is strongly recommended that a preliminary tree inventory be prepared and submitted to the City prior to submission of a preliminary Tentative Map or site plan to determine what trees are present on the property. Submittal of an inventory will allow discussion between the developer and the Planning Department regarding the nature and degree of tree preservation that will be required, prior to beginning design work on the project. This phase is expected to generate information that will aid effective design of the project. The pre-application tree inventory is recommended but is not mandatory.

1.30 TREE PLANTING IN THE DOWNTOWN/BUSINESS DISTRICT

This section refers to areas of the city where buildings, sidewalks and streets form a high hardscape percentage where trees will be bound by asphalt, concrete, utilities, and buildings. Trees in the Downtown should offer a rich canopy that covers the majority of the sidewalk and extends into the street. Trees should offer shade on the sidewalk, but it should not be so thick as to prevent filtered sunshine. Trees should offer a measure of heat moderation in the summertime and may lose their leaves in the winter to allow the sun to pass through to the street level.

Whenever possible, street tree gaps in the Downtown should be filled using the tree species pattern already established for the street. In situations where the dominant and/or preselected tree is no longer allowed, a tree of similar leaf type, height, spread, and color should be used as the infill tree.

The selection and maintenance of new trees as well as the constructed living space for the Greater Downtown will follow guidelines set out in Appendix A to ensure both their survival and appropriateness.

1.40 TENTATIVE MAP/SITE PLAN-FORMAL APPLICATION

The primary Tree Protection and Preservation Plan for each project will be prepared and submitted in conjunction with the Tentative Map or Site Plan. At this stage of design, the basic parameters of development such as lot layout, building envelopes, and street improvements will be available for review in relation to project trees. The initial report shall be based on this level of information only and may be used to modify the plan where necessary to preserve a greater number of trees, or better preserve those that are healthy.

1.50 IMPROVEMENT PLAN

The secondary Tree Protection and Preservation Plan for each project shall be based on all the data initially collected for the primary Tree Protection and Preservation Plan, and shall be prepared at the time that Improvement Plans, which illustrate the details of construction, including grading, building footprints, drainage, and underground utilities, are submitted. This secondary plan shall include data on expected construction impacts based on the Improvement Plans, recommendations for modifying the plan to improve tree preservation and recommendations for protection and mitigation of impacts.

SECTION 2.00 TREE PROTECTION AND PRESERVATION PLAN

All plans must meet the basic criteria outlined in the following section. The City requires the use of the City arborist for project review. A deposit will be collected at the time of the submission of fees for the project. If an applicant does not use the City arborist and submits an arborist report it shall be subject to peer review at a cost borne by the applicant. The City will subsequently have the final decision related to recommendations when the City's arborist and the applicant's arborist recommendations are in conflict. The arborist must be certified through a program of the International Society of Arborists (ISA). This program is the standard of performance for appropriate training, experience, and knowledge about tree care.

2.10 Who Can Prepare a Tree Protection and Preservation Plan

The City requires the use of a City arborist in preparing reports and plans for projects. Applicants are strongly encouraged to abide by this requirement. However, if circumstances warrant the submission of the applicant's certified arborist report, a peer review fee will be charged. This option is at the Planning Director’s discretion.

City Contracted Arborist

The applicant deposits a fee with the City to contract with a City appointed arborist. The City maintains a list of arborists who have met specific criteria and have agreed to abide by the identified criteria in preparing, reviewing, recommending, and submitting a plan for tree protection and preservation. To have a City arborist prepare the plan, contact the Planning Department to determine the appropriate deposit fee amount for preparation of the plan, submit a preliminary site plan and a written proposal statement of the project. The written statement should include the name, phone number, and address of the contact person of the project, as well as the project address and assessor's parcel number.

Applicant Contracted Certified Arborist
The applicant has the option of contracting with a certified arborist to prepare a Tree Protection and Preservation Plan. The plan must meet the requirements identified in this manual. The plan would be subject to peer review and the cost shall be borne by the applicant.

2.20 PLAN CONTENT

All Tree Protection and Preservation Plans must include the following basic information:

1. The location of all Regulated Trees that are greater than 6 inches in trunk diameter at a height of 4.5 feet above the surrounding grade, including all that will be preserved, removed, or transplanted.

2. All trees that overhang the proposed project site and are located on immediately adjacent properties.

3. The report cover shall include the arborist' s name, certification number, project reference name and address, and report date.

4. A cover letter describing the project site, the date of inspection, and summarizing the total number of trees present, the number of trees that require removal, and the number of trees that can effectively be preserved.

5. A site plan shall be included in the report that identifies the location of each tree, including its report reference number. Each site plan shall also illustrate the recommended Tree Protection Zone (TPZ). The site plan will be either a plot plan for a single home, or a Tentative Map or Improvement Plan for a subdivision.

   Each type of site plan must include as much information pertinent to tree construction impacts as is available for that particular stage of design, including building setback lines, building footprints, fences, grading, drainage, and utilities. Pre-application plans will have minimal, if any, specific information regarding the development. Tentative Maps will provide a greater amount of information, and Improvement Plans will provide all details of construction and grading.

6. Assessment data shall be included for each tree, consisting of the following information:

   - Botanical and common name,
   - Trunk diameter measured at 4.5-foot height, and number of trunks,
   - Estimated height,
   - Estimated actual dripline size,
   - Recommended Tree Protection Zone,
   - Health rating using the following guidelines:

Excellent health (5)	health and vigor are exceptional, no pest, disease, or distress

	symptoms
Good health (4)	health and vigor are average, no significant or specific distress symptoms, no significant pest or disease
Fair health (3)	health and vigor are somewhat compromised, distress is visible, pest or disease may be present and affecting health, problems are generally correctable
Marginal health (2)	health and vigor are significantly compromised, distress is highly visible and present to the degree that survivability is in question
Poor health (1)	decline has progressed beyond the point of being able to return to a healthy condition again; long-term survival is not expected. This designation includes dead trees.

- Structural rating using the following guidelines:

Good structure (4)	some minor structural problems may be present which do not require corrective action
Moderate structure (3)	normal, typical, structural issues present, which can relate to pruning
Marginal structure (2)	serious structural problems are present which may or may not be correctable with pruning, cabling, bracing, etc.
Poor structure (1)	hazardous structural conditions which cannot be effectively corrected with pruning or other measures, may require removal depending on location and the presence of targets.

- Comments and observations regarding health or structure, which are not covered by the rating system.

- Estimate of the impacts of proposed development activities on long-term tree health and

structural integrity based on existing tree condition, tree species characteristics, and the nature and extent of proposed activities. Development impacts must consider all phases of construction including demolition, grading, pre-construction, construction, drainage, soil compaction, underground utilities, and accessibility.

- Recommendations for removal or preservation based on the development impacts expected from the proposed plan. Recommendations to include specific preservation, protection, mitigation, and pruning measures required to promote health and survivability following project completion. Recommendations may also include reasonable modifications to the plan that could reduce impacts including actions such as warping sidewalks around trees, realigning roadways, moving driveways, or changing the location of underground utilities.

- Recommendations for modification of the proposed plan to reduce or eliminate impacts to the tree. An emphasis on the preservation of mature or significant sized or species of trees may justify modification of the plan, and the City will look to the arborist report for this specific information.

- The monetary value that each tree recommended for preservation contributes to the real estate value of the property, determined by using the most current edition of the Guide for Plant Appraisal published by the Council of Tree & Landscape Appraisers, and the most recent Form for Northern California published by the International Society of Arboriculture.

7. All Tree Protection and Preservation Plans must be submitted in a bound format that includes report cover, cover letter, tree evaluation data with recommendations, and site plan.

SECTION 3.00 TREE PROTECTIVE FENCING

3.10 Fencing Requirements

Construction Project: - Multi-Unit/Lot Residential and Non-Residential All trees to be preserved shall be protected with five or six (5' - 6') foot high chain link fences. (DWG # 004). This detail shall appear on grading, demolition, and improvement plans.

Single Residential Lot/Unit:
All trees to be preserved shall be protected with a minimum four (4') foot high continuous barrier without entry points. (DWG # 001)

3.15 Tree Protection Zone

The Tree Protection Zone (TPZ) is illustrated on the Improvement Plans and represents the area around each tree, or group of trees, which must always be protected with tree protection fencing. No encroachment into the TPZ is allowed at any time without approval from the project arborist, and unauthorized entry may be subject to civil action and penalties.

3.20 Tree Protection Fencing

Prior to initiating any construction activity on a construction project, including demolition or grading, temporary protective fencing shall be installed at each site tree. Fencing shall be located at the Tree Protection Zone (TPZ) illustrated on the Improvement Plans.

Individual residential lot fencing shall be a minimum 4' height at all locations and shall form a continuous barrier without entry points around all individual trees, or groups of trees. Barrier type fencing such as Tensar plastic fencing is recommended, but any fencing system that adequately prevents entry will be considered for approval by the City. The use of post and cable fencing is not acceptable. (Standard DWG 001)

Construction project fencing shall be five or six (5'-6') foot high chain link fencing. The fences are to be mounted on two-inch diameter galvanized iron posts, driven into the ground to a depth of a least 2-feet or other methods as approved by the Building Official or Planning Director (prior to installation) at no more than 10-foot spacing shall form a continuous barrier without entry points around all individual trees, or groups of trees. (Standard DWG 004)

- Fencing shall be installed in a professional manner with steel fence posts. Plastic fencing shall be attached to each post at 5 locations with plastic electrical ties, metal tie wire, or flip tie.

- Fencing shall serve as a barrier to prevent encroachment of any type by construction activities, equipment, materials storage, or personnel.

- All encroachment into the fenced TPZ must be approved in writing and supervised by the project arborist. Approved TPZ encroachment may require additional mitigation or protection measures that will be determined by the project arborist at the time of the request.

- Contractors and subcontractors shall always direct all equipment and personnel to remain outside the fenced area until the project is complete and shall instruct personnel and subcontractors as to the purpose and importance of fencing and preservation.

- Fencing shall always be upright and functional from start to completion of the project. Fencing shall remain in place and not be moved or removed until all construction activities at the site are completed.

SECTION 4.00 PROTECTION OF TREES DURING CONSTRUCTION

INTRODUCTION

The objective of this section is to reduce the negative impacts of construction on trees to a less than significant level. Trees vary in their ability to adapt to altered-growing conditions. Mature trees have established stable biological systems in the preexisting physical environment. Disruption of this environment by construction activities interrupts the tree's physiological processes causing depletion of energy reserves and a decline in vigor, often resulting in the tree's

death. Typically, this reaction may develop from one to twelve years or more after disruption. The tree protection regulations are intended to guide a construction project to insure that appropriate practices will be implemented in the field to eliminate undesirable consequences that may result from uninformed or careless acts, and preserve both trees and property values.

Typical negative impacts that may occur during construction include:

- mechanical injury to roots, trunk, or branches
- compaction of soil, which degrades the functioning roots and inhibits the development of new ones and restricts drainage, which desiccates roots and enables water mold fungi to develop
- changes in existing grade which can cut or suffocate roots
- alteration of the water table - either raising or lowering
- microclimate change, exposing sheltered trees to sun or wind
- sterile soil conditions associated with stripping off topsoil

Prior to commencement of a development project, a property owner shall have prepared a Tree Protection and Preservation Plan. The plan shall be prepared by a certified arborist to assess impacts to trees; recommend mitigation to reduce impacts to a less than significant level and identify construction guidelines to be followed through all phases of a construction project. Projects protecting only street trees with fencing are exempt from preparing a Tree Protection and Preservation Plan.

4.10 PRE-CONSTRUCTION REQUIREMENTS

The following six steps shall be incorporated prior to permit issuance.

Site Plan
On all improvement plans for the project, plot accurate trunk locations and the dripline areas of all trees or groups of trees within the development area. The plans shall accurately show the trunk diameter, dripline and clearly indicate the tree protection zone to be enclosed with the specified tree fencing as a bold dashed line.

Verification of tree protection
The project arborist shall verify, in writing, that all pre-construction conditions have been met (tree fencing, erosion control, pruning, etc.) and is in place. Written verification must be submitted to and approved by the Planning Department prior to demolition, grading, or building permit issuance.

Pre-construction meeting
The demolition, grading and underground contractors, construction superintendent and other pertinent personnel are required to meet with the project arborist and the building official (or their designee) at the site prior to beginning work to review procedures, tree protection measures and to establish haul routes, staging areas, contacts, watering, etc.

Protective Tree Fencing

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

- **Type** I **Tree Protection**

The fences shall enclose the entire area under the **TPZ** of the tree(s) to be saved throughout the life of the project, or until final improvement work within the area is required, typically near the end of the project

Parking Areas: If the fencing must be located on paving or sidewalk that will not be demolished, the posts may be supported by an appropriate grade level concrete base.

- **Type** II **Tree Protection**

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

- **Type** III **Tree Protection**

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

- **Duration**

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

- **Warning Sign**

Warning signs shall be prominently displayed on each fence. The signs shall be a minimum of 8.5 x 11-inches and clearly state:
WARNING - *Tree Protection Zone* - DO NOT ENTER- *This fence shall not be removed. Unauthorized removal is subject to a penalty.*

Tree Protection Zone or (TPZ)

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

A. All construction activities are prohibited within the TPZ including but not limited to:

- Storage or parking vehicles, building materials, refuse, excavated spoils or

- Dumping of poisonous materials on or around trees and roots. Poisonous materials include, but are not limited to, paint, petroleum products, concrete, or stucco mix, dirty water, or any other material, which may be harmful to tree health.
- The use of tree trunks as a winch support, anchorage, as a temporary power pole, signposts, or other similar function.
- Cutting of tree roots by utility *trenching,* foundation digging, placement of curbs and trenches and other miscellaneous excavations without prior approval of the City Arborist.
- Soil disturbance or grade change.
- Discharge drainage.

B. Activities permitted or required within the TPZ include:

- Mulching during construction, wood chips may be spread within the TPZ to a 4-to 6-inch depth, leaving the trunk clear of mulch to prevent inadvertent *compaction* and moisture loss from occurring. The mulch may be removed if improvements or other landscaping is required. Mulch material shall be unscreened chipped bark, 0"-2" in particle size. Shredded redwood, recycled lumber, and bark screened for uniformity of size shall not be used.
- When areas under the tree canopy cannot be fenced, the project arborist shall provide a written recommendation on how to protect the root zone. This recommendation shall be reviewed and approved by the City prior to implementation or any work within the tree canopy.
- Irrigation, aeration, fertilizing 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% (23 degrees) or more, then approved erosion control or silt barriers shall be installed outside the TPZ to prevent siltation and/or erosion within the TPZ.

Tree Pruning, Surgery and Removal

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

A. Pruning limitations:

- **Minimum Pruning:** If the project arborist recommends that trees be pruned, and the type of pruning is left unspecified, the standard pruning shall consist of 'crown cleaning' as defined by ISA Pruning Guidelines. Trees shall be pruned to reduce hazards and develop a strong, safe framework.
- **Maximum Pruning:** Maximum pruning should only occur in the rarest situation approved by the City Arborist. No more than one-fourth (25 percent) of the functioning leaf and stem area may be removed within one calendar year of any protected or Heritage/Landmark tree, or removal of foliage to cause the unbalancing of the tree. It

must be recognized that trees are individual in form and structure, and that pruning needs may not always fit strict rules. The project arborist shall assume all responsibility for special pruning practices that vary from the standards outlined in this manual.

- **Tree Workers.** Pruning shall not be attempted by construction or contractor personnel and shall be performed by a qualified tree care specialist or certified tree worker, according to specifications contained within this manual.

B. Surgery:

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

C. Tree Removal Procedure.

- When trees are removed and adjacent trees that are to be preserved (as shown on the approved site plans) must be protected, the following tree removal practices apply:

1. Tree Removal: Removal of trees that extend into the branches or roots of Regulated Trees shall not be attempted by demolition or construction personnel, grading or other heavy equipment. A certified arborist or tree worker shall remove the tree carefully in a manner that causes no damage above or below ground to trees that remain.
2. Stump Removal: Before performing stump extraction, the developer shall first consider whether roots may be entangled with trees that are to remain. If so, these stumps shall have their roots severed before extracting the stump. *Removal* shall include the grinding of stump and roots to a minimum depth of 24-inches, but expose soil beneath the stump to provide drainage. In sidewalk or small planter areas to be replanted with a new tree, the entire stump shall be removed, and the planting pit dug to a depth of 30- inches. If dug below 30-inches, compact the backfill to prevent settling. Large surface roots three feet from the outside circumference shall be removed, including the spoils, and backfilled with City approved topsoil to grade, and the area tamped to settle the soil.

4.20 ACTIVITIES DURING CONSTRUCTION & DEMOLITION NEAR TREES

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

Soil Compaction: If compaction of the soil occurs, it shall be mitigated as outlined below in "Injury Mitigation".

Grading Limitations within the Tree Protection Zone:

a. Grade changes outside of the TPZ shall not significantly alter drainage to the tree.
b. Grade changes within the TPZ are not permitted.

c. Grade changes under specifically approved circumstances shall not allow more than 6-inches of fill soil added 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.

Trenching, Excavation, and Equipment Use

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

a. Notification. Contractor shall notify the project arborist a minimum of 24 hours in advance of the activity in the TPZ.
b. Excavation. Any approved excavation, demolition, or extraction of material shall be performed with equipment sitting outside the TPZ. Methods permitted are by hand-digging, hydraulic or pneumatic air excavation technology. Avoid excavation within the TPZ during hot, dry weather.
    1. If excavating or trenching for drainage, utilities, irrigation lines, etc., it is the duty of the contractor to tunnel under/around any roots 2-inches in diameter and greater.
    2. If excavation for foundation/footings/walls or grading is required within the root zone, the project arborist shall be contacted to supervise any work. Roots shall not be disturbed or cut without the arborist's express direction either provided for in the arborist report or as directed and supervised by the arborist and only when no other alternative may be reached. Any trenching must then be hand dug and roots pruned with a saw, Sawzall, narrow trencher with sharp blades or other approved root pruning equipment.
c. **Root Severance.** Roots that are encountered shall be cut to sound wood and supervised by an on-site arborist. No cuts shall be made without the express direction and supervision of the arborist. Roots shall be cut cleanly before they are torn from the ground. Roots 2- inches and greater must remain injury free.
d. **Heavy Equipment.** Use of backhoes, steel tread tractors or any heavy vehicles within the TPZ is prohibited unless approved by the City Arborist. If allowed, a protective root buffer is required. The protective buffer shall consist of a base course of tree chips spread over the root area to a minimum of 6-inch depth, layered by 3/4-inch quarry gravel to stabilize 3/4-inch plywood on top. This buffer within the TPZ shall be maintained throughout the entire construction process.
e. **Structural design**. If injurious activity or interference with roots greater than 2-inches will occur within the TPZ, plans shall specify a design of special foundation, footing, walls, concrete slab, or pavement designs

subject to City arborist approval. Discontinuous foundations such as concrete pier and structural grade beam must maintain natural grade (not to exceed a 4-inch cut), to minimize root loss and allow the tree to use the existing soil.

Alternative Methods to Root Cutting
The following remedies should be considered before cutting tree roots that may result in tree instability or decline:

1. Ramping the walking surface over the roots.
2. Routing the construction work around the tree roots.
3. Utilization of a grade beam foundation design to span large roots where required.

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

Emergency utility repairs shall be exempt if work is within the TPZ. The City Arborist shall be contacted after any such repairs that may result in significant tree damage or removal.

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

a. Irrigation Program. Irrigate to wet the soil within the TPZ to a depth of 24- inches to 30-inches. Or apply sub-surface irrigation at regular specified intervals by injecting on approximate 3-foot centers, 10- gallons of water per inch trunk diameter within the TPZ. Duration shall be until project completion or monthly until seasonal rainfall totals at least 8-inches of rain, unless specified otherwise by the project arborist.
b. Dust Control Program. During periods of extended drought, wind or grading, spray wash trunk, limbs, and foliage to remove accumulated construction dust.
c. Soil Compaction Damage. Compaction of the soil is the largest killer of trees on construction sites due to suffocation of roots and ensuing decline of tree health. If a compaction event to the upper 12-inch soil horizon within the tree protection zone has or will occur by any means, then one or more of the following mitigation measures shall be implemented.

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

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

4.30 DAMAGE TO TREES

Reporting

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

1. Root injury: If trenches are cut and tree roots 2-inches or larger are encountered, they must be cleanly cut back to a sound wood lateral root. The end of the root shall be covered with either a plastic bag and secured with tape or rubber band or be coated with latex paint. All exposed root areas within the TPZ shall be backfilled or covered within one hour. Exposed roots may be kept from drying out by temporarily covering the roots and draping layered burlap or carpeting over the upper 3-feet of trench walls. The materials must be kept wet until backfilled to reduce evaporation from the trench walls.
2. Bark or hunk wounding: Current bark tracing and treatment methods shall be performed by a qualified tree care specialist within two days.
3. Scaffold branch or leaf canopy injury: Remove broken or torn branches back to an appropriate branch capable of resuming terminal growth within five days. If leaves are heat scorched from equipment exhaust pipes, consult the project arborist within 6 hours.

Damage to street trees

If street trees or their roots have been damaged, the contractor or property owner is responsible for the replacement and/or maintenance cost to repair the damage. Measurement of the damage shall be the width of the wound measured across the grain at the widest point. The contractor/property owner shall be required to replace any lost trees and/or pay for the cost to repair the damage, prior to the City granting final occupancy or a final permit on the project.

4.40 INSPECTION SCHEDULE

The project arborist shall conduct the following required inspections of construction sites containing regulated trees. Inspections shall verify that the type of tree protection and/or plantings are consistent with the standards outlined within this Manual and/or the Conditions of Approval for discretionary projects. For each required inspection or meeting, a written summary of the changing tree related conditions, actions taken, and condition of trees shall be provided to the City of Petaluma. Monthly Inspection Reports shall be submitted to the project planner or building department, as specified at the pre-construction meeting.

Inspection of Protective Tree Fencing. The City Arborist shall be in receipt of a written statement from the applicant or project arborist verifying that he has conducted a field inspection

of the trees and that the protective tree fencing is in place prior to issuance of a demolition, grading, or building permit, unless otherwise approved.

Pre-Construction Meeting. Prior to commencement of construction, the applicant or contractor shall conduct a pre-construction meeting to discuss tree protection with the job site superintendent, grading equipment operators, project arborist, and building official.

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

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

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

Landscape Architect Inspection. For discretionary development projects, prior to temporary or final occupancy the applicant or contractor shall call for the Landscape Architect to perform an onsite inspection of all plant stock, quality of the materials and planting and that the irrigation is functioning consistent with the approved construction plans. The City shall be in receipt of written verification of Landscape Architect approval prior to scheduling the final inspection, unless otherwise approved.

4.50 PAVEMENT AND HARDSCAPE CONFLICTS WITH TREE ROOTS

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

Removal and Replacement of Pavement or Sidewalk

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

- Replacement of pavement or sidewalk: An alternative to the severance of roots greater than 2- inches in diameter should be considered before cutting roots. If an alternative is not feasible, remove the sidewalk, grind roots only as approved by the City Arborist and

replace sidewalk using wire mesh reinforcement and #3 dowels at the expansion joint if within 10-feet of a street tree. Use a wire mesh reinforcement if within 10-feet of the trunk of a protected or street tree.

Note: Any work in the right-of-way requires an encroachment permit from the Public Works Department.

Alternative Methods to Prevent Root Cutting
The following remedies should be considered before cutting tree roots that may result in tree instability or decline:

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

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

1. Plant deep rooted trees that are proven to be non-invasive.
2. When installing a sidewalk over soil that shrinks and swells, install a sidewalk with higher strength that has wire mesh and/or expansion slip joint dowel reinforcement.
3. Follow soil loosening planting techniques to promote deep rooting.
4. Install root barrier only along the hardscape area of the tree (but allow roots to use open lawn or planter ship areas).
5. Dedicate at least 10-linear feet of planting space for the growth of each tree.

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

SECTION 5.00 APPRAISAL METHODS

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, a certified arborist must prepare the appraisal by using the most current edition of the 'Guide for Plant Appraisal', published by the Council of Tree and Landscape

Appraisers.

The Trunk Formula Method

Applies to trees that are too large for practical replacement by transplanting and shall be appraised by: determining the basic tree value and adjusting this value by a condition and location rating. 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 6.00 REMOVAL, REPLACEMENT AND PLANTING OF TREES

Regulated trees may not be removed without City review and approval, except in certain emergencies. The purpose of the City review is to verify that the removal is allowed under City law, and to prevent unnecessary tree removal. In some cases, a removed tree must be replaced by the property owner or, in the case of street trees, the developer. This section describes the type and size of tree required, and the planting techniques to be used. It also describes how to determine the replacement value of a tree that cannot be replaced in its original location, and the circumstances in which the City may require a security deposit to assure the survival of trees during development projects.

6.10 TREE REMOVAL

Allowable Removal

A permit is required to remove a Regulated Tree, except in emergency situations outlined in this manual. A Regulated tree is any Protected Tree, Street Tree or Heritage/Landmark Tree. The permit is issued by the Planning Department. Removal of Regulated Trees is allowed if:

1. A Regulated Tree is determined to be dead, hazardous, a detriment to or crowding an adjacent Regulated Tree, or a Public Nuisance.
2. A Regulated 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, gutter, etc.).
3. On projects other than a single-family residence, a Regulated Tree reduces the otherwise-permissible buildable area by more than 25%.
4. In the case of street trees, it is authorized by the City in connection with development.
5. In the case of a Heritage/Landmark tree, the Planning Director reviews and approves the removal. The City arborist may be required to be on-site during removal.

Permit Application

Tree Removal Permits are available at the Petaluma Planning Department and online. The following is a checklist of items necessary for City review for tree removal. The reviewing staff may require additional information. Responses will generally be mailed to the applicant within 10 days. The removal permit must be on site during the removal.

1 Completed Tree Removal Permit.

2 Arborist report from a certified arborist. The applicant may request the City

Arborist prepare the report or they may obtain a report from an independent arborist. The report may be subject to peer review by the City Arborist. The cost of the arborist report and/or peer review are borne by the applicant.

3 Site Plan showing location, drip line, etc. of tree(s) to be removed.

4 Photo (digital or paper) of the tree to be removed.

A Tree Removal Permit shall be exercised within one year from the date of approval or other time limit established through a discretionary permit approval. If a Tree Removal Permit is not exercised within the established time frame the permit shall expire.

Stump Grinding

Tree stumps located in the parking strip or in a possible pedestrian pathway which are not removed after a tree has been taken down shall be addressed on a priority basis. Stumps can be hazardous to pedestrians and interfere with future landscaping. Stumps are to be removed or ground down below grade level. Notices shall be mailed to the property owner giving them thirty (30) days to correct and an approximate cost of service if they fail to comply. If the property owner fails to comply within the designated period, the City will assign the stump grinding to a contractor and invoice the work.

6.15 TREE PRESERVATION AND GENERAL PLAN - DENSITY GOALS AND POLICIES

The City Council and/or Planning Commission may direct the removal of Regulated Trees for development purposes. Removal at the direction of the Council and/or Commission may be allowed to meet density and housing goals and policies of the General Plan. Removal and/or partial removal is at the sole discretion of the City Council and/or Planning Commission based on the proposed project and will be on a case-by-case basis. The following criteria may be required to determine the level of removal that may be allowed for any given project:

- Preparation of a Tree Preservation and Protection Plan and review and recommendation by a City Arborist (expense to be covered by applicant). This plan will be used in determining which trees due to health and other factors may be more appropriate to preserve and/or remove.
- Submittal of at least one project site plan. Alternate site plans may be required to preserve a specific tree or grove/stand of trees.
- Alternate building types including multiple stories may be requested to address tree preservation.
- The following mitigation for tree removal may be considered by the Council and/or Commission in determining actual tree removal for a project:
    1. On-site mitigation may include planting of trees of the species to be removed in open spaces, as street trees, parkway strips or in public rights-of-way.
    2. Payment and/or waiver of in-lieu fee, based on appraised values and direction by the Council and/or Commission.
    3. Off-site mitigation may include planting of trees of the species to be removed or alternate species on City owned properties including but not limited to parks, trails, public rights-of-way, etc.

Removal of Regulated Trees requires a thorough analysis to determine that all avenues have been explored for site development. Sites that may be otherwise underdeveloped, or severely limit the ability to meet the goals and policies of the General Plan may be authorized by the Council and/or Commission for tree removal. The applicant must demonstrate that all reasonable alternate site plans have been explored. A written feasibility analysis of alternate site plans may be required by the Council and/or Commission in making the final determination of a project's tree removal.

6.20 WHEN TREE REPLACEMENT IS REQUIRED

Certain conditions determine whether a Regulated Tree must be replaced. The following are three categories of Regulated Trees that need replacement:

Protected Trees
If the City authorizes removal of a protected tree because it is dead, dangerous, or a nuisance and the area will not support replacement, no tree replacement is required. In all other cases, the tree must be replaced.

Street Trees
If the City authorizes removal of a street tree in connection with a development project, it shall specify the replacement requirements in the permit authorizing removal. Street Trees that are removed must be replaced.

Heritage/Landmark Trees
When authorizing removal of a Heritage/Landmark Tree, the Director or the Director's designee shall require tree replacement if it is necessary or desirable to implement the intent of the original site design. The number and nature of the replacement trees shall be determined by the Director or designee, taking into consideration the value of the tree removed and the site design.

6.21 Posting notice of street tree removal.

A. Any street tree for which a removal permit is required shall be posted with a notice of proposed removal in accordance with this section, unless the Director determines that such street tree poses an imminently hazardous condition.

B. The notice shall be in a form prescribed by the Director, and shall be posted in a manner prescribed by the Director, for a period of two weeks.

C. Any resident of the city who wishes to object to the proposed removal may file an objection in writing with the Director that must be received within fourteen calendar days of the date the notice was first posted.

D. The proposed removal may be carried out seventeen calendar days from the initial date of posting if the Director notifies the applicant that no timely written objection was received by the Director.

E. The Director shall give any person(s) who file(s) a timely written objection an opportunity to be heard and will thereafter render a written decision regarding the proposed removal. The

informal hearing may be conducted by phone, in person, in writing, or a combination thereof as required by the Director.

F. A copy of the Director's decision shall be made available to any person who has filed a timely written objection, and such decision will be final.

6.22 Presentation of permit on request.

A. It shall be unlawful for any person to remove or cause the same to be done to a street tree unless the permit or a copy of the permit allowing for this activity is maintained on the site where the street tree to be pruned or removed is located.

B. It shall be unlawful for any person to prune or remove or cause the same to be done to a street tree unless the permit or a copy of the permit can immediately be presented upon request to the Director of planning, building, and code enforcement, Director of transportation, police officers, and their designees.

C. It shall be unlawful for any person to engage in any work on the street tree or allow any work on the street tree that is the subject of the permit to occur unless and until:

(1) the permit or a copy of the permit is located on the site where the subject tree is located; and

(2) the permit or a copy of the permit is readily available for presentation upon request as described in this section.

6.30 ALTERNATIVES WHEN TREES CANNOT BE REPLACED ON SITE

In some circumstances, crowding or other physical constraints make it impossible or undesirable to replace a tree in the same place. In that case, the value of the tree shall be determined as outlined within this manual and the Zoning Ordinance. Once the value has been determined, that sum of money shall be used in the following order of preference, as approved by the Director: (1) to provide additional trees elsewhere on the site; (2) to add or replace street trees or other public landscaping in the vicinity, or (3) to add trees or other landscaping to other City property.

Tree mitigation may be in the form of in-kind replacement, in-lieu replacement, and/or a combination of both.

A. *New Commercial and/or Residential (2 or more parcels) Development Projects.* In the event that there are no viable and/or practical alternatives except to remove a protected tree, the City will require replacement trees at the following ratios:

1. All protected trees, determined by the project arborist to be in good (4) or excellent (5) health, and/or with moderate (3) to good (4) structure, shall be replaced on a one-to-one trunk diameter basis. (Example: A 24-inch protected tree in good or excellent condition must be replaced with new trees totaling 24 inches in trunk diameters.)

2. All protected trees, determined by the project arborist to have fair (3) or marginal (2) health, and/or with marginal (2) structure, shall be replaced on a two-to-one trunk diameter basis.

(Example: A 24-inch protected tree in fair-to-marginal condition must be replaced with new trees totaling 12 inches in trunk diameter.

3. All protected trees, determined by the project arborist to have poor (1) health or poor (1) structure, are not required to be replaced.

c. *Tree Mitigation.*

1) A tree designated for preservation in a development project must have a good chance of long-term survival as determined by an assessment of proposed development impacts. Simply preserving a tree does not excuse it from designated mitigation requirements; it must, in the professional opinion of the project and/or City arborist, have a good chance to survive after all the impacts of construction are considered.

2) *In-Kind Replacement.* If the location of replacement tree planting will remain as a natural area suitable for the healthy and long-term growth of native trees, replacement of protected trees should occur in-kind. If the location of replacement tree planting will be part of an irrigated, ornamental landscape area, replacement of protected trees may occur with a species as identified by the project arborist and approved by the City arborist.

3) Replacement tree ratios shall be applied as follows:

a) 24-inch box replacement tree = 2-inch replacement trunk diameter

b) 36-inch box replacement tree = 3-inch trunk replacement diameter

c) 48-inch box replacement tree = 4-inch trunk replacement diameter

Replacement trees shall be at minimum 24-inch box size.

4) *In-Lieu Replacement.* In the event that a development site is insufficient in size or use to plant any or all of replacement trees, the City may accept payment of in-lieu fees by the applicant. In-lieu fees will be utilized by the City to purchase and install trees in future public open space, park space, or other areas designated for tree planting. Replacement tree costs for the purposes of satisfying in-lieu fees shall be based on the typical northern California wholesale tree cost plus average installation cost.

In-lieu fees for replacement trees shall be based on a minimum 24-inch box size.

B. *Tree Protection/Removal Requirements for additions, pools, and/or other accessory structures.* The City requires the land developer to protect and preserve trees during the development and/or subdivision of residential parcels. The resulting lots are then sold to property owners with the understanding that the trees should be protected. Property owners may request any number of modifications to their properties that may in turn result in impacts to the protected trees. Lots with protected trees are subject to the following requirements for additions, pools, and/or other accessory structures that may result in an impact to the protected trees.

1. An arborist report is required for all properties considering additions, pools, and/or accessory structures that may have an impact on a protected tree, including improvements within the tree protection zone.

2. In the event that there is no viable and/or practical alternative to removal of protected trees to accommodate the addition, pool, and/or accessory structure the following shall apply:

a. A request for a Tree Removal Permit for protected trees 15" or greater, determined by the project arborist to be in good (4) or excellent (5) health, and/or with moderate (3) to good (4) structure will require review and action by the Planning Commission at a noticed public hearing. The request will require a Tree Removal Permit, arborist report, statement justifying removal of the tree, and payment of a permit application fee. For protected trees 14" or less which are requested to be removed, the Community Development Director shall review the request and make the determination for removal. If the Community Development Director authorizes removal, mitigation shall be required either by in-kind replacement or in-lieu fee payment, as defined in this ordinance. If the Community Development Director denies the request for removal, the decision may be appealed.

b. A request for a Tree Removal Permit for all protected trees, determined by the project arborist to be in fair (3) or marginal (2) health, and/or with marginal (2) structure may be approved and require mitigation. The Community Development Director shall review the request and make the determination for removal. If the community Development Director authorizes removal, mitigation shall be required either by in-kind replacement or in-lieu fee payment, as defined in this ordinance. If the Community Development Director denies the request for removal, the decision may be appealed to the Planning Commission as allowed by Section 24.070(B)(3).

c. A request for a Tree Removal Permit for a protected tree, determined by the project and/or City arborist to be in poor (1) health, poor (1) structure, or to be structurally unsafe or hazardous (1), will be approved and will not require mitigation.

d. *In-Kind Replacement.* In-kind replacement shall be the same as outlined in Section A.1.a. The arborist report shall specify the replacement value. The applicant/owner shall include a replacement landscape plan with the Tree Removal Permit. The building permit for the addition, pool, and/or other accessory use shall be conditioned to require installation of the replacement trees prior to building permit final.

e. *In-Lieu Replacement.* In-lieu replacement shall be the same as outlined in Section A.1.b. The arborist report shall specify the replacement value. The applicant/owner shall pay to the City the in-lieu fee with the Tree Removal Permit. The building permit for the addition, pool, and/or other accessory use shall be conditioned to require a Tree Removal Permit and payment of the in-lieu fee, prior to initiation of the work.

6.40 TREE CANOPY REPLACEMENT STANDARD FOR ONSITE TREE REPLACEMENT

When a Regulated Tree is to be replaced on site, the following standards apply.

Species
The replacement trees shall be the same species unless the Director determines that another species would be more suitable for the location. Factors to be considered include the long-term health of the tree in the location and its compatibility with the adjacent uses as well as design considerations.

Location
The Director shall approve the location of replacement trees on site. If it is not possible or desirable to replace the tree on site, a sum of money equal to the value of the tree may be deposited with the City to be used for future replacement or installation of trees within public landscape areas or other City property.

Size and Number
Occasionally, it is not possible to replace a large, older tree with a single equivalent tree. In such cases, the following tree canopy replacement ratio shall be used:

Dripline Canopy Diameter of Tree Removed	Required Replacement Trees	Alternative Replacement Trees
4-9 feet	2 x 24" boxes	1 x 36" box
10-27 feet	3 x 24" boxes	2 x 36" boxes
28-40 feet	4 x 24" boxes	2 x 48" boxes
40 - 56 feet	6 x 24" boxes	2 x 48" + 2 x 36" boxes
56 feet or more	2 x 48" + 2 x 24" + 2 x 36"	

Timing
Replacement trees shall be completed within one year of removal.

6.50 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.

6.60 SECURITY DEPOSITS

A security deposit shall be posted to cover the value of Regulated Trees designated for preservation. Value of trees is established in the Tree Protection and Preservation Plan. The security deposit(s) shall be posted and approved before building or grading permits are issued.

The security deposit, time frame, and type are specified in the Zoning Ordinance. The guarantee period shall be specified within the agreement between the City and the Developer at the time the security is posted.

If any tree fails to survive, or declines to a point where it is deemed to not be expected to survive,

the City may use the security value of the dead or declining tree(s) to purchase new trees for on or off-site use. In the event that replacement cannot be accomplished on-site, the security will be placed in a fund with the City for use in planting trees within public right-of-way, parks, public landscape areas, or other areas as deemed appropriate by the City.

If a tree(s) that has been designated for preservation and protection is determined to have failed or died on its own and not through impacts from development, the security deposit shall not be used for replacement. This determination of failure/death shall be conducted by the City arborist and will require a written report.

NOTE:

1. Single developed lot property owners that are proposing remodels, additions, pools, etc. are exempt from security deposits.
2. Creeks, riparian corridors, and significant groves or stands of trees are exempted from security deposit requirements.

6.70 PLANTING STOCK AND MATERIALS

Quality

It is the contractor's responsibility to supply stock that meets ANSI 760.1-1996.

1. All plants and trees installed within the City shall conform with the American Association of Standards, ANSI Z60.1, Specifications for Acceptance of Nursery Trees at the Time of Delivery, in all ways.
2. Plants 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 it is delivered and shall not be root bound or have girdling roots.
4. Trees shall not have been topped or headed.
5. A Landscape Architect shall inspect and verify, in writing, that all plant material to be installed on the site meets the above standards and is acceptable. The written verification shall be forwarded to the Planning Department within one week of acceptance.
6. Inspection shall occur after delivery of stock to the project site. Plants and trees with broken tops, branches or injured hunks shall be rejected.

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 shall be used and installed in a figure eight fashion to support the tree to the stakes.
3. Mulch. Unscreened wood mulch which is 0 inch- 2 inch in diameter, 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. An 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. Mower guards. For trees in turf areas requiring regular mowing, the tree stem shall be protected with Tree Guard or equivalent.
6. 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 Engineering. Minimum size grates shall be 4' x 4' unless specified otherwise. All tree grates shall be mounted in frames inset into a concrete foundation within the sidewalk or surface material and shall be flush with the surrounding surface.

SECTION 7.00 CRITERIA USED BY THE CITY TO DETERMINE IF A TREE IS HAZARDOUS

Introduction

Property owners are responsible for the trees on their own property. The City does not require advance permission for removal of Regulated Trees in emergencies. However, it does require documentation of the problem 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.

Evaluation Form

The City uses the national standard, an ISA - HAZARD EVALUATION FORM as a basis to determine the hazard rating of a tree. 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.

Authorization

If the hazardous condition or target cannot be mitigated or reduced to a less than significant level (see Hazard Reduction Section), then the tree shall be authorized by the City and removed by the property owner to abate the condition.

7.10 DETERMINING A TREE'S HAZARD RATING

For a tree to be declared a hazard and removed, 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.

ISA - Hazard Rating Formula

Failure Potential	+ Target	+ Additional Factors/Size of Part	= Hazard Rating

	+	+	=
1= low 4= severe	**1= low 4= severe**	**1= low 4= severe**	**3= low 12= severe**

*Note: The above factors are combined to quantify a hazard rating. For example, a minimum rating of 3 is the safest (a low predictable hazard), and the maximum rating of 12 is an imminent hazard (a high predictable hazard). Further details regarding this formula can be found in the ISA-HAZARD EVALUATION FORM and the ISA publication * Evaluation of Hazard Trees in Urban Areas, most current edition.*

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 battle stability, individual species susceptibility to failure, pruning, history, decay weaknesses, and any other compromising or pertinent factors considered by the consultant.

Target Rating

Evaluation of potential targets shall include people, structures or property use and occupancy that are imminently threatened. 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 will be present when failure occurs. 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). 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.

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.

7.20 TREE EVALUATION CHECKLIST

This part is intended to further help the property owner 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 alert a property owner to potential hazards and suggest action to avert a tree failure and liability. If you answer 'yes' to one or more of the checklist items, you should contact an arborist to discuss how to reduce the potential hazard.

Hazard Evaluation Questionnaire

1. Target: If the tree or branch falls will it hit cars, houses, structures, power lines or people? If so, immediate action may be necessary.
2. Dead Branches: Are there dead tops or branches? Is the tree dead?
3. Cracks: Are there deep, open cracks in the trunk or branches? These are major starting points for trunk and branch failure.
4. Crotch Cracks: Are there deep, open cracks below joining hunks or stems?
5. Tree Architecture: Has the tree grown beyond its species-specific shape into a hazardous form? Is the tree leaning?
6. History: Has the tree recently lost large branches?
7. 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?
8. Living Branches: Do live branches bend abruptly upward or downward where the 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 hunks.
9. 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?
10. Storm injury: Are there broken branches, split trunks, or injured roots? Are branches close to power lines?
11. Root Rot: Are there fungus fruit bodies (mushrooms) on roots or near the trunk? Were roots injured by construction?
12. Rots and Cankers: Are there hollows or cankers (dead spots) in the trunk or major branches, some with fungus fruit bodies?
13. Construction injury: Have roots, trunk, or branches been injured?
14. 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.
15. 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.

7.30 HAZARD REDUCTION AND PREVENTION

Plant trees that are not problematic and that fit the site. The International Society of Arboriculture (ISA) has developed a list to assist you to avoid planting a tree that may become a problem. 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. The risk may be reduced by removing dead and broken branches and by reducing branch end weights, by mechanically supporting weak branches from below, or by cabling and bracing.

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

The following checklist will help property owners avoid future problems:

1. Inspect your trees carefully at least once each season every year. Annually, have a

Certified Arborist inspect your trees and provide you with a written report.
2. Avoid planting brittle species where falling limbs could injure people or property
3. Prune trees when they are young and regularly thereafter.
4. Use correct pruning methods, always making the pruning cut outside the branch collar. This will allow only the minimum of decay infection.
5. Do not allow topping.
6. Always plant the right tree in the right place. Select trees based upon their mature height and shape, and make sure the species selected matches the soil and other site characteristics. For example, avoid planting tall-growing trees such as redwoods near power lines or too close to your house.
7. Water thoroughly (generally, until saturation is reached) during dry periods, slowly applying at least 2-inches of water.
8. Erect barriers around or slightly beyond the root protection zone of trees during construction. Insist that these root protection zones be honored by construction workers.
9. Consider cabling or bracing weak forks of branches in larger trees of high value.
10. Do not plant trees with a narrowly forked stem v-crotch, embedded bark, or girdling root ball.
11. Where a valuable specimen tree may be suspected of developing into a hazardous tree, use landscaping to keep people at a safe distance. This may require techniques such as rerouting walks, moving patio furniture, or planting shrubs and hedges to function as barriers to keep foot traffic at a safe distance.

SECTION 8.00 MAINTENANCE OF TREES

8.10 MAINTENANCE, CARE AND PRUNING

Various trees may require that branches be pruned clear from structures, activities, building encroachment or may need to be strengthened by means of mechanical support or surgery. The most compelling reason to prune is to develop a strong, safe framework and tree structure. Tree pruning standards should be consistent with the "Tree-Pruning Guidelines" of the International Society of Arboriculture.

8.10.01 Property owner maintenance - Responsibility and duty to the public.

A. The property owner of a lot or portion of a lot adjacent to or fronting on any portion of a street shall maintain and replace, if necessary, any street trees, shrubs, hedges or other landscaping adjacent to or fronting on the subject property in such condition that the street trees, shrubs, hedges or other landscaping comply with this chapter. Each property owner shall plant and replace any removed or otherwise missing street trees.

B. A property owner required by this section to plant, maintain, and replace, if necessary, street trees, shrubs, hedges and other landscaping shall owe a duty to members of the public using streets to maintain such street trees, shrubs, hedges or other landscaping in a safe and nonhazardous condition for users of the streets. For purposes of this section, maintenance of street trees, shrubs, hedges and other landscaping includes, but is not limited to: watering, pruning, fertilizing, pest control, removal of branches, leaves, and other debris, weed abatement, and protection of the critical root zone.

C. A property owner required by this section to maintain any street trees, shrubs, hedges, or landscaping shall comply with the following:

1. Provide the necessary maintenance so that the street tree, shrub, hedge or landscaping is not in a hazardous condition or in a condition that will likely become a hazardous condition;
2. Provide a minimum eight-foot vertical pedestrian clearance from the top of the sidewalk and a minimum thirteen-foot vertical vehicular clearance from the top of the pavement, to any part of a street tree;
3. Provide adequate clearance for unobstructed pedestrian and vehicular view of all authorized traffic signals, traffic cameras, street lights, regulatory signs, street name signs, and other similar type of equipment or signs;
4. All maintenance shall be completed in accordance with the American National Standard Institute (ANSI);
5. Obtain a permit to remove or plant a street tree.

D. If any property owner fails to maintain any adjacent street trees, shrubs, hedges or other landscaping in a nonhazardous condition as required by this part, and any person suffers damage or injury to person or property, the property owner shall be liable for all damages or injuries caused by the failure of the owner to maintain the adjacent street trees, shrubs, hedges or other landscaping in a non-hazardous condition.

8.10.02 Disclosure obligations upon sale or transfer of a residential real property.

A. Not less than seven business days before the sale or other transfer of residential real property concludes a selling or transferring property owner must disclose to the acquiring property owner, on a disclosure form provided by the city, whether the residential real property to be sold or transferred fully complies with the city's street tree maintenance and replacement requirements.

B. If the selling or transferring property owner cannot determine whether street trees located on or adjacent to the residential property are substantially in compliance with the approved development permits for the property, or the property's approved development permits are inconclusive as to the requirements for the presence and location of street trees on or adjacent to the property, then the following requirements for the planting and presence of street trees shall apply:

1. The property must have one street tree for any adjacent street if it is an interior lot and at least three street trees if it is a corner lot, unless otherwise modified by the Director in the interest of public safety.
2. If the current general plan requirements for street trees on or adjacent to the property differ from the requirements specified in Subsection B.1., then the current general plan requirements shall govern the number and location of street trees required on or adjacent to the property at the time of sale or transfer. If the property meets the general plan requirement, then the selling property owner must indicate such compliance with the general plan on the disclosure form provided to the acquiring property owner.
3. All street trees shall be planted to ANSI A300 standards.

C. Upon a written request, the Director may grant the selling or transferring property owner an

exemption in writing from the requirements of this section if the Director determines in the interest of public safety that planting and maintaining street trees on or adjacent to the residential property at the time of sale or transfer is not appropriate. Such an exemption does not run with the land and shall not allow any deviations from the disclosure requirements upon residential real property sales or transfers for future sellers or transferors.

8.10.03 Interfering with maintenance work or injuring street trees prohibited.

A. No person shall in any way interfere with the city, its employees or contractors engaged in the planting, mulching, pruning, spraying, treating or removing any street tree, or in the removing of stone, cement or other substance about the trunk of any street tree.

B. No person shall, except with written permission of the Director,

(a) damage, cut, carve, girdle or injure the bark of any street tree;

(b) attach or keep attached, or cause the same, any sign, wire, device or injurious material to any such tree or to the guard or stake intended for the protection of such street tree;

(c) allow any gaseous, liquid or solid substance, or pesticide, herbicide or similar chemical agent harmful to such street trees to come in contact with the roots, leaves, bark or any part of any such street tree;

(d) construct concrete, asphalt or brick paving or otherwise fill up the ground area within four feet of any such street tree that may shut off air, light or water from the roots;

(e) pile building material or other material about any street tree in any manner that will in any way injure such street tree; or

(f) construct any raised planter around the street tree trunk.

C. As part of any construction work or activity of a building or structure, the owner or responsible party thereof shall place such guards around all nearby street trees as shall in the opinion of the Director effectively prevent injury to them.

D. Tree stakes or guards may be placed around street trees by the department of transportation, or such other department designated by the city manager to administer or enforce this chapter, by city contractors or by owners of property abutting such street trees provided the same are merely placed near such street tree for the purpose of protecting or training such street trees.

E. Every person having any wire charged with electricity running through a street in the city shall securely fasten such wire so that it will not come in contact with any street tree therein; and no person shall, without the written permit of the Director, attach any electric wire, insulator or any device for the holding of any electric wire or for bracing the poles which carry the same to any street tree growing or planted upon any street.

F. No person shall move any building or other object along any street in such manner as to injure any street tree. Whenever the Director determines or reasonably believes that any street tree may be injured, the Director may require any person moving a building or any other object along a street in the city to furnish a bond in an amount sufficient to cover the damage or destruction of such street tree.

8.20 HOMEOWNER DISCLOSURE

A great deal of time and effort is put into preserving and protecting trees within Petaluma. Measures are taken to protect the trees before and during construction. When the property is sold, a new homeowner becomes responsible for the maintenance and care of these trees. Often the homeowner is not aware of proper maintenance and care of trees. Projects shall be conditioned to provide a disclosure to new homeowners that would include information regarding maintenance, care, regulations, permitting, and protection of trees on-site.

8.30 ENFORCEMENT

STOP WORK- TEMPORARY RESTRAINT

If a violation of the City's ordinance, or of the recommendations contained in the Tree Protection & Preservation Plan occurs during development, the City may immediately issue a stop work order prohibiting further activity on the project site, and/or a citation. A mitigation plan must then be filed with the Planning Director by the project arborist, which includes the specific measures that must be implemented for protection of the remaining trees on the property, specific mitigation or remediation measures necessary to compensate for tree damage which has occurred, or monetary compensation per the appraisal process for trees illegally removed.

If a violation occurs while a building permit application or development approval is pending, the Planning Director may issue a temporary moratorium on the proposed development. This moratorium may not exceed eighteen months. The moratorium time period is intended to provide the City an opportunity to assess the violation(s) and to determine suitable mitigation measures for the future development. These mitigation measures shall be placed as a condition of any future permits for development on the property.

CIVIL PENALTIES

Where a tree is illegally removed, or damaged to a degree that survival is not expected, civil action may be brought by the City. Refer to the Zoning Ordinance for additional information on enforcement.

A civil action may be implemented to provide injunctive relief to abate, enjoin, or otherwise compel the cessation of such violation.

If civil action is brought by the City, and the City prevails, the court shall award all costs associated with investigation, preparation for trial, costs of the trial, reasonable expenses including overhead and administration costs incurred when prosecuting the action, and reasonable attorney fees, to the City.

ENFORCEMENT AND ASSESSMENT

8.30.500 Notice of violation.

If the Director determines that the condition of any tree, shrub, hedge, or landscaping constitutes a violation of any provision of this chapter, the Director shall, by notice in writing, notify the owner of the property in violation to prune or remove the tree, shrub, hedge, or landscaping or take any other necessary corrective action to cure the violation.

8.30.510 Notice of violation - Delivery.

The notice of violation specified in Section 8.30.500 may be given by delivering a written notice personally to the property owner, or by mailing the notice, postage prepaid, to the property owner thereof at his or her last known address as the same appears on the last equalized assessment rolls of the county.

8.30.520 Notice of violation - Contents.

A. Any notice of violation issued by the Director pursuant to Section 8.30.500 shall contain the following information:

1. The date of the inspection.

2. The address or a description of the property upon which such tree, shrub, hedge, or landscaping is located, or the property which fronts upon the street on which such tree, shrub, hedge, or landscaping is located.

3. A description of the violation.

4. A description of the corrective action required to address the violation.

5. A definitive time period to complete the corrective action.

8.30.530 Notice of violation - Hearing.

The notice of violation shall further specify that the property owner receiving such notice may file with the Director his or her written objection to such notice and such written objection must be received by the Director within seven calendar days of the notice. The written objection shall clearly outline the objection to the notice and the basis for such objection. The Director shall duly review all timely written objections that comply with this section and provide the property owner with an opportunity to be heard, and will thereafter render a written decision within a reasonable amount of time to sustain, overrule, or amend the notice of violation. The written decision of the Director shall be provided to the owner in the manner specified in Section 8.30.510, and such decision will be final.

8.30.540 Work performed by the City.

A. If the corrective action required by notice is not completed within the time specified in the notice of violation, the city shall have the authority to perform this work or cause this work to be performed and the owner of the affected property shall be billed for the costs incurred. The property owner shall be responsible for all costs associated with the corrective action including costs of planting, removal or pruning of the tree, shrub, hedge, or landscaping, administration time and expense, late charges, and the handling of any lien placed on the property owner's property due to failure of the property owner to pay within the required period.

B. After the city completes the corrective action as set forth in this section, the city shall mail an invoice to the property owner. The property owner shall remit full payment to the city on or before the date specified in the invoice.

C. Any invoice not fully paid by the date specified on the invoice shall be deemed delinquent and the Director shall initiate the assessment procedures set forth in this part.

8.30.550 Emergency services performed by the City.

A. In cases of imminently hazardous conditions, the Director shall have the authority to perform or cause to be performed the corrective work to abate the imminently hazardous condition without observance of any notice requirements. The property containing a tree, shrub, hedge, or landscaping that poses an imminently hazardous condition or the property adjacent to or fronting on the subject street tree, shrub, hedge, or landscaping that poses an imminently hazardous condition may be assessed for the costs incurred in accordance with this part.

B. The owner of a property containing a tree, shrub, hedge, or landscaping that poses an imminently hazardous condition or adjacent to or fronting on a street tree, shrub, hedge, or landscaping or a property containing a tree, shrub, hedge, or landscaping that poses an imminently hazardous condition for which the city takes corrective action shall pay any costs and expenses associated with the emergency services, including costs of removal of the tree, shrub, hedge, or landscaping, administration time and expense, late charges, and the handling of any lien placed on the property owner's property due to failure of the property owner to pay within the required period. The city shall send an invoice to the property owner setting forth the costs and expenses as described herein and the date specified for full payment to the city.

C. If the property owner has failed to pay the invoice, the Director shall issue a notice of cost informing the property owner of the failure to pay the invoice and that failure to pay the amount will result in the initiation of proceedings to place a lien against the property owner's property.

8.30.560 Notice of hearing before city council.

After completion of the work and failure of a property owner to pay the amounts set forth in the invoice, the Director shall duly notice the public hearing on the cost to be given to the property owner in the manner specified in this part, which shall specify the day, hour and place when the city council will hear and pass upon a report by the Director of the cost of the work, the amount proposed to be assessed against the property, together with written objections, if any, which may be raised by any person liable to be assessed for the cost of such work.

8.30.570 Conference with the Director on notice of cost.

The Director may include with the notice of hearing, as specified in Section 8.30.560 hereinabove, notice of a conference with the Director. The conference, which may be scheduled by the Director upon receipt of the written objection specified in Section 8.30.560, shall be conducted prior to the city council hearing for the purpose of discussion between the property owner and the Director of the costs of the work. Upon the conclusion of the conference, the Director shall note his or her conclusions in the report to the city council together with any recommendations for adjustment of the costs of the work.

8.30.580 Report to city council.

If the property owner does not pay the invoice by the required date, the Director shall prepare and file with the city council a report specifying the work which has been done, the cost thereof, a description of the real property upon which the tree, shrub, hedge, or landscaping was located or of the real property adjacent to or fronting upon the street on which such street tree, shrub, hedge, or landscaping was located and the assessment against the parcel of land proposed to be levied to pay the cost thereof.

8.30.590 Hearing on assessment costs.

A. Upon the day and hour fixed for the hearing, the city council shall hear and pass upon the report of the Director, together with any written or oral objections which may be raised by any property owner liable to be assessed for the corrective work. The city council may make such modifications in the report as it may deem just, after which, by resolution, the report as submitted or as modified shall be confirmed. The decision of the city council on all objections shall be final and conclusive.

B. This hearing serves to provide the full opportunity of a person subject to an invoice to be heard and object to the determination that a violation occurred and was not corrected. The failure of any person to appear at the hearing shall constitute a failure to exhaust administrative remedies.

8.30.600 Assessment deemed a lien.

The cost of any corrective action may be assessed by the city council against the parcel of property upon which the tree, shrub, hedge, or landscaping is located, or the parcel of property which fronts upon or is adjacent to the street on which such street tree, shrub, hedge, or landscaping is located, and such cost so assessed, if not paid within five days after its confirmation by the city council, shall constitute a special assessment against that parcel of property, and shall be a lien on the property for the amount thereof, which lien shall continue until the assessment and all interest thereon is paid, or until discharged.

8.30.610 Lien - Recordation and collection.

The city council, after confirmation of the report of the Director, may order a notice of lien to be delivered to the county recorder, who shall enter the amount thereof on the county assessment book opposite the description of the particular property, and the amount shall be collected, together with all taxes against the property. Thereafter, the amount of the lien shall be collected at the same time and in the same manner as taxes against the property are collected, and shall be subject to the same penalties and interest, and to the same procedure under foreclosure and sale in case of delinquency.

8.30.630 Private arrangements for tree trimming or removal.

The Director may cut down, trim or remove any trees in any street, or remove any trees in any street or which overhang any street, or cause the same to be done, by private arrangement for reimbursement to the fund from which the expenditure by city was made, with the owner of any lot or parcel of land upon which, or fronting upon which the trees are situated.

8.30.640 Liability limitation.

Nothing contained in this chapter shall be deemed to impose any liability upon the city, its officers or employees, nor to relieve the owner of any private property from the duty to keep trees, shrubs, hedges, or landscaping upon said private property, or under his or her control or upon streets in front of or contiguous to such private property, in a safe condition.

8.30.650 No interference with enforcement of this chapter.

No person shall interfere with or delay the authorized representative of the city from the execution and enforcement of this chapter except as provided by law.

8.30.660 Failure to give or receive notice.

The failure to post, mail or deliver by personal service any notice required under this chapter or the failure of any person to receive such notice shall not affect the validity of any proceedings or actions taken by the city or its employees, agents or contractors under this chapter.

8.30.670 Remedies.

The provisions of this chapter are nonexclusive and supplementary to any existing rights and remedies, and the provisions of this chapter may be enforced by any remedies provided for in this municipal code or otherwise available at law. Violations of this chapter may be prosecuted criminally, civilly, or administratively, either undertaken separately or in conjunction with other remedies, at the sole discretion of the city. Nothing in this chapter shall be deemed to prevent the city from commencing any administrative or legal proceeding to enforce this chapter, Municipal Code, or any law.

SECTION 9.00 DEFINITIONS AND TERMINOLOGY

ANSI Standards – a set of standards put forth by the American National Standards Institute (ANSI) to help ensure openness, balance, consensus and due process in tree-related work. Also called ANSI A300 Standards.

Acidic – soil having a pH of less than 7.0 (neutral pH), typical acidic soils range from 5.5 to 6.9.

Alkaline – soil having a pH of more than 7.0; in the Santa Clara Valley, typical alkaline soils range from 8.2 to 7.1, with 7.0 as neutral

Arborist, Certified - a person that holds an arborist certification from the International Society of Arboriculture, a Registered Consulting Arborist number from the American Society of Consulting Arborists or an expert in arboriculture as determined by city staff.

Arborist Report - a written, formal report which documents the species, condition, description of work required, alternatives to the work (where applicable) and recommendations for action including, but not limited to mitigation methods, pruning, removal and planting of tree(s).

Building Footprint - the two-dimensional plan of a building's perimeter boundaries measured at grade level.

Canopy – the upper layer of vegetation formed by tree crowns.

Central Leader – the upright, main stem of a tree from which all secondary branches sprout.

Circling Roots – roots growing in a circular manner around the trunk of a tree, often crossing and constricting other roots, as well as restricting the development of the trunk of the tree.

Community Forest – the collection of trees growing in the City of Petaluma, which includes street trees, parks trees, trees along City properties and private property trees.

Compaction - compression of the soil structure within a TPZ by any means (e.g. traffic, heavy equipment, storage of construction materials, etc.) that creates an upper layer that is dense and impenetrable. Compaction injures the roots of trees and leads to poor health and decline. Symptoms of soil compaction often take 3 to 10 years to manifest themselves.

Critical root zone - a defined circular area around a tree with a radius measured to the nearest foot of the tree's longest drip line radius plus one foot.

Dead Tree - either a tree that is dead, or one that has been so irreparably damaged, or is in such an advanced state of decline that not enough live tissue exists to sustain life. Such a determination must be made by a certified arborist. Once a tree has been determined to be dead then removal is permitted.

Designated Tree -trees listed on landscape plans. Designated Trees are subject to discretionary development approval, such as a variance, home improvement exception, architectural review, site and design, subdivision, etc. Designated trees are to be indicated on approved building permits or landscape plans. All trees specifically required by the City to be saved and protected on public or private property become Protected Trees.

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

Director - duly authorized representative of the City in charge of making desicions concerning trees.

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

Dripline Area - the area represented by the actual size and shape of the tree canopy, as shown on an aerial photograph. Dripline does not represent the size or area of the root zone and is not the same as the Tree Protection Zone (TPZ), which represents the area required for preservation by fencing.

Excessive Pruning - removing in excess, one-fourth (25%) or greater of the functioning leaf, stem, or root area. Pruning more than 25 percent is injurious to the tree and is a prohibited act. Also includes removal of the leaf or stem area predominantly on one side, topping or excessive tree canopy or crown raising.

Exception: when clearance from overhead utilities or public improvements is required or to abate a hazardous condition or public nuisance.

Frontage Landscaping – an area of city-maintained landscaping that lies between a front property line and a city street.

Grove - a planting of fruit or nut trees or a small wood or group of trees without substantial underbrush, e.g., a picnic *grove*. A grove has at least 4 or more trees in a group but less than a forest area.

Heritage Tree - A heritage tree is typically a large, mature tree with unique value which is considered irreplaceable. The major criteria for heritage tree designation are age, rarity, and size, as well as aesthetic, botanical, ecological, and historical value, which may include a significant community member or event. A Heritage Tree may be 1) an Indigenous species of historic, cultural, or environmental significance to the community or 2) a commemorative planting by a group of citizens or the city in recognition of a significant community member or event.

Hand Digging - performing underground trenching without traditional trenching equipment such as backhoes, excavators, or trenchers. Alternate trenching techniques, as specified by the project arborist, might include using horizontal boring technology, high pressure air, high pressure water, and in limited locations, manual removal of soil from a trench area with a shovel.

Hardscape - the paved surfaces within the landscape like sidewalks, driveways, curb, gutter and pavement.

Hazardous condition - any tree, shrub or hedge that is or appears to be (i) dead; (ii) likely to fall; (iii) seriously diseased; (iv) an obstruction or potential obstruction to pedestrian or vehicular travel in any street; (v) an obstruction or potential obstruction to any traffic signs, traffic controls, streetlights, regulatory sign, or similar type of equipment or sign; or (vi) in a condition that is detrimental to the public health, safety, or general welfare.

Hazardous Tree - a tree that possesses a significant structural defect that poses an unacceptable risk should the tree, or any part of it, fall on a target. A structural defect is defined as any structural weakness, whether caused by disease or any other means, which results in the deformity or weakness of a tree. Such a condition can be verified by a certified arborist. The City retains the discretionary right to approve or amend a hazardous rating, in writing, and recommend any action that may reduce the condition to a less-than significant level of hazard. A tree with a structural defect may not be a hazard if a 'target' is absent within the falling distance

of the tree or its parts (e.g., a substandard tree in a non-populated area away from pedestrian pathways may not be considered a hazard).

Heritage Tree - any tree which, because of factors including but not limited to its history, girth, height, species or unique quality, has been determined by the city council to have a special significance to the community. It may be 1) indigenous species of historic, cultural or environmental significance to the community or 2) commemorative planting by a group of citizens or the city in recognition of a significant community member or event.

Imminently hazardous condition - a hazardous condition which presents an immediate threat to the health, safety or general welfare of the public which requires immediate action to abate.

Injury - a wound resulting from any activity, including but not limited to, excessive pruning, cutting, bruising, scarring, tearing, or breaking of roots, bark, trunk, branches, or foliage. It also includes damage inflicted on a tree through activities in the tree protection zone such as trenching, excavating, altering grade, paving or compaction. It also includes the application of herbicides or poisons, or any other action that ordinarily would result in damage to a tree.

Inspection Report - a written report prepared by the project arborist to document that the specified tree inspection, or any other required procedure, has been accomplished. All necessary mitigation or action items that are required based on conditions existing at the time of inspection shall be noted, as well as any violations of the Tree Preservation Policy or Tree Protection and Preservation Plan.

Inventory - a site plan that illustrates the location and driplines of all trees on a proposed project site. An inventory is a recommended submission in the pre-application stage of development.

Landmark tree - a tree specified by the city to be 1. Exceptional size/age as relates to generally accepted horticultural standards for the species. 2. Unusual or distinctive form, character, function or visual impact as related to the species and setting. 3. Association with a historically significant person, structure, or event. 4. Groves or stands of trees which collectively meet one or more of the criteria set forth in subsection B(1) through B(3) above. Citizens may have a tree designated as a Landmark Tree using the Heritage Tree application.

Line-of-Sight – a straight line in which clear visibility exists

Mulch – a protective covering placed around the base of vegetation in order to discourage weed growth and help to retain soil moisture

Native Tree - any tree which has its natural origin at the project site. Does not include trees that originate in other parts of the world that have naturalized in Petaluma. Does not include trees that are native to other parts of California that have been planted in Petaluma.

Non-native Tree - any tree which has its natural origin outside Petaluma. Includes ornamental trees, trees that have naturalized from other areas, and natives from other areas of the state.

Nursery Stake – a rigid stake affixed directly to the trunk of a sapling while at the nursery; proper planting techniques involve removing this stake in favor of properly placed planting

stakes

Park strip - shall mean that area of the street lying between the face of the curb and the sidewalk.

Planting easement - an easement in the name of the city for planting trees, shrubs or hedges contiguous to the public right-of-way for vehicular traffic.

pH - a measure of how acidic or alkaline a soil is, as described by a logarithmic progression from 0-14, with 7.0 as neutral.

Project Arborist - a certified arborist retained by the City for the purpose of overseeing on-site activity involving the welfare of the trees to be preserved. The project arborist shall be responsible for all reports, appraisals, tree preservation plans, and/or inspections as required for the duration of the project.

Protected Tree - Actual species of protected tree and sizes are specified within the City's Zoning Ordinance. Size is the trunk diameter measured at a height of 4.5 feet from the surrounding grade. Multiple trunk trees must possess at least one trunk with the stated diameter (based on species) to be considered protected.

Protective Tree Fencing - a temporary enclosure erected around a tree to be protected at the boundary of the tree protection zone. The fence serves the tree's primary functions:

- To keep the crown, branch structure and hunk clear from direct contact with, and damage by, equipment, materials, or other disturbances.
- To preserve roots and soil in a natural, intact, and non-compacted state.
- To identify the tree protection zone in which no soil disturbance is permitted and in which activities are restricted.

Prune - shall mean to remove any segment of the above or below-ground woody tissue of a tree, shrub, or hedge.

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

Regulated Tree - same as Protected Tree.

Removal - complete tree removal either by cutting to the ground, or extraction, and then grinding or pushing over the stump of the tree and disposing of the remains as directed by the Project Arborist.

Riparian Corridor – any defined stream channels including the area up to the bank full-flow line, as well as all riparian (streamside) vegetation in contiguous adjacent uplands.

Root Pruning - the deliberate and intended cutting of any root over 1 inch in diameter using a clean saw or other cutting instrument. Roots must never be torn from the ground but must always be cleanly severed when encountered.

Root Ball – the main roots of a tree and soil attached to them

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

Root Flare – the widened area at the base of the tree where the main, woody roots of the tree extend into the soil from the trunk

Significant Tree - as determined by the arborist, a significant tree can be identified by size, age, species, unusual character, historical significance, or a combination of these features. When identified by the arborist as significant, exceptional measures to preserve and protect may be required.

Site Plan - either a Pre-application Plan, Improvement Plan, or Tentative Map. The Pre-application Plan need only show the surveyed tree locations and the tree driplines (including trees located on neighboring property that overhang the project site). The Improvement Plan or Tentative Map must show the surveyed tree locations, tree protection zones (TPZ), and tree numbers that correspond to the tree information contained in the Tree Protection and Preservation Plan. Additionally, the Improvement Plan or Tentative Map shall show existing site conditions and proposed improvements.

Site Plan - a set of drawings (e.g. preliminary drawings, site plan, grading, demolition, building, utilities, landscape, irrigation, tree survey, etc.) that show existing site conditions and proposed landscape improvements, including trees to be removed, relocated or to be retained. Site plans shall include the following minimum information that may impact trees:

- Surveyed tree location, species, size, dripline area (including trees located on neighboring property that overhang the project site) and street trees within 30-feet of the project site.
- Paving, concrete, trenching or grade change located within the tree protection zone.
- Existing and proposed utility pathways.
- Surface and subsurface drainage and aeration systems to be used.
- Walls, tree wells, retaining walls and grade change barriers, both temporary and permanent.
- Landscaping, irrigation and lighting within the dripline of trees, including all lines, valves, etc.
- Location of other landscaping and significant features.
- All of the final approved site plan sheets shall reference tree protection instructions

Soil Amendment – a material added to the soil to change the chemistry or physical properties in order to improve the health of vegetation

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

improve the root growing environment.

Street - a public right-of-way owned by or under the control of the City of Petaluma whose primary function is to carry vehicular traffic and shall also include sidewalks, park strips and planting easements.

Street Tree - any publicly owned tree growing within the City's right-of-way or an area within a public easement. A permit from the City is required prior to any work on or around these trees.

Target - people, vehicles, structures, other trees, or landscape improvements subject to damage by a falling tree. A tree with a hazardous structure may not be a hazard if a 'target' is absent within the falling distance of the tree or its parts. For example, a small tree in a non-populated area, away from pedestrian pathways, might possibly not be considered a hazard.

Topping - the practice of cutting back large diameter branches to a stub or truncating the main stem.

Tree - shall mean any perennial, woody plant species or cultivar that reaches a height exceeding six feet at maturity, whether planted singly or as a hedge, and having secondary branches supported on a main stem or stems.

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

Tree Protection and Preservation Plan - a plan prepared by a certified arborist that outlines measures to protect and preserve trees on a project. This plan shall include requirements for preservation, establish a Tree Protection Zone (TPZ), specify tree protection during demolition and/or construction, and specify mitigation measures and appraisal values for each tree. This plan shall include requirements for preconstruction; treatments during demolition and/or construction; establish a tree protection zone for each tree; tree monitoring and inspection schedule; and provide for continued maintenance of those trees after construction.

Tree Protection Signage - signs measuring a minimum size of 12" x 18" designating the tree protection zone, which is a protected area. Tree protection signs must be attached to the tree protection fencing at maximum intervals of 12 feet apart on all fenced areas.

Tree Protection Zone or (TPZ) - the area of temporary fenced tree enclosure. The roots that are critical for tree survival are typically found in the upper three feet of soil and may extend beyond the dripline area. Protecting the roots in the TPZ is necessary to ensure the tree' s survival. The TPZ is a restricted activity zone where no access or soil disturbance is permitted, unless approved, in writing, and supervised by the Project Arborist. A TPZ must be identified for each tree and shown on all applicable Improvement plans. The TPZ is measured from the dripline of the furthest most tree limb plus a minimum of one inch for every inch of the diameter of the tree or a minimum of 3' beyond the dripline, whichever is greater to provide a protected zone outside the furthest dripline of the tree. (DBH - the diameter of the tree trunk at four and one-half feet

(54") above the natural grade level). The Project Arborist retains the discretionary right to decrease or increase the size of the TPZ.

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

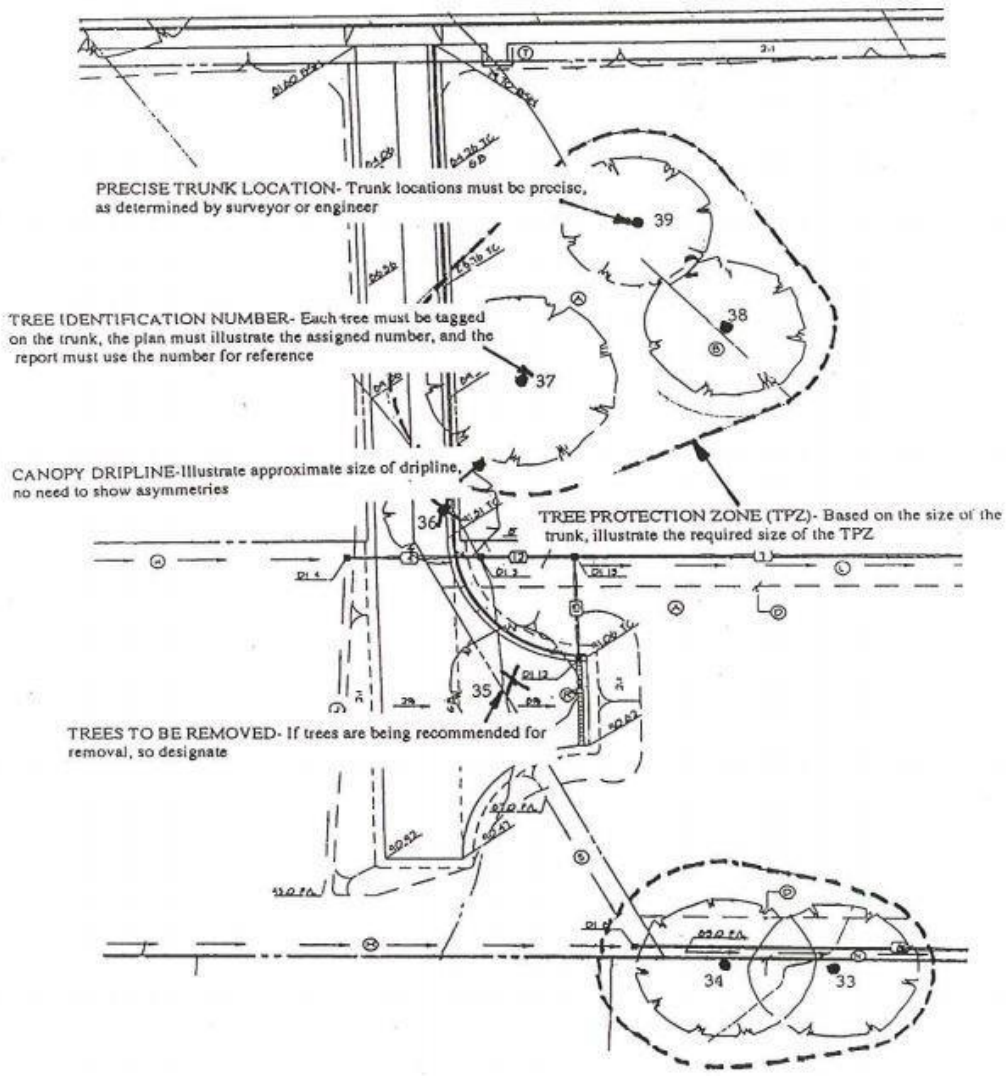
> Tree Survey Report. In the case of a discretionary development approval, a tree survey report is required to provide information about all trees on the site including: inventory of all trees, location, species, size, condition, maintenance needs, potential impacts of disturbance, recommended mitigation measures, tree appraisal value, etc.
>
> Letter Report. A 'letter report' shall provide a brief description of the tree information to determine whether or not a tree is dead, hazardous or constitutes a public nuisance.

Trenching - any excavation, whether to provide irrigation, install foundations, lay utility lines, pipe, drainage, or other property improvements below grade. Trenching within the TPZ is injurious to roots and tree health and is prohibited, unless approved in writing by the project arborist.

SECTION 10.00 STANDARDS AND DETAILS

Drawing of Homeowner Site Plan Sample
Dwg 605 - Tree Protection Recommendation (from Palo Alto Tree Technical Manual)
Dwg 604 - Tree Detail Planter Strip (from Palo Alto Tree Technical Manual)
Dwg 603A - Street Tree Planting (from Palo Alto Tree Technical Manual)
Dwg 001 - Residential Single Lot/Unit Plastic Tree Fencing During Construction Detail
Dwg 002 - Tree Protection During Construction Detail
Dwg 003 - Tree Location and Numbering Plan Sample Plan for Architects.
Dwg 004 - Multi-Lot/Unit Residential and Non-Residential Chain Link Tree Fencing During Construction Detail
ANSI Risk Evaluation Form (applicant should use ANSI A300 most current form)

PDF of this form.
Instructions on filling out the ISA form



SCALE: NTS

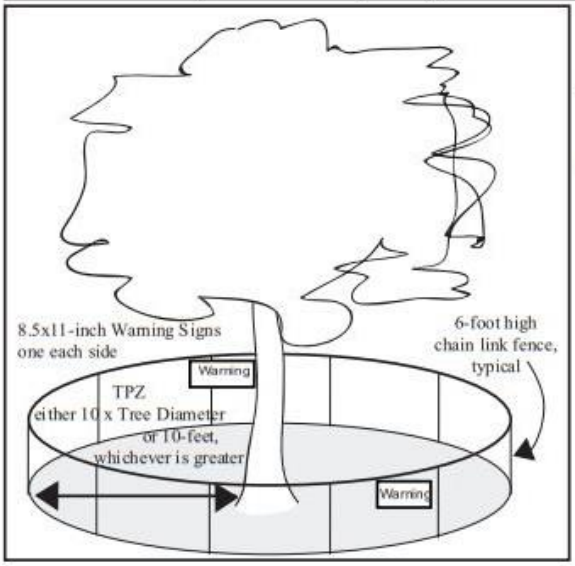
Rev	By	Date	LOCATION AND NUMBERING PLAN	Date: 07/02/01

For written specifications associated with illustrations below, see Public Works Specifications Section 31

Detailed specifications are found in the Palo Alto Tree Technical Manual (TTM) (www.cityofpaloalto.org/trees/)

Tree Protection Zone (TPZ) shown in gray (radius of TPZ equals 10-times the diameter of the tree or 10-feet, whichever is greater).

- Restricted activity area -- see Tree Technical Manual Sec 2.15(E).
- Restricted trenching area -- see Tree Technical Manual Sec 2.20(C-D), any proposed trench or form work within TPZ of a protected tree requires approval from Public Works Operations. Call 650-496-5953.

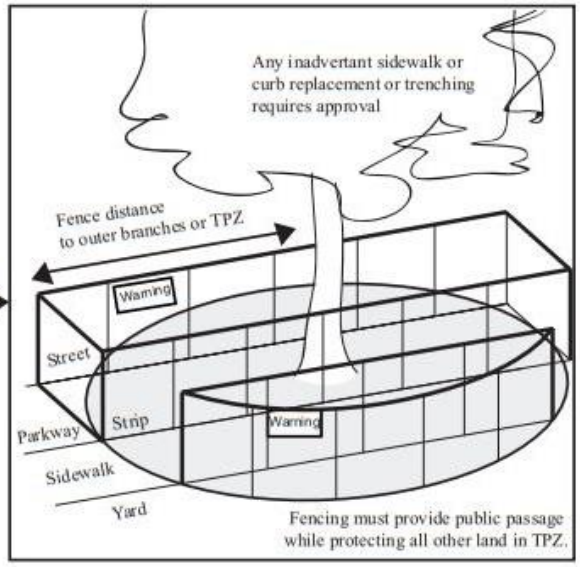


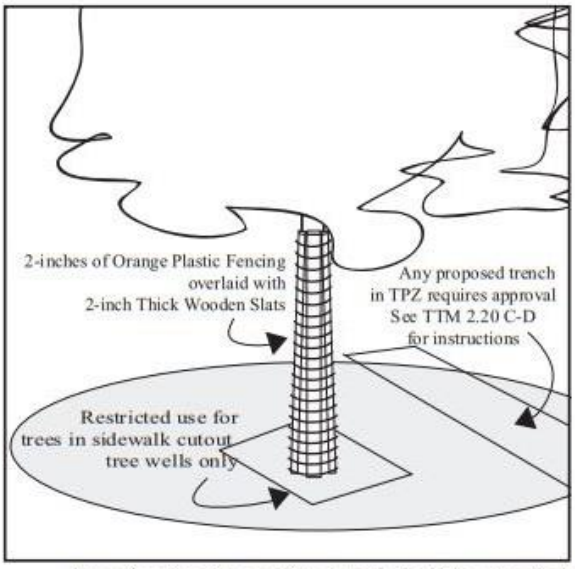
Type I Tree Protection

For all Ordinance Protected and Designated trees, as detailed in the site specific tree preservation report (TPR) prepared by the applicant's project arborist as diagramed on the plans.

Note: Ordinance Protected & Designated Trees. Issuance of a permit requires applicant's project arborist written verification Type I is installed correctly according to the plans and Tree Preservation Report

Type II Tree Protection





Note: Street Trees. Issuance of a permit requires Public Works Operations inspection and signed approval on the Street Tree Verification (STV) form provided.

Type III Tree Protection

(to be used only with approval of Public Works Operations)

Tree fencing is required and shall be erected before demolition, grading or construction begins.

Rev	By	Date
0	DWH	12/14/92
01	D.D.	08/04/04
02	D.D.	08/10/06

Scale: NTS

Tree Protection During Construction

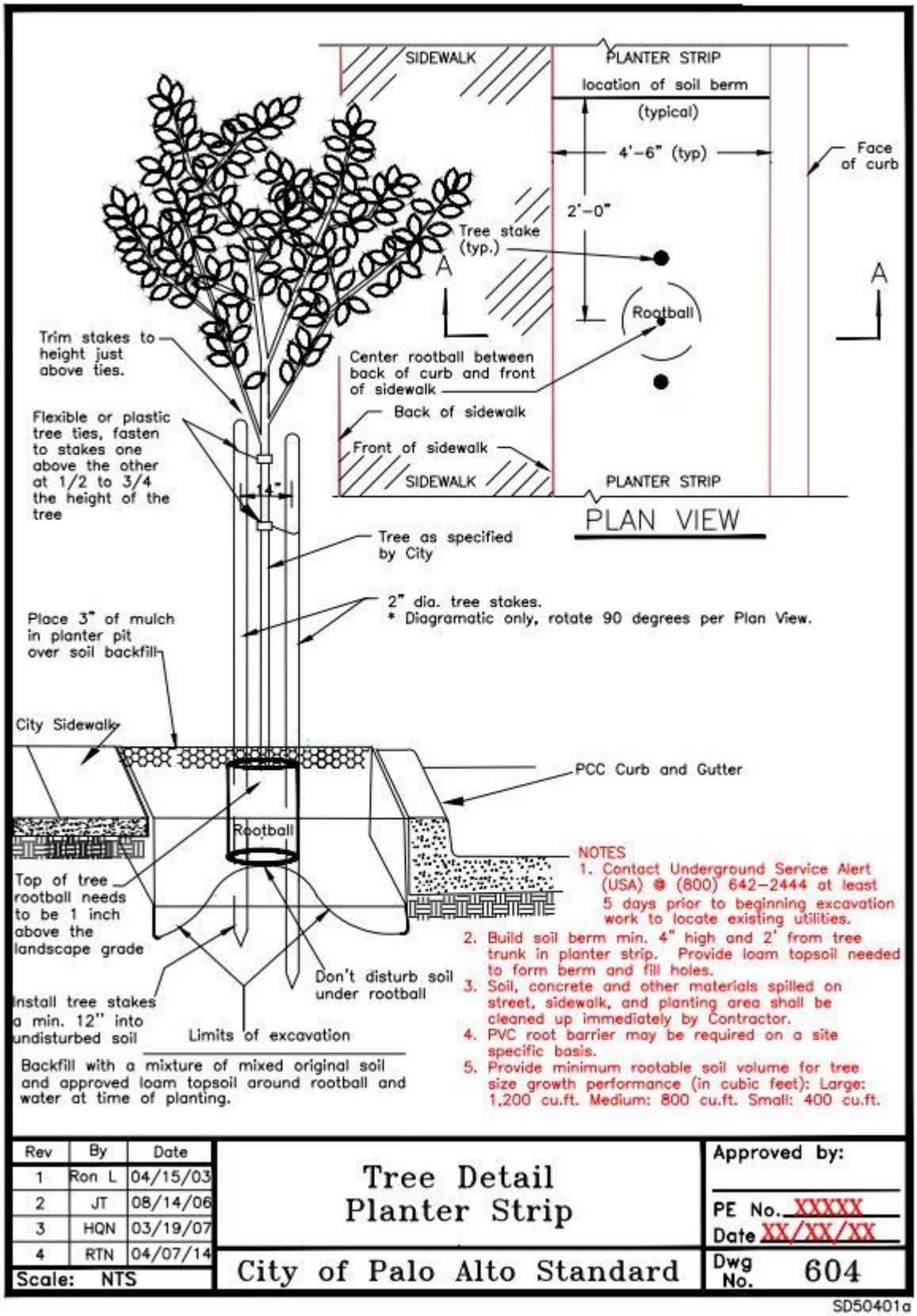
City of Palo Alto Standard

Approved by: Dave Dockter

PE No. _____

Date 2006

Dwg No. 605



NOTES

1. Contact Underground Service Alert (USA) @ (800) 642-2444 at least 5 days prior to beginning excavation work to locate existing utilities.
2. Build soil berm min. 4" high and 2' from tree trunk in planter strip. Provide loam topsoil needed to form berm and fill holes.
3. Soil, concrete and other materials spilled on street, sidewalk, and planting area shall be cleaned up immediately by Contractor.
4. PVC root barrier may be required on a site specific basis.
5. Provide minimum rootable soil volume for tree size growth performance (in cubic feet): Large: 1,200 cu.ft. Medium: 800 cu.ft. Small: 400 cu.ft.

Rev	By	Date
1	Ron L	04/15/03
2	JT	08/14/06
3	HQN	03/19/07
4	RTN	04/07/14

Scale: NTS

Tree Detail Planter Strip

City of Palo Alto Standard

Approved by:

PE No. XXXXX

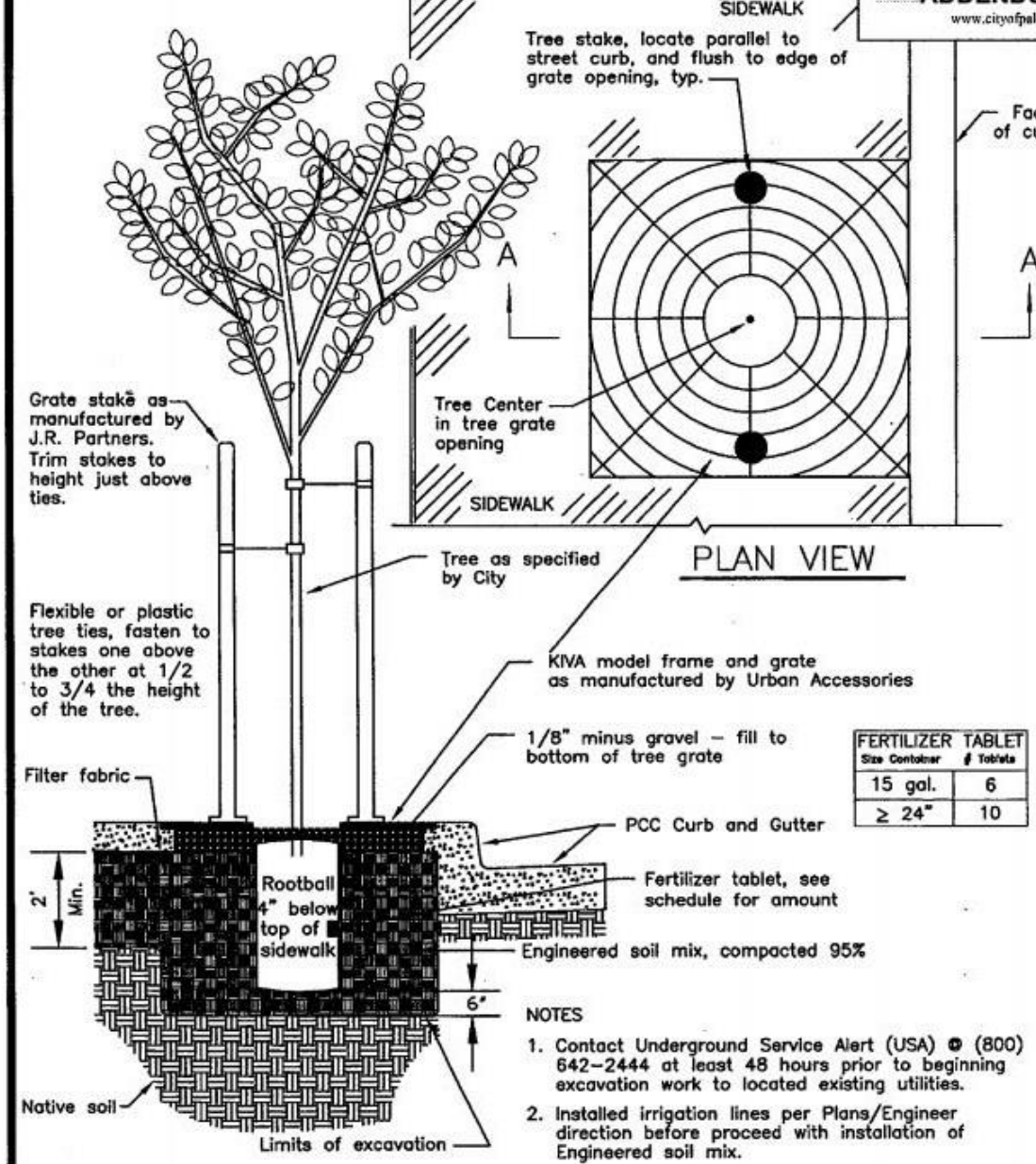
Date XX/XX/XX

Dwg No. 604

SD50401a

ADDENDUM 6
www.cityofpaloalto.org

PLAN VIEW



FERTILIZER TABLET	
Size Container	# Tablets
15 gal.	6
≥ 24"	10

SECTION A–A

NOTES

1. Contact Underground Service Alert (USA) @ (800) 642–2444 at least 48 hours prior to beginning excavation work to located existing utilities.
2. Installed irrigation lines per Plans/Engineer direction before proceed with installation of Engineered soil mix.
3. If tree planting is delayed after tree wells are constructed, holes shall be filled and barricades secured to grates.

Rev	By	Date
0	HQN	4/4/07
Scale: NTS		

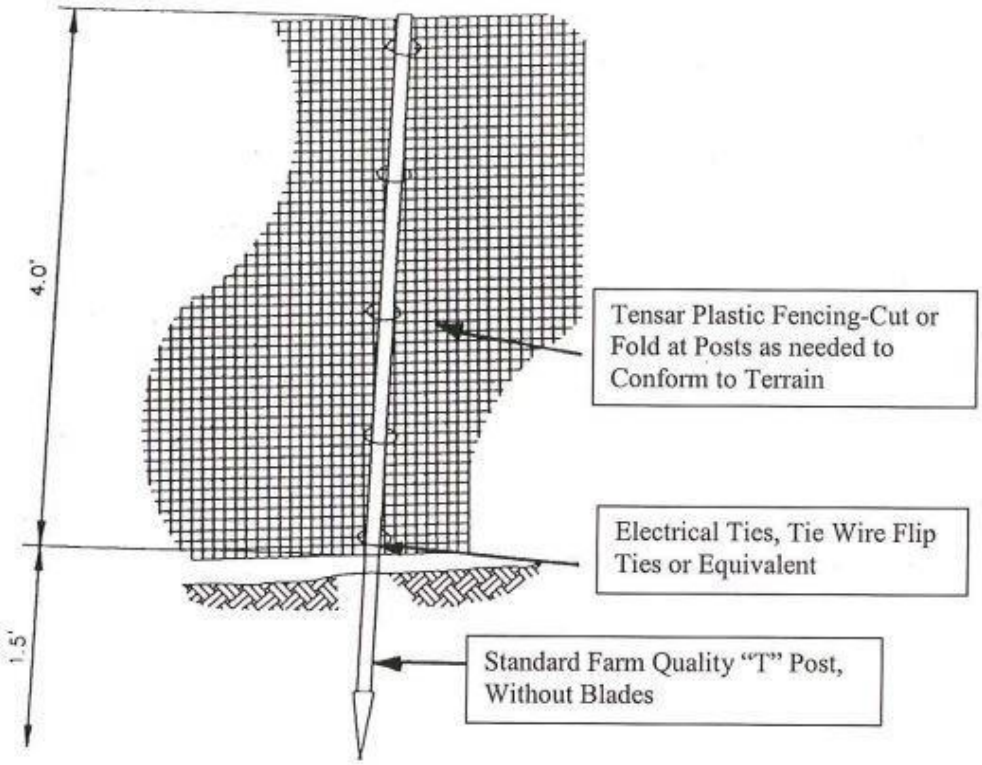
Street Tree Planting with Engineered Soil Mix

City of Palo Alto Standard

Approved by: Dave Dockter
PE No. ISA-0351
Date May 2, 2007
Dwg No. 603A

ADDENDUM 6
www.cityofpaloalto.org

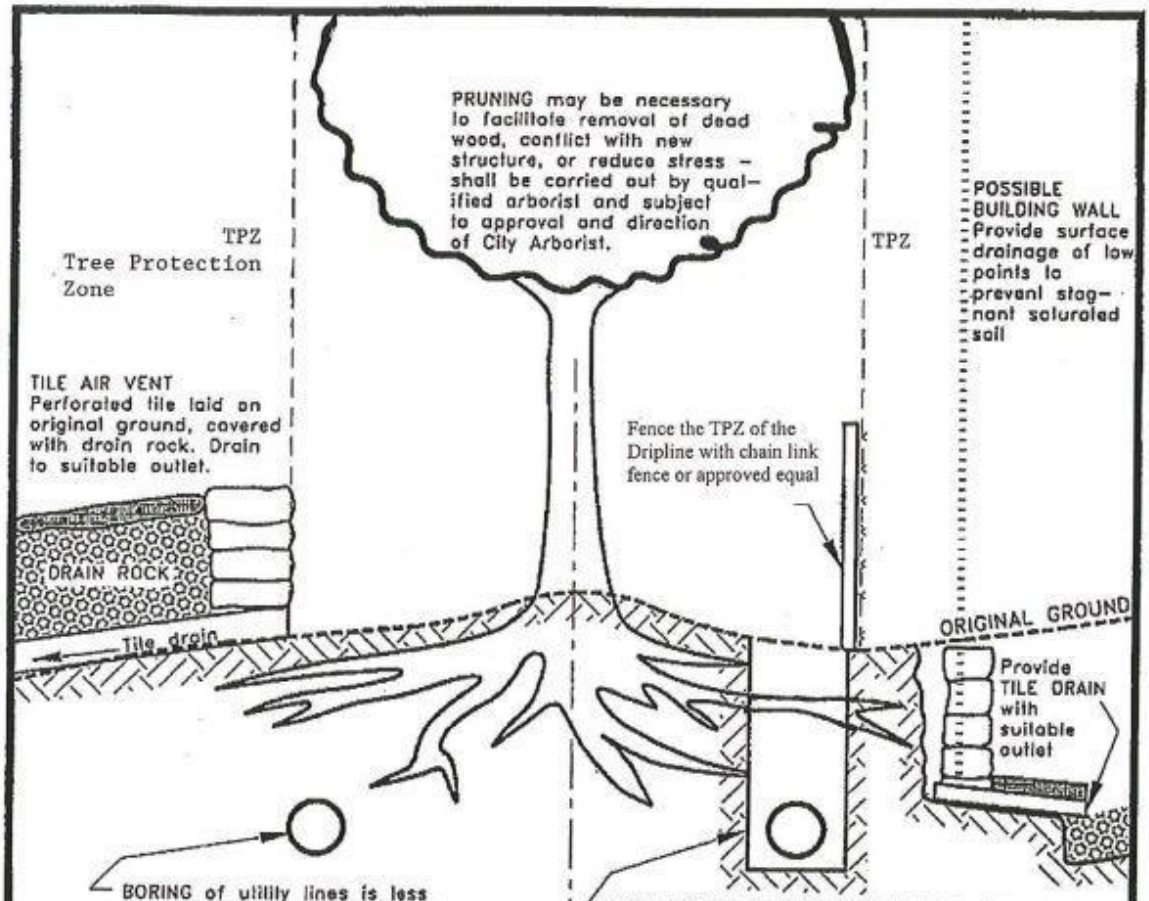
SD603



Tree protection fencing shall be a minimum of 4' in height at all locations, and shall form a continuous barrier without entry points around all individual trees, or groups of trees. Fencing shall serve as a barrier to prevent encroachment of any type of construction activities, equipment, materials storage, or personnel.

Scale: NTS

Rev	By	Date		
			RESIDENTIAL SINGLE LOT/UNIT PLASTIC TREE FENCING DURING CONSTRUCTION	**Date** 07/23/03
			TOWN OF WINDSOR STANDARD	**DWG NO. 001**



Rev	By	Date

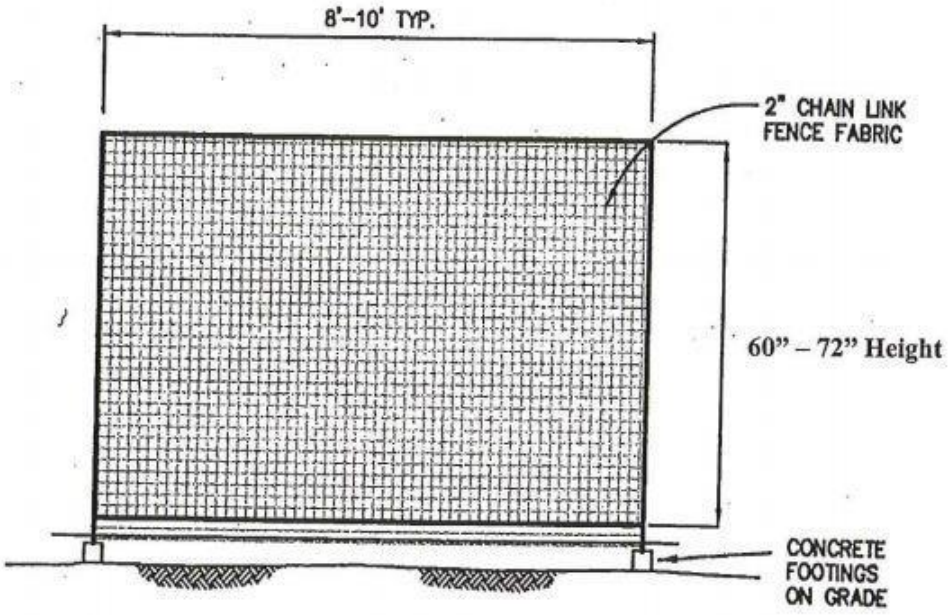
Scale: NTS

Tree Protection During Construction

TOWN OF WINDSOR STANDARD

Date 08/26/03

Dwg No. 002



INSTALL PORTABLE CHAIN LINK FENCE PANELS AS TEMP. TREE PROTECTION FENCING AT LOCATIONS SHOWN ON PLANS

TEMPORARY TREE PROTECTION FENCE

NOT TO SCALE

Rev	By	Date		
			MULTI-LOT/UNIT RESIDENTIAL AND NON-RESIDENTIAL CHAIN LINK TREE FENCING DURING CONSTRUCTION	Date 08/26/03
			TOWN OF WINDSOR STANDARD	DWG NO. 004

ISA Basic Tree Risk Assessment Form

Client _____ Date _____ Time _____

Address / Tree location _____ Tree no. _____ Sheet _____ of _____

Tree species _____ dbh _____ Height _____ Crown spread dia. _____

Assessor(s) _____ Tools used _____ Time frame _____

Target Assessment

Target number	Target description	Target protection	Target zone: Target within drip line	Target zone: Target within 1 x Ht.	Target zone: Target within 1.5 x Ht.	Occupancy rate (1 – rare, 2 – occasional, 3 – frequent, 4 – constant)	Practical to move target?	Restriction practical?
1								
2								
3								
4								

Site Factors

History of failures _____ **Topography** Flat ☐ Slope ☐ _____% **Aspect** _____

Site changes None ☐ Grade change ☐ Site clearing ☐ Changed soil hydrology ☐ Root cuts ☐ Describe _____

Soil conditions Limited volume ☐ Saturated ☐ Shallow ☐ Compacted ☐ Pavement over roots ☐ _____% Describe _____

Prevailing wind direction _____ **Common weather** Strong winds ☐ Ice ☐ Snow ☐ Heavy rain ☐ Describe _____

Tree Health and Species Profile

Vigor Low ☐ Normal ☐ High ☐ **Foliage** None (seasonal) ☐ None (dead) ☐ Normal _____% Chlorotic _____% Necrotic _____%

Pests / Biotic _____ **Abiotic** _____

Species failure profile Branches ☐ Trunk ☐ Roots ☐ Describe _____

Load Factors

Wind exposure Protected ☐ Partial ☐ Full ☐ Wind funneling ☐ _____ **Relative crown size** Small ☐ Medium ☐ Large ☐

Crown density Sparse ☐ Normal ☐ Dense ☐ **Interior branches** Few ☐ Normal ☐ Dense ☐ **Vines/Mistletoe/Moss** ☐ _____

Recent or expected change in load factors _____

Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —

Unbalanced crown ☐ LCR _____%

Dead twigs/branches ☐ _____% overall Max. dia. _____

Broken/Hangers Number _____ Max. dia. _____

Over-extended branches ☐

Pruning history

Crown cleaned ☐ Thinned ☐ Raised ☐

Reduced ☐ Topped ☐ Lion-tailed ☐

Flush cuts ☐ Other _____

Cracks ☐ _____ Lightning damage ☐

Codominant ☐ _____ Included bark ☐

Weak attachments ☐ _____ Cavity/Nest hole ____% circ.

Previous branch failures ☐ _____ Similar branches present ☐

Dead/Missing bark ☐ Cankers/Galls/Burls ☐ Sapwood damage/decay ☐

Conks ☐ Heartwood decay ☐ _____

Response growth _____

_____ Condition(s) of concern _____

Part Size _____ Fall Distance _____

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

Part Size _____ Fall Distance _____

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

— Trunk —

Dead/Missing bark ☐ Abnormal bark texture/color ☐

Codominant stems ☐ Included bark ☐ Cracks ☐

Sapwood damage/decay ☐ Cankers/Galls/Burls ☐ Sap ooze ☐

Lightning damage ☐ Heartwood decay ☐ Conks/Mushrooms ☐

Cavity/Nest hole _____% circ. Depth _____ Poor taper ☐

Lean _____° Corrected? _____

Response growth _____

Condition(s) of concern _____

Part Size _____ Fall Distance _____

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

— Roots and Root Collar —

Collar buried/Not visible ☐ Depth _____ Stem girdling ☐

Dead ☐ Decay ☐ Conks/Mushrooms ☐

Ooze ☐ Cavity ☐ _____% circ.

Cracks ☐ Cut/Damaged roots ☐ Distance from trunk _____

Root plate lifting ☐ Soil weakness ☐

Response growth _____

Condition(s) of concern _____

Part Size _____ Fall Distance _____

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

[PDF of this ISA form](#).

See [Instructions on filling out the ISA form](#)

Risk Categorization

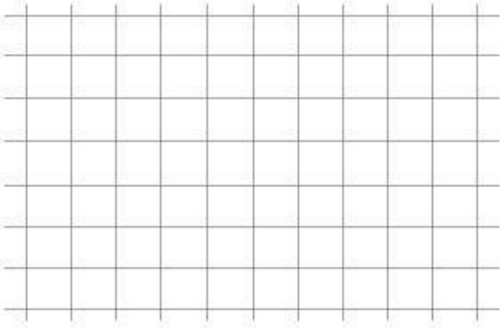
Target (Target number or description)	Tree part	Condition(s) of concern	Likelihood: Failure: Improbable	Failure: Possible	Failure: Probable	Failure: Imminent	Impact: Very low	Impact: Low	Impact: Medium	Impact: High	Failure & Impact (from Matrix 1): Unlikely	Somewhat	Likely	Very likely	Consequences: Negligible	Minor	Significant	Severe	Risk rating (from Matrix 2)

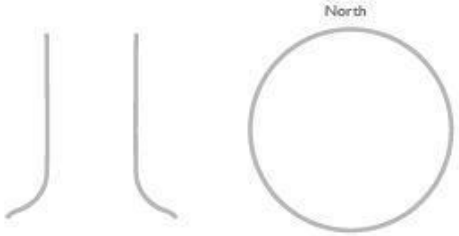
Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low





Notes, explanations, descriptions

_____

_____

_____

_____

_____

Mitigation options

1. _____ **Residual risk** _____
2. _____ **Residual risk** _____
3. _____ **Residual risk** _____
4. _____ **Residual risk** _____

Overall tree risk rating Low ☐ Moderate ☐ High ☐ Extreme ☐

Overall residual risk None ☐ Low ☐ Moderate ☐ High ☐ Extreme ☐ **Recommended inspection interval** _____

Data ☐Final ☐Preliminary **Advanced assessment needed** ☐No ☐Yes-Type/Reason _____

Inspection limitations ☐None ☐Visibility ☐Access ☐Vines ☐Root collar buried **Describe** _____

SECTION 10.10 APPENDICES

Appendix A: Downtown Streetscape Policy
Appendix B: Trees for Downtown Petaluma
Appendix C: PGE Small Tree Recommendations for Under Power Lines
Appendix D: Landscape Design Standards
Appendix E: Street Tree Planting Guidelines - Street Tree Setbacks and Offsets
Appendix F: ANSI Reference and Link

Appendix A

DOWNTOWN STREETSCAPE POLICY

Tree species that may do well as recommended as street trees may not be suitable in the hardscape urban zone due to the amount and type of litter they produce, higher need for care and maintenance, poor growth in restricted root space, and potential interference with the hardscape and utilities. These species are not recommended as street in the downtown business area: American Sweet Gum: *Liquidambar styraciflua*, Idaho Locust: *Robina ambigua 'ldahoensis'*, Tulip Tree: *Liriodendron tulipifera*, Raywood Ash: *Fraxinus oxycarpa 'Raywood*'. Also, Thick heavy evergreen trees such as Ficus are not recommended.

Trees in the Downtown should offer a rich canopy that covers the majority of the sidewalk and extends into the street. Trees should offer shade on the sidewalk, but it should not be so thick as to prevent filtered sunshine. Trees should offer a measure of heat moderation in the summertime and may lose their leaves in the winter to allow the sun to pass through to the street level.

Whenever possible street tree gaps in the Downtown should be filled using the tree species pattern already established for the street, in situations where the dominant and/or preselected tree is no longer allowed, a tree of similar leaf type, height, spread, and color should be used as the infill tree.

Use the following guidelines for new tree selection in the Downtown/Business area to ensure both survival and appropriateness.

Local Examples/Performance: Potential trees must have a proven track record in the local climate and environment as successful street trees. As the urban environment for street trees is much more difficult than in other growing condi-tions, trees must be successfully grown in an urban environment for 5-6 years. Trees that have been proven in similar climates but not specifically in the southern Bay Area are not acceptable.

Disease Resistance: Trees must have a proven record of disease prevention in difficult urban conditions. Watering: In most cases, selected species do not require special watering after establishment. After a period of establishment (5 years) trees will not be regularly watered in the Downtown unless watered by an automatic irrigation system. In new developments all new trees are to be watered using an automatic irrigation system. All irrigation backflow devices and controller assemblies are to be within the Building and maintained by the property owner.

Canopy/Size: Trees should have an average height in urban conditions at maturity of at least 25 feet with a spread of at least 10 feet. Tree species are not naturally low branching and are able to conform to vertical clearance guidelines listed below without excessive pruning.

Color: In Downtown, as part of the sidewalk, street trees should be light to mid-green in color. Trees with heavy dark green leaves, purple or other colored leaves are generally discouraged as they provide too much shade and darken the street corridor. Purple/red-leafed trees are allowed

in adjacent plazas or parks.

Leaf and Seed/Flower: A variety of leaf shapes are selected, though excessively large-leafed tree species such as Catalpa are prohibited. Trees that drop excessive amounts of seed or flower debris are also prohibited.

Roots: Trees must not be prone to the uplifting of sidewalks due to shallow rooting.

Shape and Form: Spreading, vase-shaped or pyramidal canopied trees are encouraged. Columnar trees are discouraged unless the unique conditions of the street dictate a tree with a narrow canopy.

Evergreen/Deciduous: Generally deciduous trees are selected in the Downtown for their less dense canopy, the possibility of fall color and the addi-tional light available at the ground level after they shed their leaves in the fall. Evergreen trees that have a naturally light canopy are allowed.

MINIMUM PLANTING DIMENSIONS

An adequate planting area is crucial for the health and long-term success of a street tree. All new streets must meet the minimum-planting dimensions to ensure the feasibility and health of street trees. A 5'x5'or 4'x6' planting pit is required for all new street tree installations. All tree planting areas require structural soils and may require soil to be amended depending on existing soil conditions. In some infill/retrofit instances where the sidewalk width will be less than 10', alternative planting solutions may be considered. These may include planting trenches using structural soil, pervious concrete pan lids and other options approved by the RDA Landscape Design Staff on a case-by case basis. All construction activity around trees is to be reviewed and approved by an arborist or architect prior to commencement of work.

The removal of existing street trees to make way for building signs or other streetscape elements is strongly prohibited. Efforts must be made to locate new driveways between existing trees whenever possible. When no feasible alternative exists, an application to remove a tree for a driveway can be considered by the City. Wherever possible new development should be planned to fit around the existing street trees, and variances to the Guidelines contained herein should be applied for from the Department of Public Works. To request removal of a tree, obtain a permit. In situations where a single tree must be removed, a replacement tree should be planted adjacent provided it meets all applicable 'Clear Zones' guidelines. In no instance may two or more trees be removed from the streetscape without their replacement in a manner consistent with the existing species pattern size and spacing of trees on the street.

VERTICAL CLEARANCE

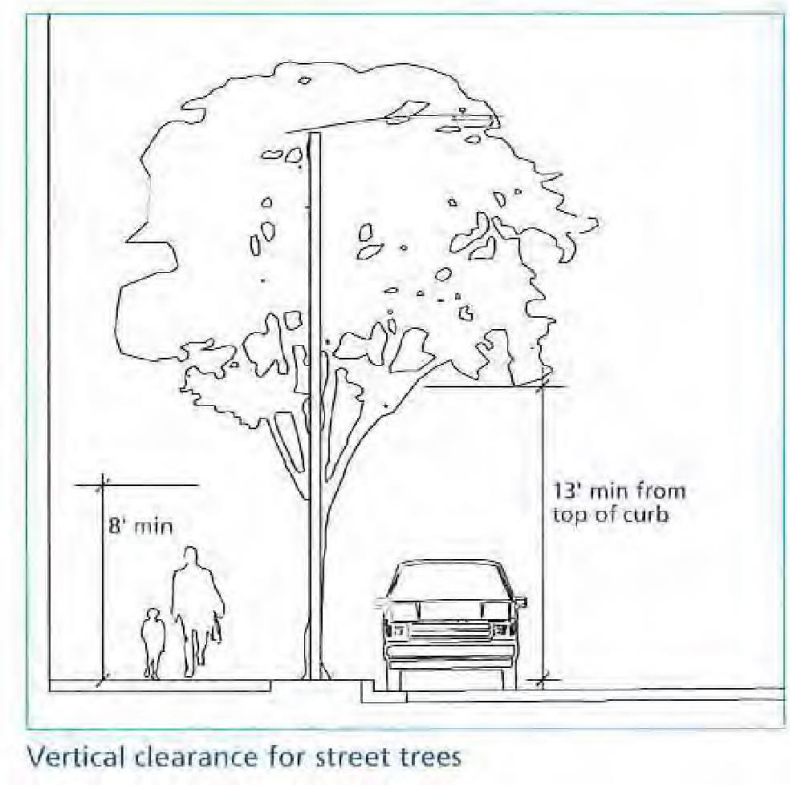
An adequate vertical clearance along the sidewalk provides a clear view for pedestrians ensuring a higher degree of safety and a better opportunity to observe retail signs and entrances. Vertical clearance along the street is absolutely necessary to avoid trucks and buses from hitting and damaging street trees.

The following guidelines outline the minimum dimensions for vertical clearance in the

Downtown area and trees should be pruned as necessary to maintain proper clearance after an establishment period of 2-5 years.

Along the Sidewalk: Minimum height at edge of tree well/tree grate: 8'

Along the Street: Minimum height at curb, from top of curb: 13'



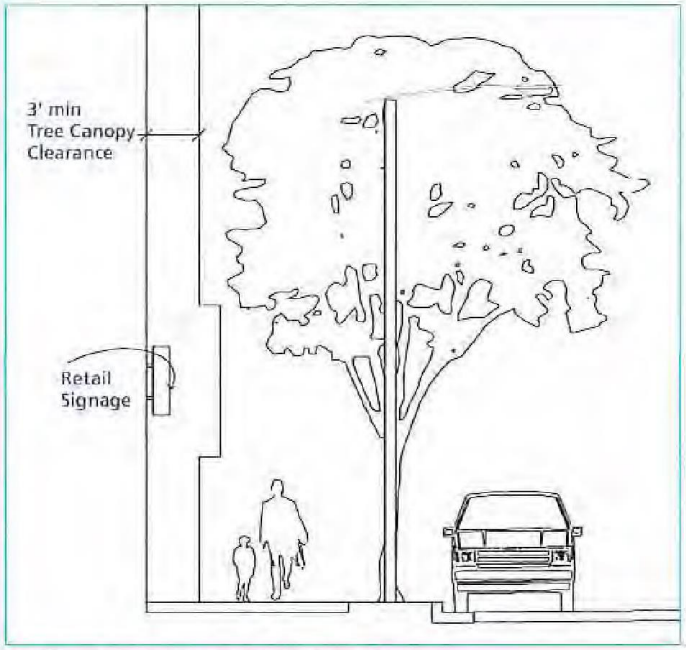
Vertical clearance for street trees

HORIZONTAL CLEARANCE

Planning, planting and pruning for an adequate horizontal clearance along buildings and signs will result in a tree canopy that is even on both the sidewalk and the street and does not result in a tree looking crowded against the building edge.

Recognizing the importance of theaters and theater marquee signs downtown. exceptions to interrupt the street tree rhythm are permitted.

The following guidelines outline the minimum distances for horizontal clearance to the building edge and trees should be pruned as necessary to maintain clearance at maturity: 5 years.



Horizontal clearance for street trees

CLEAR ZONES

While trees are allowed to be planted anywhere outside of the Corner Clear Zone, the following distances represent the minimum distance a tree must be planted from existing or concurrently planned streetscape infrastructure. In some instances where infrastructure or trees already exist, these guidelines may be adjusted or altered subject to the approval of the Department of Public Works.

Overhead/cobrahead style street lights and overhead signal devices: 20'

Single or double-headed acorn style street lights: 20'

Pedestrian sidewalk lighting: 10'

Residential driveways: 5'

Commercial driveways: 10'

Sewer lines: 10'

Stop signs: 20'

Other Streetscape furniture/elements: edge of tree well, one-side only. Other side: 3'

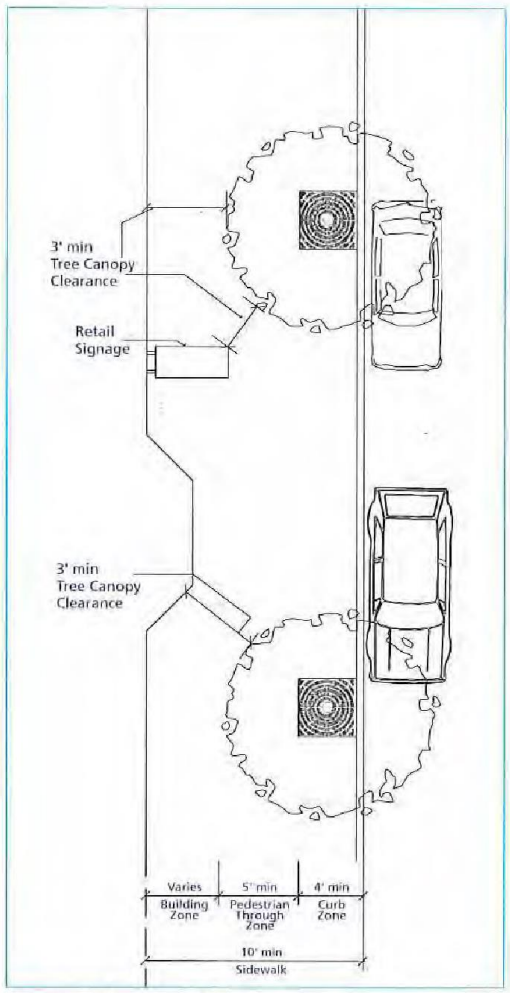
Underground utilities: 5'

Utility cabinets: 5'

Fire hydrants: 5'

Bike racks: 2'

Corners: 40'



Horizontal clearance of tree canopy

These guidelines do not apply on the Transit Malls which are subject to specific transit Mall Guidelines developed by the Petaluma Transit and SMART.

TREE GRATES

To increase the walkable area of the sidewalk as well as to protect street trees, tree grates are recommended for all street trees on Urban Structure and Downtown Pedestrian Network streets.

Placement Guidelines

- A standard 5'x5' tree grate is required unless another grate has been approved for use along Urban Structure Streets, or in the case of a special situation as outlined below.

  Grates must be bolted at each corner using hex bolts and tree gates must be bolted to tree guards if used.

- Streets with planting strips do not require tree grates.

- Streets with sidewalks greater than 15' may use other treatments as part of an overall street-specific design for the entire street length with the approval of RDA Landscape Design Staff.

- The use of tree-pan lids is discouraged, though may be used at the discretion of Public Utilities Staff in special instances, such as cases of narrow sidewalks.

- Tree grates need to be inspected regularly and enlarged as necessary to accommodate tree growth. (Per City Ordinance, property owners are responsible).

- For new development or significant rehabilitation, non-conforming grates are to be replaced to meet accessibility standards.

The approved Petaluma tree grate, Boulevard Collection Model R8713 with the approved Model "C" tree guard both from Neenah Foundry

TREE STAKING AND GUYING

Street tree staking or guying is necessary to promote straight growth and to help prevent damage from wind and vandalism. All new street trees must be staked or tied to tree guards at the time of planting to minimize the potential for damage. Trees should be staked/guyed for a minimum of 1 year. Additionally staking/guying may be required as determined by an authorized arborist. In these situations, the need for staking/guying should be reviewed every six months.

Appendix B

Trees For Downtown Petaluma Area

*CA Native

Scientific Name	**Common Name**
Acer campestre 'Queen Elizabeth'	Hedge Maple
Arbutus x marina	Strawberry Tree
Arbutus unedo (single trunk)	Dwarf Strawberry Tree
*Celtis reticulata**	Western Hackberry
*Cephalanthus occidentalis**	California Buttonbush
Cercis canadensis	Eastern Redbud 'Forest Pansy'
*Cercis occidentalis (single trunk)**	Western Redbud
Cornus 'Eddie's White Wonder'	Dogwood
Ginko bilboa 'Autumn Gold' 'Princeton Sentry'	Maidenhair Tree
Koelreuteria bipinnata	Chinese Flame Tree
Lagerstroemia x 'Natchez'	Crepe Myrtle
Lagerstroemia indica	Crepe Myrtle
Magnolia grandiflora 'Little Gem'	Little Gem Magnolia
Magnolia grandiflora 'St. Mary'	Southern Magnolia
Magnolia grandiflora 'Samuel Sommers', 'Majestic Beauty'	Southern Magnolia
*Myrica californica**	Pacific Wax Myrtle
Pistacia chinensis	Chinese Pistache
*Platanus racemosa 'Roberts'**	California Sycamore 'Roberts'
Prunus cerasifera 'Krauter Vesuvius'	Purple Leaf Plum

*Prunus ilicifolia**	Holly-leafed Cherry
Prunus serrulata 'Kwanzan'	Kwanzan Cherry
Prunus subhirtella 'Autumnalis'	Higan Cherry
Prunus yedoensis 'Akebono'	Akebono Cherry
Tristania conferta	Brisbane Box
Tristaniopsis laurina	Laurel Leaf Box
Ulmus parvifolia x carpinifolia 'Frontier'	Frontier Elm

Appendix C

Page A

Small Trees < 25 ft. tall — Recommended by PGE for California for under power lines.

Common Name	Scientific Name	Tree Type	Climate Zones	Average Mature Height	Average Mature Spread
Crepe Myrtle	Lagerstroemia indica Lagerstroemia hybrids	Deciduous	7-10; 12-14; 19-21	25 ft.	20-30 ft.
Hawthorn, Washington**	Crataegus phaenopyrum	Deciduous	1-12;14-17	25 ft.	25 ft.
Magnolia, Saucer	Magnolia soulangeana	Deciduous	1-10;12-24	25 ft.	25 ft.
Manzanita**	Arctostaphylos	Evergreen	4-9; 14-24	17 ft.	6-10 ft.
Maple, Japanese	Acer palmatum	Deciduous	1-10; 12; 14-24	25 ft.	24 ft.
Pear, 'Fauer' Callery	Pyrus calleryana var. ' fauriei'	Deciduous	2-9; 14-21	20 ft.	15-20 ft.
Redbud, Western**	Cercis occidentalis	Deciduous	2-14	25 ft.	20 ft.
Smoke Tree, American	Cotinus obovatus	Deciduous	12-24	25 ft.	20 ft.

**California
Native Species

Appendix C

Page B

Common Name	Growth /Yr	Soil Preference	Shade Capacity	Comments
Cockspur Coral Tree	24 inches	Moist to Dry	Moderate	Stunning red flowers in spring. Attracts hummingbirds. Interesting, rough bark texture. Good for streets and gardens.
Crepe Myrtle	24 inches	Moist to Dry	Moderately Dense	Many varieties and flowers colors. Long blooming period. Attractive fall color. Good for narrow lawns. Drought tolerant.
Hawthorn, Washington**	24 inches	Moist to Dry	Moderate	Profuse white flowers in spring. Fruit attracts wildlife. Makes a good screen or street tree.
Holly, Yaupon	24 inches	Moist	Dense	Tiny white flowers attract bees. Berries attract wildlife. Good as a hedge or screen.
Magnolia, Saucer	24 inches	Moist	Dense	Profuse, large pink and white flowers. Attracts birds. Best used as a specimen.
Manzanita**	12-24 inches	Moist to Dry	Moderate	Clusters of drooping, bell-shaped flowers attract butterflies and hummingbirds. Berries attract wildlife. Colorful bark. California native.
Maple, Japanese	12-24 inches	Moist: Well Drained	Low to Moderately Dense	Brilliant fall color. Good as a single specimen or accent tree.

Pear, 'Fauer' Callery	12-24 inches	Moist	Dense	Lovely white spring blossoms. Fruit attracts birds and wildlife. Brilliant fall color. Good street or shade tree. Plant ' Fauer·variety near power lines.
Redbud, Western**	24-36 inches	Moist to Dry	Moderate	Showy spring flowers. Attracts hummingbirds. Good screen or specimen. California native.
Smoke Tree, American	12-24 inches	Well Drained	Dense to Very Dense	Good small shade tree with brilliant fall color. Flowers create a smoke-like effect.

**California
Native Species

Appendix D

LANDSCAPE DESIGN STANDARDS

Landscape Design Standards

The following standards were derived to provide minimum design criteria for the installation of landscaping and irrigation systems in all commercial, industrial, residential and multi-family residential developments.

1. Plants should be of the type which are proven successful in Petaluma's climate and soils.
2. Only landscaping will be permitted in yard areas, with the exception of driveways, sidewalks or other improvements approved by the Site Plan and Architectural Review Committee.
3. All unusable areas in and around parking lots shall be landscaped where practical.
4. Landscaped areas shall be encouraged between asphalt areas and all building structures, fences and property lines. Hardscape may be used where pedestrian access is necessary as determined by the Site Plan and Architectural Review Committee.
5. Landscaping should be concentrated in highly visible locations where it will have the greatest visual impact. Specifically, areas around building entrances and site perimeters should be given extra consideration. Landscaping in parking lots should

introduce bio-swale features into most areas not specifically required for driveways or parking spaces.

6. Attractive natural features of existing sites, including existing trees, shall be preserved whenever possible. Trees which must be removed should be documented by a certified arborist and an ASA value should be assigned. Such documentation should be reviewed and evaluated by the City Arborist. The mitigation shall be determined by the Director of Community Development or the Planning Commission (see Implementing Zoning Ordinance Chapter 17.060 and 17.065).
7. Parcels located along all arterial roads or highway entrances to the City (such as Petaluma Blvd., Lakeville Street, Washington Street, East Washington Street and U.S. 101, etc.) shall be designed with greater than average quality landscaping to visually accommodate the high volume of passing motorists.
8. Electrical transformer boxes and garbage enclosures should be screened with attractive fencing or walls constructed of materials consistent with those used on the primary structure(s).
9. Loading areas, vehicles, parking lots, meters, outdoor storage, etc., should be adequately screened whenever possible.
10. The improvement and dedication of island landscape areas within the public right-of-way in newly developing areas should be encouraged.
11. Plant type should be adaptable to the size and location of the space it is to occupy.
12. Use of recycled landscape materials shall be encouraged.
13. Alternative materials may be substituted for ground cover plantings. Where wood chips are used as part of the landscaping material, it should not be used where it will cause increased public maintenance problems. Appropriate planting material may also be required in addition to ground cover.
14. Trees planted under power or telephone lines shall be of a species which will not conflict with the overhead lines.
15. Motorist and pedestrian views of long expansive building walls, fencing or paving should be visually broken up with intermittently spaced and large groupings of trees, and additional plantings may be required.
16. The variety of landscape materials should be consistent with the building architecture and street tree master plan and with that found in the surrounding areas. For example, desert or tropical plants would contrast with the downtown iron front buildings.
17. The design and materials used for fencing, street furniture, outdoor lighting and paving should be consistent with the architectural style of the building and the neighborhood.
18. Where appropriate, the areas between street curbs and sidewalks should be improved with street trees, shrubs, ground cover, brick, cobblestone or other decorative materials and shall be maintained by the property owner.
19. Landscape material planted on dedicated City property shall be of a drought resistant, low maintenance variety. Native or adaptive drought resistant plants are also encouraged in all private developments.
20. Unless an extraordinary number of trees are to be planted (i.e., campground), all trees shall have a trunk diameter of at least three-quarter (3/4) inch as measured one foot above the ground, (fifteen gallon minimum size container). All trees shall be double staked in accordance with approved City standards. Street trees shall conform to the

City Street Tree Ordinance. For growing purposes, street trees should be planted in the ground instead of in confined pots or planters. Any tree not on the approved street tree list may be approved for such use if approved by the Public Works Director after review by the appropriate departments and commissions. Application for use of a tree type shown on the approved list must be made on a form provided by the Park and Recreation Department with the applicant to provide all necessary information for appropriate review.

21. All shrubs not used as ground cover shall be at least five (5) gallons in size.
22. Ground cover shall be spaced to allow for complete infill within one (1) year of the date of planting (for example, ivy hypericum, wild strawberry, etc., should be spaced on twelve-inch centers). Loose stones and gravel should not be placed adjacent to streets, driveways, parking spaces or sidewalks.
23. The City reserves the right to inspect and reject any landscape material not in accordance with the approved plan, or if diseased.
24. Approved irrigation systems should be provided for all landscaping areas in accordance with the City's Water Efficiency Standards.
25. All landscaping shall be maintained in healthy growing condition by the permit holder for a period of 90 days after receiving an occupancy permit.
26. All planting shall be maintained in good growing condition. Such maintenance shall include, where appropriate, pruning, mowing, weeding, cleaning, fertilizing, and regular watering. Whenever necessary, planting shall be replaced with other plant materials to ensure continued compliance with applicable landscaping requirements (Implementing Zoning Ordinance Chapter 14.030).
27. Adequate soil preparation in accordance with accepted landscape industry practices should be a requirement for all landscape areas. Particular attention should be given to slopes or berm areas with a 5% slope or greater to prevent the loss of plant materials or slope erosion during the watering cycle or wet weather. Refer to the City's Water Resources and Conservation Department for additional conservation techniques which include but are not limited to:
    A. Use of jute or other biodegradable mesh to hold the plant material in place.
    B. Use of hydro-mulch which provides slope stabilization and adequate nutrients until the plant material has established itself.
28. Landscaping shall not be located where it will block visibility and create traffic hazards or sight distance problems (Implementing Zoning Ordinance Chapter 14.030).
29. Landscaping should be used in conjunction with required fencing as a buffer between land uses where possible.
30. Tree plantings should encourage summer shade on walls, windows, roofs, parking spaces and drives, and walks to help improve energy efficiency and reduce temperatures.
31. Each project shall provide at least one on-site tree for each 500 square feet of open space and at least one tree for each 4 off-street uncovered parking stalls. Those trees required, due to the amount of open space, shall be planted in the remainder of the site. Open space, for this purpose, has been determined to include all open space areas existing on-site, but excludes parking or drive aisles.
32. Maintenance necessary for various types of plants will be considered in determining the appropriateness of landscaping.

33. Plants which drop seed pods or fruit should not be located where such droppings would cause maintenance or safety problems.
34. Landscaping shall be used to screen parking areas where possible.

Appendix E

Street Tree Planting Guidelines

A. *Planting patterns.* Street trees shall be planted per Section 5.10.060 (Public Frontages).

B. *Planting details.* Street trees shall be planted per City of Petaluma Street Tree Planting Detail, page 101, with the addition of structural soil (see below). Install root barriers as required per City of Petaluma Root Barrier Standard Detail Number 102.

C. *Soil.* Placement of structural soil, 8' minimum length along the street, centered on street trees, 6’ minimum wide x 24” minimum deep, is required as a planting medium under sidewalks for street trees in areas where new sidewalks are to be constructed.

D. *Mulch.* Mulch shall be walk-on mulch.

E. *Irrigation.* Irrigation shall be provided for street trees in areas where new sidewalks are to be constructed. “Bladder” type irrigation may be provided by the City of Petaluma to existing sidewalk areas on a case-by-case basis.

Street Tree Setbacks and Offsets

Street Lights	20 Feet	To prevent blocking light & dark streets
Underground utilities	5 Feet	If they dig up utility, they do heavy damage to tree roots if tree is too close
Driveways	Residential 5 Feet Commercial 10 Feet	Trucks in & out of drive dam- age trees; trees also can block sight lines of vehicles backing out.
Sewer Lines	10 Feet	Roto Rooter loves roots that clog sewers
Water Meter	5 Feet	Trees break lines at meter
Stop signs and other traffic devices	20 Feet	Major Danger here: Vehicle collision/pedestrian collisions
Fire Hydrants	5 Feet	If trees are too close = Block access for fire hoses
Corners	40 Feet	To allow for line of sight to on- coming traffic and pedestrians

APPENDIX F

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

Reference Source
Publication can be obtained from the International Society of Arboriculture (ISA), P. O. Box 3129, Champaign, IL 61826-3129, Phone: (217) 355-9411, Fax:(217) 355-9516,
www.ag.uiuc.edu/~isa
https://wwv.isa-arbor.com/store/category/117/