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city of palm desert landscape maintenance guide

VOLUME ONE 2005 Edition







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GENERAL REOUIREMENTS

The guidelines presented in this manual outline current landscape maintenance standards as well as the established landscape practices of the American National Standards Institute (ANSI) ZI33.1, the International Society of Arboriculture (ISA), the State of California, and the Cal-OSHA Safety Rules and Regulations.

In order to promote consistent landscape work standards, developers, landscape contractors, City crew members and others employed to carry out routine landscape maintenance work within the public rights of way, or on public properties, should strive to become familiar with these guidelines. As with most guides, this book is attempting to inform and outline the most pertinent information that can be used in day to day landscape maintenance operations.

Regardless of the size of the landscape being maintained, one should familiarize oneself with local planting conditions such as weather, soil types, local plant choices along with their respective growing and maintenance requirements including pruning and irrigation needs.

An understanding of the equipment used in each maintenance operation is important as some work may require unique skills. On these occasions special licenses or certifications may be required to either perform or supervise the work. Examples of specialized work include tree pruning and pesticide/herbicide application. Most work described in this manual is classified as "general landscape."

The maintenance and care of landscaped areas featured in this manual includes median islands, parkways, parking lots, park and sports facilities, but can be used in the maintenance of commercial or residential areas. Elements to be maintained include shrubs, ground covers, trees, palm trees, accent plants, ornamental grasses, woody or herbaceous plants, turf areas and irrigation systems.

General maintenance responsibilities will vary from day to day and week to week. Daily responsibilities will include trash removal as well as the irrigation of turf, plants and trees. Weekly maintenance may include weeding, trash pick up, checking irrigation system, mowing, and edging turf areas. Periodic or quarterly maintenance responsibilities include weed control, pruning, removal and replacement of plants, fertilizing plants and turf areas, pest control, and maintaining (adjusting/repairing) irrigation systems.

GENERAL WORK ACTIVITIES

General landscape maintenance work includes trash pick up, mowing/edging turf areas, weeding shrub beds, irrigating plants/turf areas as well as removing litter. In addition, a general inspection of all maintained areas is required on a regular basis to determine the need of further attention such as pruning, turf problems, weeds, insects, fertilization needs and adjustments to irrigation systems.

When prioritizing work schedules, consider the following:

- + Public access areas must be kept neat, clean and safe.
- + Planted areas should look kept and be free of weeds and litter.
- + Immediately remove debris and dispose of properly.
- + Remove dead or dying plant parts. (This includes hanging or broken tree limbs/palm fronds) + Discard green waste at appropriate green waste recycling facilities.
- + Report faulty irrigation systems immediately. In the case of damaged irrigation heads repairs should be made the same day.

PERIODIC WORK ACTIVITIES

Several maintenance procedures are performed only one or two times per year. This work is usually sensitive to plant flowering cycles, temperatures and seasonal watering needs. Work generally performed on a "seasonal" basis includes: pruning, fertilizing, adjusting irrigation schedules, turf aeration, over-seeding, applying herbicides/pesticides and removing/replacing dead or dying plants.

The following sample schedule shows probable "seasonal" work activities:

- Winter (December February)
- + Spray weed infested turf areas with a selective post emergent herbicide.
- + Apply pre-emergent herbicide to control crabgrass, spurge, dandelions and oxalis in turf areas.
- + For weeds that have emerged in planter beds, apply a broad leaf herbicide (contact or systemic).
- + Apply fertilizer to turf, annual color beds as needed.
- + Fertilize lawns with a balanced, slow release product appropriate for the season of application and per soil fertility test results.
- + Prune deciduous shrubs and trees. (Pruning should be completed prior to leafing, or after flower buds emerge and after any danger of frost has passed)
- + Fall pruning of trees and shrubs should occur after over-seeding and when over-seeded areas are well established.
- Early Spring (March May)
- + Eliminate broad-leaf weeds in grass areas with selective post-emergent herbicide registered for use on the particular weed species present.
- Apply a second application of a pre-emergent herbicide to control crab grass.
- + Prune shrubs and ground covers to control their size, to remove any dead stems and branches and to remove any plant parts damaged by frost. Cut off and dispose of dead flower stems.
- Developing broad-leaf evergreen stems can be damaged by heat. Prune lightly only when necessary. +
- + Aerate turf.
- + Fertilize plants with slow release, well-balanced fertilizer with the exception of native or arid plant species. Irrigate problems.
- + Plants producing abnormal, or abnormally yellow, leaves should be examined for possible nutrient/water imbalance. If water related, check soil grade to ensure plant is not sitting to low in the planting hole. If necessary, adjust soil grade to adequately keep water from the root crown.

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fertilized area long enough to wash particles off foliage, but do not displace fertilizer or create surface runoff

Late Spring to Early Summer (May - early June)

- + Examine turf areas for weeds and remove with a selective post-emergent herbicide (if needed).
- + Prune Date palms in early May or when blossoms have set. Prune Washingtonia robusta palms in mid June. Remove fruit, dead and/or dying fronds. Check shrubs pruned in winter as they may require a second pruning. Summer (late June - August)
- + Prune Washingtonia filifera palms in late July. No other major pruning should be performed on plants/trees other than that which provides for the safety of pedestrians or clearance of vehicles.

Late Summer, Early Fall (September - October)

- + Pruning of some tree species may occur at this time.
- + Scalping, aeration and over-seeding operations should begin as soil temperatures drop and night time air temperatures are consistently below 65 for five consecutive nights.
- + Plant trees, shrubs, perennials and bulbs.
- + Prune ground covers back to established borders. Take care not to over prune.

SPECIFIC MAINTENANCE DUTIES

Several maintenance procedures require advanced skills and technical knowledge. Examples of such tasks include specific pruning techniques, plant diagnostics, pest or disease control as well as the repair of irrigation systems. The following guidelines provide details related to these tasks.

PRUNING AND MAINTENANCE OF TREES AND SHRUBS

All plant material should be maintained in a manner that (1) eliminates hazards such as visibility impairment or right-of-way obstruction, (2) preserves or enhances the health of the plant, and (3) maintains a desirable appearance. Plants should be pruned to promote a natural shape and form and only when needed.

Damaged plants should be trimmed/removed within 24 hours of notification (for City maintained jobs). All debris blocking roadways, sidewalks or parking areas must be removed immediately. Other debris collected from pruning, trimming, and routine maintenance must be removed the day the work is performed.

Trees should be pruned in accordance with established City and national standards adopted from the International Society of Arboriculture and the National Arborist's Association. Prune in a manner that presents a natural appearance by (1) eliminating structurally unsound, dead or dying branches first, (2) removing all co-dominant branches, and (3) eliminate crossing and/or weakly attached limbs.

Pruning practices such as topping or lion-tailing are not permitted. (See Illustration #1) Pruning is considered a selective process. It takes knowledge of a tree's physiology and biology to understand why trees grow the way they do. Important questions to ask before any pruning begins; Why are you pruning? Is it to develop tree/branch structure? Is it to remove problem branches? Are there visibility and safety issues? Does the tree require restructuring? Are you aware of the typical growth pattern of the trees you are about to prune? Once these questions have been answered it is that much easier to proceed with the task at hand. Large trees are prone to bad pruning due in part to misconceptions that large trees always cause problems. Topping of large trees has become a solution to this supposed problem. Topping is not a selective process rather, it is an arbitrary one. Topping causes unnecessary stress on a tree, a rapid re-growth of foliage, wounds to branches and limbs that the tree may not close thereby causing decay. If there is concern about a large tree then seek professional advice from an ISA Certified Arborist before topping or severely pruning any tree. There are alternatives to topping that do not impact the health of the tree that a certified arborist can recommend. Lion-tailing is another practice that has become synonymous with bad pruning. Lion-tailing is the practice of overly "thinning" a tree's canopy. Lion-tailing consists of removing a significant amount of branches from the tree and stripping the foliage from the interior of the tree. This pruning practice encourages the tree to develop suckers, exposes the interior trunk and branches to sun damage, and causes branches to bend and break due to excessive end weight.

Illustration #1 (courtesy of Dr. Ed Gilman)

Topping is wrong



Never top a tree. Instead, prune it to retain its natural shape.

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RECOMMENDED PRUNING PRACTICES:

- + At least one-half of the foliage should be left in the upper two-thirds portion of the tree.
- + Branches should not be crowded. Branches should be uniformly spaced throughout the entire tree and along the length of each branch.
- + After trees are established (four to five years after planting), they should be placed on a rotational pruning schedule ranging between three to five years. Based upon the type (species), location and overall condition, individual trees should be placed on a pruning cycle.

Note: Pruning cycles do not eliminate the need for immediate or emergency maintenance demands.

Always consider the plant type, its natural form, location and overall condition. Whenever possible, trees should conform to one of the following techniques.

Crown/Canopy Cleaning: Selective removal of one or more branches which are dead, dying, diseased, weakly attached or producing water sprouts in the tree's canopy. (See Illustration #2)

Crown/Canopy Raising: Selective removal of lower branches to provide desired clearance for vehicles and/or pedestrians. (See Illustration #2)

Crown/Canopy Reduction: Reduce the height, and/or spread, of the entire tree by selective (Crown shaping) removal of branches closest to the nearest lateral branch. (See Illustration #2 and #3)

Crown/Canopy Restoration: Selectively removes overcrowded, dead or dying water sprouts that have occurred from topping, vandalism, over pruning or acts of nature. The remaining water sprouts are allowed to grow to form a natural canopy. (See Illustration #4)

Crown/Canopy Thinning: Selective removal of branches to increase light penetration, enhance air movement, or reduce the weight of lateral/scaffold branches. (See Illustration #2)

Drop Crotch: Selective removal of "vertical" growth branches allowing for the development of more "horizontal" growth branches. Vertical branches are cut back to the base of a strong scaffold or parent branch. (This is the least preferred technique but may be required on trees located beneath utility lines or on trees that have been previously topped) (See Illustration #5)

Subordination: Reducing or removing branches and stems to slow down the growth rate of competing leaders. (See Illustration #6) When removing branches consider the size of the branch, its location, attachment angle as well as the health and vigor of the tree. No more than 20% of the live foliage should be removed at one time. The older the plant the less tolerance it will have to pruning.

Note: On mature plants, prune less. It is always better to remove smaller branches rather than larger ones.

Keep pruning tools sharp and clean. When pruning diseased trees tools should be dipped in a 10% bleach solution after each cut.

Cuts should be clean and smooth. A three-cut process is used to remove larger limbs. This will help avoid stripping or tearing of the bark and minimize wounding. (See Illustration #2A)

Cuts should be made just outside the branch bark ridge and collar area. If collar is not visible, the cut should be performed at a right angle to the parent branch leaving a slight stub (1/16 to 1/8 inch). (See Illustration #7)

When removing dead branches, the final cut should be made just outside of the branch bark ridge and collar of the live callus or wounded tissue. When removing diseased branches, remove at least 6 to 9 inches of additional live branch tissue. This will help prevent the further spread of disease.

Trees taller than 15 feet will require the use of a ladder, rope and saddle, or lift truck. Do not use spurs and/or gaffs, as they will cause damage to the tree trunk. The only exceptions to this rule occur when emergency efforts are required to reach an injured climber or when the entire tree being removed.

PRUNING TECHNIQUES

Specific types of pruning may be necessary to maintain a mature tree in a healthy, safe and attractive condition. Illustration #2 (courtesy of ISA^e)





REDUCTION

Branch Collar. Branch should be removed slightly above branch collar.

Illustration #2A (courtesy of City of Palm Desert[©])

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CROWN THINNING



CROWN RAISING



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Illustration #3 Illustration #4 RESTORING A TIPPED OR ROUNDED-OVER TREE (courtesy of Dr. Ed Gilman) (courtesy of Dr. Ed Gilman) Before restoration pruning Remove indicated branches REDUCING THE SIZE OF THE CANOPY Before reduction + Remove and shorten some + Too many branches crowded together lateral branches + Branches are forced to + Do not remove too many grow too long cracks could develop After inappropriate reduction After appropriate reduction Note: Closely-spaced, small diameter branches are normal on excurrent trees and usually require no treatment. DROP-CROTCHING BRANCHES COMPETING WITH SCAFFOLD LIMBS Before pruning

Illustration #5 (courtesy of Dr. Ed Gilman)

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Canopy reduction makes a tree similar by removing the end portion of branches with reduction cuts (lower right).

Inappropriate reduction uses heading cuts and can result in more problems later (lower left).

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- so remaining ones develop
- back to the trunk trunk
- + Main limbs are now spaced apart
- + A second and third pruning may be needed in the next few years to help scaffold limbs develop appropriate spacing







Side view of correct cuts





Before pruning

After pruning

Side view of correct cuts





Correct collar cut

Flush cut: an incorrect cut

TRAINING JUVENILE TREES

Newly planted (juvenile) trees will require four to five years of training to develop strong trunks and permanent well spaced branches. Training includes the removal of dead, broken or temporary branches, correction of co-dominant/weak branch patterns, removal of ties/stakes, and the adjustment of irrigation pattern and/or water basins. (See Illustration #8) Temporary branches (on the trunk) protect the trunk from sun-scald and possible equipment related damage. Therefore, they should remain on the tree as long as possible. When the time comes to remove them (after the first growing season), locate the lowest permanent branch and begin removing the temporary branches alternately. (See Illustration #9)

Branches that are dead, broken, or obstructing pedestrian and/or vehicular traffic should be removed first. Try not to remove more than 1/4 of the temporary branches in anyone year.

In early growth stages, temporary branches should be spaced at least 4 to 6 inches apart. Although they do provide protection, removal of temporary branches should take place before they grow to one half the diameter of the trunk.

Branches on the side of the tree that faces the afternoon sun should be retained at long as possible to help protect the trunk.

Following the second growing season slow growing and/or weakly attached branches should be removed. Additionally, stakes and ties utilized to train the trunk should also be removed. Trees that cannot stand on their own by the end of the second year should be removed/replaced. (See Illustration #10)

Monitor and, when necessary, correct irrigation patterns to ensure root structure is well watered.

Removal of branches continues until the lowest branch is no less than 8 feet above a sidewalk or 14 feet above a curb or street area. (See Illustration #11)

Illustration #7 (courtesy of Dr. Ed Gilman)

The branch collar forms a swelling at the base of the branch (top right). A correct pruning cut is made between the arrows at the edge of the collar. Notice that the arrows at the top of the branches are located at the point where the branch top makes an abrupt turn toward the branch bark ridge. A properly executed cut will leave the entire collar on the trunk (bottom left). Never make a flush cut (bottom center), and do not leave a branch stub (bottom right).

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PRUNING TECHNIQUE: BRANCH COLLAR PRESENT







Stub cut: an incorrect cut



CLEAR A SHORT SECTION OF TRUNK TO DELINEATE BOTTOM OF PERMANENT NURSERY CANOPY



Illustration #8 (courtesy of Dr. Ed Gilman)

Clear a short section of the trunk to delineate the bottom of the permanent nursery canopy. Lower branches remain to build caliper and prevent over-extension of the leader. Only 2 or 3 branches may have to be removed from the trunk to form a clear zone immediately below the lowest branch in the permanent nursery canopy. Be sure to shorten any temporary branches growing up into the permanent nursery canopy.

MAINTAINING MATURE TREES

Mature tree pruning focuses on maintaining structure, form, health and safety. Mature trees require very little pruning. Pruning is based on the species' particular growth rate and pattern, natural inclination for breaking and susceptibility to numerous environmental factors. Pruning to remove dead, diseased or dying branches can be done any time during the year. To minimize potential problems most pruning should occur in spring when growth and wound closure is fastest. Pruning after spring flush should be avoided. The tree can become stressed if heavy pruning occurs which removes new shoot growth and foliage from the tree.

Depleting the trees of their source of food production (leaves) forces the tree to replace the foliage that was removed thereby, seriously jeopardizing the trees' food reserves. Removing large limbs has the potential of creating a wound an older tree may not be able to close. The older the tree the more difficult it becomes to stave off decay and insect damage.

Illustration #9 (courtesy of Dr. Ed Gilman)

The branch collar forms a swelling at the base of the branch (top right). A correct pruning cut is made between the arrows at the edge of the collar. Notice that the arrows at the top of the branches are located at the point where the branch top makes an abrupt turn toward the branch bark ridge. A properly executed cut will leave the entire collar on the trunk (bottom left). Never make a flush cut (bottom center), and do not leave a branch stub (bottom right).

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SPACING BRANCHES ALONG THE TRUNK

Branches less than two-thirds the trunk diameter, without included bark, and spaced along one trunk, indicate strong structure

Ten years later



together on the trunk

to the trunk. Shorten some of the remaining branches.

Illustration #10 (courtesy of Dr. Ed Gilman)

Reduce or remove some of the aggressive branches on upright trees (left and center). Remove some all the way back to the trunk. Shorten remaining limbs that are large in diameter to keep them smaller than half the trunk diameter. Other upright trees have well formed branches and require little pruning because they are less aggressive (right).

If pruning a large tree becomes necessary it would be prudent to hire a certified arborist. A certified arborist is a professional trained in the proper care of trees. Certified arborists have the knowledge, equipment, trained personnel, and the liability insurance necessary. Here is a checklist of what to look for when selecting a certified arborist:

- + Make sure they are certified through the International Society of Arboriculture (ISA)
- + Are they member of professional organizations: ISA, NAA (National Arborist Association) or ASCA (American Society of Consulting Arborists)
- + Proof of insurance
- + A list of references
- + Avoid using the services of any tree company that:
 - + advertises topping as a service provided.
 - + uses tree climbing spikes to climb trees that are being pruned. Climbing spikes can damage trees, and their use should be limited to trees being removed.

Young nursery Older nursery stock stock

STREET TREE NURSERY STOCK

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Illustration #11 (courtesy of Dr. Ed Gilman)

Permanent canopy

- Poor candidate for street tree planting because low temporary branches are too aggressive and large
- Suitable candidate for lawn and park planting

All these branches eventually come off the tree in most landscapes

Permanent canopy

- Good candidate for street tree planting because low temporary branches are small
- Suitable candidate for lawn and park planting

Growing trees for street tree planting that have only small diameter branches up to about 15 feet makes it easy to train branches to grow well over the traffic (bottom). The first big branch is 15 feet from the ground. Trees planted in open landscapes such as in a lawn area can have the lowest scaffold branch closer to the ground (top). Trees trained in the nursery as specimen trees (top) that are planted along streets require more work to prune because large low branches are in the way.

TOPPING OF TREES

The following information on Topping Of Trees is courtesy of the International Society of Arboriculture.

Topping is perhaps the most harmful tree pruning practice known. Yet, despite more than 25 years of literature and seminars explaining its harmful effects, topping remains a common practice. This brochure explains why topping is not an acceptable pruning technique and offers better alternatives.

What is Topping?

Topping is the indiscriminate cutting of tree branches to stubs or lateral branches that are not large enough to assume the terminal role. Other names for topping include "heading," "tipping," "hat-racking," and "rounding over."

The most common reason given for topping is to reduce the size of a tree. Often homeowners feel that their trees have become too large for their property. People fear that tall trees may pose a hazard. Topping, however, is not a viable method of height reduction and certainly does not reduce the hazard. In fact, topping will make a tree more hazardous in the long term.

Topping Stresses Trees

Topping often removes 50 to 100% of the leaf-bearing crown of a tree. Since the leaves are the food factories of a tree, this can temporarily starve a tree. The severity of the pruning triggers a sort of survival mechanism. The tree activates latent buds forcing the rapid growth of multiple shoots below each cut. The tree needs to put out a new crop of leaves as soon as possible. If a tree does not have the stored energy reserves to do this, it will be seriously weakened and may die.

A stressed tree is more vulnerable to insect and disease infestations. Large, open pruning wounds expose the sapwood and heartwood to attacks. The tree may lack sufficient energy to chemically defend the wounds against invasion, and some insects are actually attracted to stressed trees by chemical signals.

Topping Causes Decay

The preferred location to make a pruning cut is just beyond the branch collar at the branch's point of attachment. The tree is biologically equipped to close such a wound, provided the tree is healthy enough and the wound is not too large. Cuts made along a limb between lateral branches create stubs with wounds that the tree may not be able to close. The exposed wood tissues begin to decay. Normally, a tree will "wall off" or compartmentalize the decaying tissues, but few trees can defend the multiple severe wounds caused by topping. The decay organisms are given a free path to move down through the branches.

Topping Can Lead to Sunburn

Branches within a tree's crown produce thousands of leaves to absorb sunlight. When the leaves are removed, the remaining branches and trunk are suddenly exposed to high levels of light and heat. The result may be sunburn of the tissues beneath the bark. This can lead to cankers, bark splitting, and death of some branches.

Topping Creates Hazards

The survival mechanism that causes a tree to produce multiple shoots below each topping cut comes at great expense to the tree. These shoots develop from buds near the surface of the old branches. Unlike normal branches that develop in a socket of overlapping wood tissues, these new shoots are anchored only in the outermost layers of the parent branches.

The new shoots grow very quickly, as much as 20 feet in one year, in some species. Unfortunately, the shoots are very prone to breaking, especially during windy conditions. The irony is that while the goal was to reduce the tree's height to make it safer, it has been made more hazardous than before.

Topping Makes Trees Ugly

The natural branching structure of a tree is a biological wonder. Trees form a variety of shapes and growth habits, all with the same goal of presenting their leaves to the sun. Topping removes the ends of the branches, often leaving ugly stubs. Topping destroys the natural form of a tree.

Without the leaves (up to 6 months of the year in temperate climates) a topped tree appears disfigured and mutilated. With the leaves, it is a dense ball of foliage, lacking its simple grace. A tree that has been topped can never fully regain its natural form.

Topping is Expensive

The cost of topping a tree is not limited to what the perpetrator is paid. If the tree survives, it will require pruning again within a few years. It will either need to be reduced again or storm damage will have to be cleaned up. If the tree dies, it will have to be removed.

Topping is a high maintenance pruning practice, and there are some hidden costs of topping. One is the reduction in property value. Healthy, well maintained trees can add 10 to 20% to the value of a property. Disfigured, topped trees are considered an impending expense.

Another potential cost of topped trees is the potential liability. Topped trees are prone to breaking and can be hazardous. Since topping is considered to be an unacceptable pruning practice, any damage caused by branch failure of a topped tree may lead to a finding of negligence in a court of law.

Alternatives to Topping

There are times when a tree must be reduced in height or spread. Providing clearance for utility lines is an example. There are recommended techniques for doing this. If practical, branches should be removed back to their point of origin. If a branch must be shortened, it should be cut back to a lateral that is large enough to assume the terminal role. A rule of thumb for this is to cut back to a lateral that is at least 1/3 the diameter of the limb being removed.

This method of branch reduction helps to preserve the natural form of the tree. However, if large cuts are involved, the tree may not be able to close over and compartmentalize the wounds. Sometimes the best solution is to remove the tree and replace it with a species that is more appropriate for the site.

Hiring an Arborist

Pruning large trees can be dangerous. If pruning involves working above the ground or using power equipment, it is best to hire a professional arborist. An arborist can determine what type of pruning is necessary to improve the health, appearance, and safety of your trees. A professional arborist can provide the services of a trained crew, with all of the required safety equipment and liability insurance.

There are a variety of things to consider when selecting an arborist:

- + Membership in professional organizations such as the International Society of Arboriculture (ISA), the Tree Care Industry Association (TCIA), or the American Society of Consulting Arborists (ASCA).
- + Certification through the ISA Certified Arborist program.
- + Proof of insurance.
- + A list of references. (Don't hesitate to check)
- + Avoid using the services of any tree company that: Advertises topping as a service provided. Knowledgeable arborists know that topping is harmful to trees and is not an accepted practice.
 - Uses tree climbing spikes to climb trees that are being pruned. Climbing spikes can damage trees, and their use should be limited to trees that are being removed.

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PALM TREE PRUNING

Palm trees should be pruned to remove dead fronds and thorny fruit stems as they will become hazardous and unsightly.

- + When palms are located adjacent to sidewalks or parking areas, fronds should be removed to a minimum clearance height of 8 feet.
- + Healthy fronds are to be removed only when they drop below the horizontal plane or horizon line. (See Illustrations #12 and #13)



Before Pruning

- Dead and severely chlorotic leaves in lower canopy
- Some chlorosis on other lower leaves
- Developing fruit in canopy



PRUNING PALMS AND CYCADS

Acceptable Pruning

- Only dead and severely marred or chlorotic leaves removed
- Remove mature fruit, if you wish
- Remove flower, if you wish
- No green leaves are removed



Overpruning

- Causes a narrowing of the trunk (called pencil pointing)
- Attracts pests such as weevils
- Reduces resistance to cold
- Causes nutrient deficiencies to be pushed up into young foilage
- Can increase the need for pruning to keep this over-pruned form

Illustration #12 (courtesy of Dr. Ed Gilman)

It is rarely necessary to remove green leaves from a palm. However, if you wish to do so, only remove those drooping below an imaginary horizontal line drawn through the bottom of the canopy (center). Growth will be slowed and the palm can be damaged and attract pests and diseases when green leaves are removed from above this imaginary line (right).

Illustration #13 (courtesy of Dr. Ed Gilman)

Do not trim above this line

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PALM TREE TRIMMING SPECIFICATIONS



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MAINTAINING SHRUBS

Shrubs should be pruned when they: (1) grow too tall for the area where they are located, (2) block vehicular line of sight, (3) become rangy or woody, (4) have dead flower stocks, and (5) block or hamper access to sidewalks or curb areas. Shrubs/hedges should be pruned annually or semi-annually, depending on their growth pattern and their growth rate. (See Illustration #14)

The best time to prune evergreen plants is in fall or spring. Flowering plants are not pruned until after they have bloomed and cold sensitive plants are not pruned until after danger of frost has passed.

Pruning should be done with the use of hand held pruning tools. Avoid the use of hedge shears except when the height of a shrub must be reduced quickly. When the use of power shears is necessary, remove branches to a desired height or width first, then selectively remove every other branch with hand pruners. Pruning of plants into geometric forms is not an acceptable form of pruning (with the exception of specialized topiary pruning).

Depending upon the type of plant and the overall landscape design, it is desirable to allow plants to grow near or into each other to create a hedge or a screen. Shrubs/ground cover adjacent to curbs will not exceed a height of 3 feet. Shrubs located behind sidewalk areas are allowed to grow taller but should not impede pedestrian access to, or pedestrian traffic, on the sidewalk.

Ornamental grasses should be cut back annually or bi-annually to a height of 9 to 12 inches. Dividing the grasses is another way to control their growth horizontally. (See Illustration #15)

REDUCING SHRUBS



After reduction





To thin a shrub, some stems are cut to near ground level and some are shortened back inside the canopy.

Remove indicated branches

After growth resumes



REDUCING CANE-TYPE SHRUBS/GRASSES



Illustration #15 (courtesy of Dr. Ed Gilman)

To reduce cane-type shrubs, cut about one-third of the stems back to near ground level. The shrub is shorter and less dense following this treatment.

MAINTAINING VINES

Vines and espalier plants tied to training devices should be examined monthly, and when necessary should be pruned and re-tied.

Secure vines in a manner that promotes directional growth in conjunction with supports. Do not use nails to secure vines to masonry walls.

MAINTAINING GROUND COVERS

Ground covers are to be kept free of weeds, and properly trimmed along walks, walls, and paved areas. Do not use a hand hoe to remove weeds in plant bed areas. Extract weeds by hand or spray with an approved herbicide. Remove litter in ground cover areas as needed.

Ground covers should be trimmed to within a minimum of 12 inches from control units, valve boxes, couplers, other appurtenances, and fixtures. They should not be allowed to grow into trees or shrubs nor onto structures or walls. Ground covers should be maintained as shrubs would be; selectively prune stems to reduce size and eliminate whips such as on Bougainvillea. Arbitrary and non-selective pruning on ground covers can cause problems similar to those on trees or shrubs. Non-selective pruning does not remove dead or dying portions of the ground cover. The damage caused by hedge shears on the stems is unsightly (especially when using power hedge shears) and it does not reduce the size of the plant but can actually cause rapid re-growth. Use hand pruners or loppers to reduce the size of the ground cover. In some cases, removal of excess plant material may be the solution to controlling the plants within a given planter area.

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MAINTAINING CACTI AND SUCCULENTS

Maintenance of cacti and succulents is minimal. Monitor growth and development, inspect for possible excess moisture, scale, weevils or mite problems. This is especially important for Agave, Cereus, Carnegiea, Echinocactus, Opuntia, Fouqueria, and Yuccas species.

Keep spray heads, or high volume drips away from base of plants. The tendency to over-water these plants is the leading cause of their demise. Controlling the watering frequency will help eliminate this problem and may prevent root rot. Scale and mite problems should be controlled with a systemic pesticide as these insect pests can spread and may lead to the death of the plant. Scale must be controlled when the insect is still in its crawler stage. Before the application of any pesticide, it is important to identify the pest and get a written recommendation from a California State Certified Pest Control Advisor for the best method to control the pest.

PLANTING

Occasionally it will be necessary to remove and/or replace trees, shrubs or ground covers. Adhering to the proper planting techniques described here will help ensure the health and longevity of all plant material.

(Whenever possible, avoid planting in July and August)

- I. Dig a hole at least 2 times the width of the root ball and no deeper than the depth of the root ball to ensure the crown remains slightly (1 inch) above the final grade.
- 2. Prior to placing plant, fill the hole with water.
- 3. Once the water has drained, position the plant upright in the hole making sure that the root crown is at least 1 inch above the expected final grade.
- 4. Once the plant is properly positioned, loosen sides of the root ball, spreading out any tangled roots.
- 5. Prior to backfilling, water in and around the root ball and the top of the hole.
- After water has drained, fill with excavated soil in the following manner:
 Fill halfway then slightly tap soil with shovel to remove any air pockets.
 Complete backfilling until the soil is at desired grade. Tamp to remove air pockets.
- 7. Construct a 2 to 3 inch berm just outside the drip line of the plant.

TREE STAKING

Trees that cannot stand on their own, or are placed in very windy areas, may require stakes to provide the necessary support. Newly planted trees or trees in open areas may require staking. Without the support of a stake, damage to the root ball and to the fine absorbing roots of the tree may occur.

- 1. Drive two, 10 to 12 foot lodge pole pine stakes into firm, solid ground just outside the root ball. (Stakes should be located parallel to a curb/sidewalk or perpendicular to prevailing winds)
- 2. To tie the tree to the stakes, utilize 2 (two), 16 inch rubber cinch ties, fastening them to the trunk of the tree in a figure eight manner. Make sure ties are loose enough to allow some natural movement caused by wind.
- 3. Never use wire, string, or plastic nursery tape to tie the stake to the tree.
- 4. If a tree needs to be guy wired, this should only be done by professional arborists or by maintenance personnel trained in the proper methods to guy a tree.

Tree stakes should be periodically checked. Once the tree is established, usually one to two growing seasons, the stakes and ties or guys should be removed. We should not rely on tree stakes to do the work of the trees root system. Trees that become dependent upon a stake for their support will develop a smaller root system, will become taller but with a smaller trunk diameter, they are unable to support themselves and can break easily in the wind once the stakes are removed. (See Illustration #16)

Illustration #16 (courtesy of City of Palm Desert[©]) PROPER TREE STAKING

2X ROOTBALL

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Note: If Needed

- Stake single trees 24" box and smaller, remove nursery stakes.
- In turf areas leave a bare area approx. 4" away from tree base in all directions
- Do not stake multi's, unless needed
- Cinch ties (2 each) do not over tighten, allow tree to move somewhat to build caliper
- lodge pole pine
 tree stake (2 each)
- Set 2" to 4" above grade
- Depressed watering basin
 remove from turf areas
 during finish grading
- Final Grade

Native undisturbed soil

For plant pit size refer to specifiations

ROOTS AND ROOT PRUNING

Roots are the main source of water and mineral absorption of a plant. They provide anchorage and stability, as well as store nutrients and energy. Protection of the root system is essential to ensure proper growth, health and development of plants and trees. Under normal conditions, root pruning is not a routine maintenance practice. It requires a knowledge of the tree physiology, biology and an understanding of how roots function especially in a tree. In new construction areas, soils are manipulated for the structure that is to be built. This usually involves the removal of native soil, re-grading, bringing in fill soil, and compacting the soil. This structural change in the soil is not conducive to tree growth. Tree roots extend far beyond the drip line of the tree and are usually within the top 18 inches to 24 inches.

- 1. Avoid cutting roots that have a diameter of 2 inches or more and are within the drip line of a plant. Never cut a root closer to the tree than 3 feet when the tree trunk circumference is 12 inches or less. Never cut a root closer than 6 feet when the tree trunk circumference is 13 inches or more. If possible, always attempt to tunnel under the root system.
- 2. The removal, or cutting, of any root greater than 2 inches in diameter must be pre-approved by a member of the City staff prior to removal.
- 3. If more than an estimated 30% percent of a tree's root system is removed, and of that 30%, half of the roots are located on one side of a tree, the tree should be removed. This amount of root removal leaves the tree unstable and prone to being uprooted.
- 4. Roots should be kept at least 5 feet away from hardscape (pavement, concrete) surfaces. (Also depends on the tree species)
- 5. Cut roots cleanly and smoothly as near as possible to the closest node or union. Roots that have been either crushed or torn should be removed.
- 6. Record all root pruning activities.

HAZARDOUS PLANTS

Trees or plants that could fall into a public right-of-way causing harm to a person(s), property, or right-of-way areas, should be examined and evaluated by City Arborist or a professional Arborist for removal immediately upon notification that a hazard may exist. Any plants in City right-of-way or easements need City approval for removal. Plants and/or trees with frequent limb breakage or trunk rot would be considered hazardous.

- I. Remove entire plant/tree when 50% of foliage, branch area, trunk, or root structure is decayed, dead or damaged. Plants/trees with less than 50% damage to these areas may only require the affected portions removed.
- 2. Imminently hazardous plants must be removed within 24 hours of notification.
- 3. Diseased or infested plants/trees that seriously jeopardize the health and growth of nearby plants should be removed.
- 4. Removal of healthy trees will only be considered if it (removal) is determined to be the only option available. Leaves in gutters or pools, fallen fruit or root invasion are not considered as hazardous problems.

HAZARDOUS TREES

A hazardous tree is one that is structurally unsound and is in the presence of structure(s), vehicle(s), and/or people.

- I. Trees suspected of being imminently hazardous should be immediately inspected (within 24 hours of notification) by City Arborist, a certified arborist or other qualified person.
- 2. A tree hazard evaluation and a report describing the problem as well as the actions necessary to correct the situation, must be filed with the appropriate agencies within 24 hours from the time of the site inspection.

SAFETY AND CLEAN-UP OF DEBRIS

The safety of the workers, and the general public, dictate that all debris generated from work activity be removed the day the work is performed.

- I. All debris resulting from a maintenance operations will be disposed of at the end of each work day. At no time will debris be blown into streets or gutters.
- 2. All walkways will be kept clean and clear of debris and plant growth.
- 3. All shrub areas not inter-planted with ground cover will be raked a minimum of once a month.

SCALPING AND OVER-SEEDING

Scalping and over-seeding (Bermuda grass) should begin by the first of October when daytime temperatures are below 80 degrees and night time temperatures drop below 60 degrees for five consecutive nights. The process should be completed by the first of November.

- I. Stop all turf fertilization by September 1.
- 2. Decrease irrigation by September 15, to slow the growth of the Bermuda grass.
- 3. Lower mowing height to within 3/4 inch from the ground. One week prior to over-seeding shut off all water and lower mower height to 1/2 inch, or until blades are flush with the crown of grass stolen.
- 4. Before over-seeding scalp or thatch turf if necessary and remove clippings.
- 5. Immediately before scalping or de-thatching, pre wet the turf to control dust generated by the equipment or as required by site conditions.
- 6. Over-seed with a select perennial rye at a rate of 12 to 15 pounds per 1,000 sq. ft. When possible, split the application rate and apply a second application in the opposite direction.
- 7. Lightly water, keeping soil moist, but not saturated. Water three to five minutes, four times per day. 8. Once seed has germinated, reduce watering to twice daily (or as required by air temperature) but increase
- duration from eight to ten minutes per cycle. (In sandy soils, frequency may have to be increased) 9. First mowing should be approximately two weeks after germination at a height of $1\frac{1}{4}$ to $1\frac{1}{2}$ inches.
- 10. Three to four weeks after first mowing, fertilize turf with a 16-20-0 or 15-15-15 (per manufacturers specifications) minute cycles per day, three to four times per week.
- 11. After nine to 12 weeks, fertilize again with a 22-3-9 or 21-7-14 formulation. (per manufacturers specifications)

FFRTILIZERS AND USAGE

Supplemental fertilizing may be required to improve the nutrient levels of the soil. Test should be conducted once or twice a year (before and after the growing season) on all turf and shrub areas to determine actual nutrient needs. Soil samples should be sent to an independent testing lab at least six to eight weeks before the next scheduled application.

- 1. Record all fertilizer applications noting the identity, type, formula, application rate, frequency, and landscape tion, the surface area must be well watered, but do not allow any area to become flooded (standing water).
- 2. Fertilizers can be organic or inorganic, dry, liquid, or pellets.
- 3. After applying fertilizer, wash down all adjacent areas to prevent fertilizers from staining surfaces.
- 4. Fertilizer needs, rates, formulas and schedules very from plant to plant, and season to season. The optimum time to fertilize trees and shrubs is late fall when plant roots are most active.
- 5. Trees, shrubs, and ground covers that require supplemental applications should be scheduled in accordance with Association Standards, and in accordance with the rate indicated by the manufacturer.
- 6. Some plants may require deep root feeding or foliage applied sprays to correct iron chlorosis or other micro-nutrient deficiencies normally in the summer months of June, July, or August.

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formulation. Adjust watering cycles to ensure top 1/2 inch of turf is saturated, but no more than two 10 to 15

material (turf, trees, shrubs, ground cover) the fertilizer was applied to. Prior to, and immediately after applica-

the National Arborist Association Standard for Fertilizing Shade and Ornamental Trees, the National Arborist

- 7. Fertilizing native or desert trees, shrubs, and ground covers is not recommended.
- 8. Over-seeded turf areas should be fertilized no less than once every 90 days. Apply a high nitrogen formula once every three to four weeks after over-seeding, and again in December or January, as well as in April or May.
- 9. From June to August, use a balanced slow release fertilizer.
- 10. All fertilizer application rates should be in accordance with manufacturers specifications.

WEED CONTROL

Weeds inhibit lawns, plants, and trees from gaining the moisture and nutrients they require for growth and development. Weeds should be removed as follows:

- 1. Remove all weeds as soon as possible from lawns, planters, planting areas, expansion joints, tree pits, and "graveled" areas.
- 2. No more than 10% percent of the turf area should have weeds.
- 3. Weeds in lawns can be controlled with selective herbicides or a post-emergent spray.
- 4. Wait until the second or third cutting before using pre-emergent herbicides on newly seeded lawns.
- 5. To control crabgrass apply pre-emergence in January while Bermuda grass is dormant.
- 6. Broad-leaf weeds in lawns can be removed selectively with post emergent herbicide. When utilizing this method of control, care must be taken not to harm the areas adjacent to the application.
- 7. Weed control in planting areas may include mechanical and chemical methods. Mechanical or hand weeding should be limited to "spot" control in newly planted areas or windy conditions.
- 8. When weather permits, use herbicides to prevent weed seed germination in September. Herbicides must be registered for use on turf grasses, ornamental plants, and weeds selected for treatment.
- 9. Selected herbicides should be registered for use on turf grasses and shrub planting areas. Follow directions to ensure the herbicide is safe for use on ornamental species (if applicable).
- 10. Calibrate spreader (sprayer), apply evenly first in one direction and then the other.

PLANT DIAGNOSTICS

Causes of poor plant health can be attributed to improper watering, incorrect light levels, a nutritional imbalance, improper pH, and/or weather extremes. As abnormalities are detected, begin a diagnostic analysis to determine the probable cause. Examine the plant and systematically eliminate possible causes by utilizing the following steps:

- + Visually inspect for pattern of abnormality.
- + Examine the current site conditions including drainage, a history of area, soil moisture, the number of plants affected, and the percentage of plants affected.
- + Examine the plant's rooting structure (color). Black or brown roots often indicate a problem with root rot.
- + Check trunk and branches for wounds, canker, and sunburn.
- + Note appearance of affected leaves. Dead leaves at top or outside of foliated area is usually the result of environmental or mechanical problems. Curled leaves can be an insect, herbicide or viral infection problem.
- + Consider both current and past management practices.

INSECT RELATED PROBLEMS

If insects are suspected, identify the insect, monitor the problem, determine the extent or progression of the problem, and if necessary spray with appropriate insecticide. If possible, do not treat as this may be a seasonal problem that may correct itself.

- +of pest problems.
- enemies, biological control, and host resistance.
- Application of all pesticides will be made by a California State Licensed Pest Control Applicator. +
- life cycle of the pests.
- creating excessive runoff.
- with the guidelines established by the State of California Food and Agricultural Code and EPA regulations.
- materials. Avoid high pressure applications and water soluble drift agents.
- Pesticides should be selected from materials which characteristically have the lowest residual persistence.
- treatment(s).
- County of Riverside Agricultural Commissioner.
- + Do not use toxic pesticides to control pests when predatory or parasitic insects are present.
- + A continuing program to control insects and rodents is recommended. The following information should be included: the pest to be controlled, method of control, the product labels, a schedule as to frequency of control. Maintain a monthly and daily pesticide spray log to record all pesticides used.

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All areas of the landscape should be inspected for infestations of harmful pests which include aphids, beetles, scale, slugs, snails, spider mites, thrips, whiteflies, Eucalyptus longhorn borer, weevils, Palm borers, and Palo Verde borers. Leaves that are chewed, blotched, deformed, discolored, skeletonized, defoliated, or wilted could be signs

Pest control can include an integrated pest management control system, pesticide control, exclusion, natural

+ Pesticides should be applied when the possibility of contamination is at its lowest. Early morning application shall be used when possible to avoid contamination from draft. Applicator should monitor the weather and avoid conditions that would greatly reduce the effectiveness of the treatment or create possible harmful run-off from the treated area. Applicator should also ensure that the prescribed chemicals are most effective during the current

Post warning signs in areas where pesticides are to be applied and reduce watering to eliminate runoff. If water is required to increase pesticide efficiency, it should be applied in quantities the area is capable of receiving without

Exercise caution when mixing and transferring pesticides to prevent contaminating areas outside the target area. Application methods should be used which ensure materials are confined to the target area. Spray tanks containing excess chemicals shall not be drained on site. Disposal of pesticides as well as tank cleaning materials shall comply

+ Spray equipment shall be in good operating condition, of high quality, and designed to efficiently apply prescribed

+ Consultation with a State of California Licensed Pest Control Advisor may be required before applying chemical

+ In case a Restricted Use Pesticide is recommended, there must be a Restricted Materials Permit issued by the

SYMPTOMS OF INSECT INFESTATION

- + Foliage with holes, ragged edges and "skeletonized" leaves are signs of beetles, grasshoppers or leaf cutter bees.
- + Wilting leaves, a change in color of the foliage prematurely, or abnormal growth patterns may be a sign of aphids, mites, true bug, scales, thrips, whiteflies, lerp psyllids, and glassy-winged sharpshooters.
- + If a plant's foliated area is stunted, wilting or suddenly dies, this could be a sign of grubs chewing on root.
- + When leaves are shiny and/or are coated with a sticky substance, aphids may be present.
- + Dusty foliage and warm temperatures may produce mites. Keep mite populations low to prevent plant injury. Conifers, especially Pinus halepensis are susceptible to and often killed by red spider mites.
- + Bark beetles feed in the cambium layer of scaffold branches and trunks. Older and weaker trees are the first to be infested. Any signs of stress is cause to inspect trees. Look for dying branches. Control adult beetles before they lay eggs on bark in the spring. All trees near one infested the previous year should be sprayed in March and again in May. On-going inspections are necessary to determine if there is a summer brood.
- + Snails should be controlled before they become epidemic. Anticipate the menace from spring until the advent of high temperatures wherever moist soil prevails. Control with weekly applications of toxic bait until the youngest brood is eliminated.

AIR BORNE FUNGUS

If air borne fungus is suspected, control it with an appropriate fungicide, cut out the problem area, or remove the plant. When pruning infected areas, be sure to disinfect tools with a commercial disinfectant or a 10% bleach solution and dispose of branches. Air borne fungus diseases may include: anthracnose, powdery mildew, sudden wilting, cankers and crown gall. Symptoms include deformed leaves, powdery substance on leaves and stems, irregular growths on trunks and stems and weeping splits in bark and stems.

SOIL BORNE FUNGUS

When the problem is a soil borne fungus, some pathogens can be destroyed, or problems reduced, by using a fungicide or by increasing the soil levels of beneficial soil organisms. If plants do not respond or suffer too much, the plants may have to be removed and replaced with another less susceptible species.

- + Signs of soil borne fungus include wet wood, slime flux, leaf spotting or blotchy leaf coloring.
- + All material should be used in strict accordance, and applied, within the most current EPA regulations as well as the California Food and Agricultural Code requirements.

Prior to treating any of these ailments, soil samples should be tested by a recognized laboratory or facility. Testing shall determine level for pH, EC, nutrients, and soil organism profile. Results should include a recommended formula to properly treat the disease. A complete report should be filed and reported to the City for review and approval.

NUTRITIONAL PROBLEMS

Symptoms of common nutritional problems include:

Nitrogen Deficiency: Older leaves become uniformly yellow. After time they will die and drop off.

Phosphorus Deficiency: Plant becomes severely stunted, leaves turn darker green, or in some cases purple. Very soon after symptoms appear, plant will begin to lose older leaves.

Potassium Deficiency: Outside edges of older leaves turn yellow and immediately die. Necrotic (brown, dead looking) spots may appear across older leaves, but this usually occurs toward the outer edges.

Magnesium Deficiency: Older leaves develop interveinal chlorsis. (Yellowing between the veins of the leaves)

Iron Deficiency: Yellow discoloration between the veins of young leaves.

Manganese Toxicity: The tips of older leaves bum or have reddish-brown spots appear. (Early stages of the deficiency will produce small (1/16 inch) spots that will eventually become numerous and turn into patches of discoloration)

Boron Deficiency: Flower parts do not form naturally. They will have fewer or smaller pedals that wilt or suddenly drop. Flower buds die and try to reform producing numerous small shoots (witch's broom). There is little or no stem between leaves. Young leaves will crinkle and there may also be a thickening of both the stem and young leaves.

Boron Toxicity: The outer edge of older leaves die with a characteristic reddish-brown color. Spots may develop across the leaf, but are usually concentrated toward the outer edge.

(For additional information regarding nutritional problems refer to Sunset Western Garden Problem Solver, 1998, Sunset Publishing Corp., Menlo Park, CA 94025)

INJURY

Injury to plants can result from mechanical or chemical damage. Mechanical injury symptoms include tattered, torn, chewed leaves or broken/split limbs and torn bark. This is usually caused by insects or people.

Chemical injury symptoms include leaf or shoot distortion and/or burnt leaf margins. Weather related symptoms include split trunk tissue (sunburn), wilted leaves, dead twigs or branches. Soil problems may mean saturated soils, contaminated soils or improper balance of nutrients resulting in off colored or yellowing of leaf, spotty defoliation caused by lack of oxygen or root rot. More typical symptoms may include a sudden wilting of the leaf or presence of fungal growth or conks.

Symptoms associated with rooting include stunted growth, elongated twig growth or dead branches caused by girdling roots, confined or severed rooting structure.

Possible control measures may include the following:

- + If mechanical, repair what you can.
- tolerant species.
- + If a water saturation problem, try changing grade, irrigation patterns, or aerating soil.
- + If a rooting problem, cut off girdling root or surface root, or remove and replace material.

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+ If chemical, saturate the soil to leach out contaminated soils. If pollution, replace material with more pollution

SPRINKLER MAINTENANCE

The controlling factor in the performance of water management within landscape maintenance areas is the application of water to landscape plants at a rate which closely matches the actual demands of plant material with little or no runoff. Water conservation, roadway safety and maintenance are the first and foremost reasons why water must be strictly controlled within the City. Other important water management considerations include safe and dry turf areas for community use, water costs, and plant health.

- I. Before repairing or adjusting systems, verify the operating pressure of the supply system. Static pressure at P.O.C. should also be checked. If pressure is substantially higher than design pressure. Adjust pressure regulator accordingly.
- 2. Irrigation schedules should be adjusted seasonally.
- 3. The entire irrigation system, including all components from connection at meters, shall be maintained in an operational state at all times. This includes controllers and remote control valves, gate valves, main lines, service lines and irrigation heads.
- 4. All repairs shall be performed by fully trained personnel knowledgeable in all phases of landscaping and irrigation system operation, maintenance, adjustment, and repair. Repair personnel shall also be knowledgeable in all type of components including control clocks, valves, and sprinkler heads, as well as with all brands and models of irrigation equipment utilized in a landscape.
- 5. Main irrigation and supply systems must be tested and inspected periodically:
 - + Flush lateral lines, catch water sample and closely check for debris and suspended matter.
 - + Flush until water runs clear, should require only a few seconds.

Monthly basis:

- + Examine and clean all filters.
- + Replace filter as required.
- + Adjust and clean or replace emission devices as required.
- + Perform walk-through and look for visible plant stress, check emissions device location and flow.

- + Test irrigation heads and coverage areas to:
- + Provide adequate coverage for all landscaped areas. Prevent excessive runoff and/or erosion.
- + Prevent watering of roadways, facilities such as tennis, basketball or handball courts,
- walkways, trails, fences, and private property.
- + Match precipitation rates.
- 6. Quickly repair all irrigation system damage and record repairs.
- 7. All sprinkler heads shall be adjusted to maintain proper coverage. Adjustment shall include actual adjustments to heads, cleaning and flushing heads and lines, and removal of obstructions.
- 8. Minor repairs shall include but not be limited to: all lateral lines regardless of size, risers, exposed electrical connections, washers, seals, adjusting pins and replacement of valve box lids.
- 9. Major repairs shall include all mainline pipe regardless of size, controllers, pressure regulators, mainline, control wires others than above, valves, solenoids and diaphragms, all sprinkler heads and emitters.
- 10. Faulty irrigation systems such as malfunctioning controllers, quick couplers, manual or automatic valves and sprinkler heads should be corrected within 12 hours of notification.
- 11. All replacement components should match the original type and model unless a substitute is approved.
- 12 When sprinkler systems are out of service, temporary or alternative watering (hand or watering truck) may be required.
- 13. Personnel are responsible for damage to sprinkler heads and valves due to careless operation of vehicles and lawn mowers.
- 14. Irrigation system scheduling will be established by the City staff and will be based on ETO values obtained from the Coachella Valley Water District.

The following scheduling chart provides a general schedule only. Adjustments may be required based on location, soil characteristics and plant species.

TREES — (Gallons Per Week)

Use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
High	8	24	32	66	108	124	124	108
Mod	5	16	22	45	76	88	88	76
Low	5	10	16	33	60	60	60	52

SHRUBS — (Gallons Per Week)

Use	Jan	Feb	Mar	Apr	May	Jun	Jul	Au
High	1	2	3	6	8	9	9	8
Mod	.5	1	2	4	7	8	8	7
Low	.5	1	1	2	4	5	5	5

PALM TREE WATERING

Contrary to general knowledge, palm trees are moderate to high water users. The amount of water used by a palm depends upon the size, species, location of the tree, and time of year. Generally, the larger the tree the more water used. When establishing a newly planted palm water usage may range from 30 to 80 gallons a day. Once the palm is established (two to four months after planting) the water requirement may decrease but generally not much more than 20% to 30%.

NOTE: The warmer the air and soil temperature, the more water is used by plant material.

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3	Sep	Oct	Nov	Dec
	66	32	20	12
	48	33	14	4
	36	24	10	4
3	Sep	Oct	Nov	Dec
3	Sep 6	Oct 3	Nov 2	D ес 1
3				
3	6	3	2	1

Illustrations #1, #3, #4, #5, #6, #7, #8, #9, #10, #11, #12, #13, #14 and #15 courtesy of Dr. Ed Gilman.

Illustrations courtesy of Dr. Ed Gilman, Professor, Environmental Horticulture Dept., University of Florida, Gainesville. For more detailed information refer to "Horticopia illustrated pruning and planting, 2002, www.Horticopia.com, (800) 560-6186, and "Illustrated guide to pruning, second edition", E.F. Gilman, 2002, Delmar publishers, Albany, NY, (941) 342-0153.

