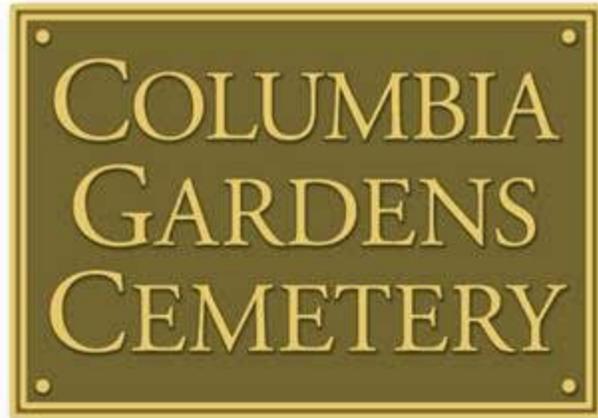


Columbia Gardens Cemetery

Arboretum Management Plan

2019



ESTABLISHED 1917

1. Scope and Purpose

This document sets forth tree management guidelines for Columbia Gardens Cemetery (CGC), 3411 Arlington Boulevard, Arlington, Virginia for planting, pruning, maintaining and protecting trees. The purpose of our arboretum is to focus resources and attention for the sustainability of the CGC landscape and preserve this unique space for future generations of families that chose this cemetery for the final resting place of loved ones and for our neighbors. More than 70 different tree species are growing in the cemetery

2. History

Columbia Gardens Cemetery is located in the heart of Arlington's Ashton Heights Historic District, about one mile west of Arlington National Cemetery. Founded in 1917, Columbia Gardens offers a range of burial and cremation options, including sites for upright monuments. Columbia Gardens serves the needs of families of all denominations and faiths, all nationalities, all walks of life.

Columbia Gardens is family owned, now managed by the fourth generation of the Thomas family. They have watched over Columbia Gardens for over 400 seasons — over 100 years — serving as trusted stewards of the memories of families and friends. Daun Thomas Frankland, great-granddaughter of the founder, and her team will personally answer your questions and guide you through the process, no matter what your needs are.

Since 1917 the cemetery has planted trees to maintain our inventory, variety and to provide an environment to sustain insects, birds, squirrels, foxes and other wildlife. Today, the tree cover includes both native and introduced tree species.

A survey of trees at the cemetery was conducted in the summer of 2017, to include identifying the scientific name, common name, and location of each tree. 71 different species were identified and the data recorded on a spreadsheet available for routine tree maintenance and to our visitors. Resources for the long term sustainability of the arboretum will be supported by the Columbia Gardens perpetual care fund.

3. Benefits of Trees

Trees provide major benefits to Columbia Gardens Cemetery in the following ways:

- Create a pleasant environment for the cemetery, grieving families and the community
- Improve the appearance of the landscape by providing flowers, foliage, fall colors and winter greenery
- Provide shade and reduce summer temperatures
- Reduce storm water runoff and erosion
- Improve air quality
- Block wind
- Provide habitat for wildlife

4. Policies

Because of these and other benefits, it is the policy of Columbia Gardens Cemetery to promote tree placement and growth wherever practical and to give proper care to newly-planted and existing trees.

Credentialed arborists and experienced tree volunteers will be used to assist in placing trees in appropriate locations.

Contractors will avoid damaging trees or their root systems and will be monitored by CGC personnel to ensure compliance.

5. Responsibilities

Columbia Gardens Cemetery will follow an annual schedule for tree planting, pruning and maintenance. This schedule will include, but not be limited to, the following:

- Tree planting primarily in the months of November and December; in March if necessary.
- Structural pruning of newly-planted trees one year after planting, in winter months only
- Pruning to prevent interference with pedestrians, gravesites and mowing. Preferably in winter
- Watering trees during July-September as needed to prevent drought damage.

- Other activities as needed without regard to season:
 - Removing hazardous limbs and trees
 - Removing dead wood and dead trees
 - Removing invasive plants interfering with trees
 - Mulching trees
 - Removing non-native, invasive trees (except in winter)

Appendices

- A. Tree Planting Guide
- B. Tree Pruning Guide
- C. Tree Maintenance Guide
- D. How to Save a Tree

When to Plant

Ideally, trees are planted during the dormant season — in the fall after leaf drop or in early spring before buds break. In these periods, weather is cool, allowing plants to establish roots in the new location before spring rains and summer heat stimulate new top growth. If absolutely necessary, a small number of healthy balled and burlapped or container trees can be planted during the growing season (except when there are drought conditions) if given appropriate care.

Avoiding Stress

Balled and burlapped trees lose a significant portion of their root system when dug at the nursery. As a result, trees commonly exhibit what is known as “transplant shock,” a state of slowed growth and reduced vitality following transplanting. Container trees may also experience transplant shock, particularly if they have circling or kinked roots that must be cut. Proper site preparation, careful handling to prevent further root damage, and good follow-up care reduces transplant shock and promotes faster recovery.

To help trees recover, pruning will not be done during the first year after planting (with the exception of removing dead or broken branches at the time of planting).

Planting

Carefully follow the steps below to help your tree establish quickly in its new location. **Note: Before digging, be sure you have located and avoided all underground utilities. Also be sure you have selected the appropriate tree for the location (see Appendix A).**

1. Identify the trunk flare. The trunk flare is where the trunk expands at the base of the tree. This point should be partially visible after the tree has been planted (see Figure 1). Remove excess soil from the top of the root ball before planting if the root flare is not visible.

2. Dig a shallow, broad hole. Holes should be 2 to 3 times wider than the root ball, but only as deep as the root ball. Digging a broad planting pit breaks up the surrounding soil and provides newly emerging tree roots room to expand.

3. Remove all wire, burlap and containers. If the root ball is wrapped, carefully cut and remove any fabric, plastic, string, and wire from around the trunk and root ball to prevent girdling and to facilitate root growth (see Figure 1). Expose the trunk flare, if necessary.

3. Correct any encircling roots. Roots, particularly in container trees, may circle around the perimeter of the root ball. Straighten any such roots by pulling them out of the ball. Cut those which cannot be straightened where they bend and remove the cut pieces. This will prevent later damage to the root ball and trunk of the tree.

4. Place the tree at the proper height. Dig the hole to the proper depth so the trunk flare will be at the surface of the ground or slightly above it. The majority of a tree's roots develop in the top 12 inches of soil. If the tree is planted too deep, new roots will have difficulty developing because of lack of oxygen. In poorly drained or heavily clayed soils, trees can be planted with the base of the trunk flare 2 to 3 inches above grade. When placing the tree in the hole, lift it by the root ball, not the trunk.

5. Straighten the tree in the hole. Before backfilling, have someone view the tree from several directions to confirm it is straight. Once planted, it is difficult to reposition the tree.

6. Fill the hole gently, but firmly. Put the original soil back in the hole, breaking up large clods, and working it in with your hands or a shovel. Pack soil around the base of the root ball to stabilize it. Fill the remainder of the hole, firmly packing the soil to eliminate air pockets that may dry out roots. Further reduce air pockets by watering periodically while backfilling. Do not fertilize or amend the soil at the time of planting.

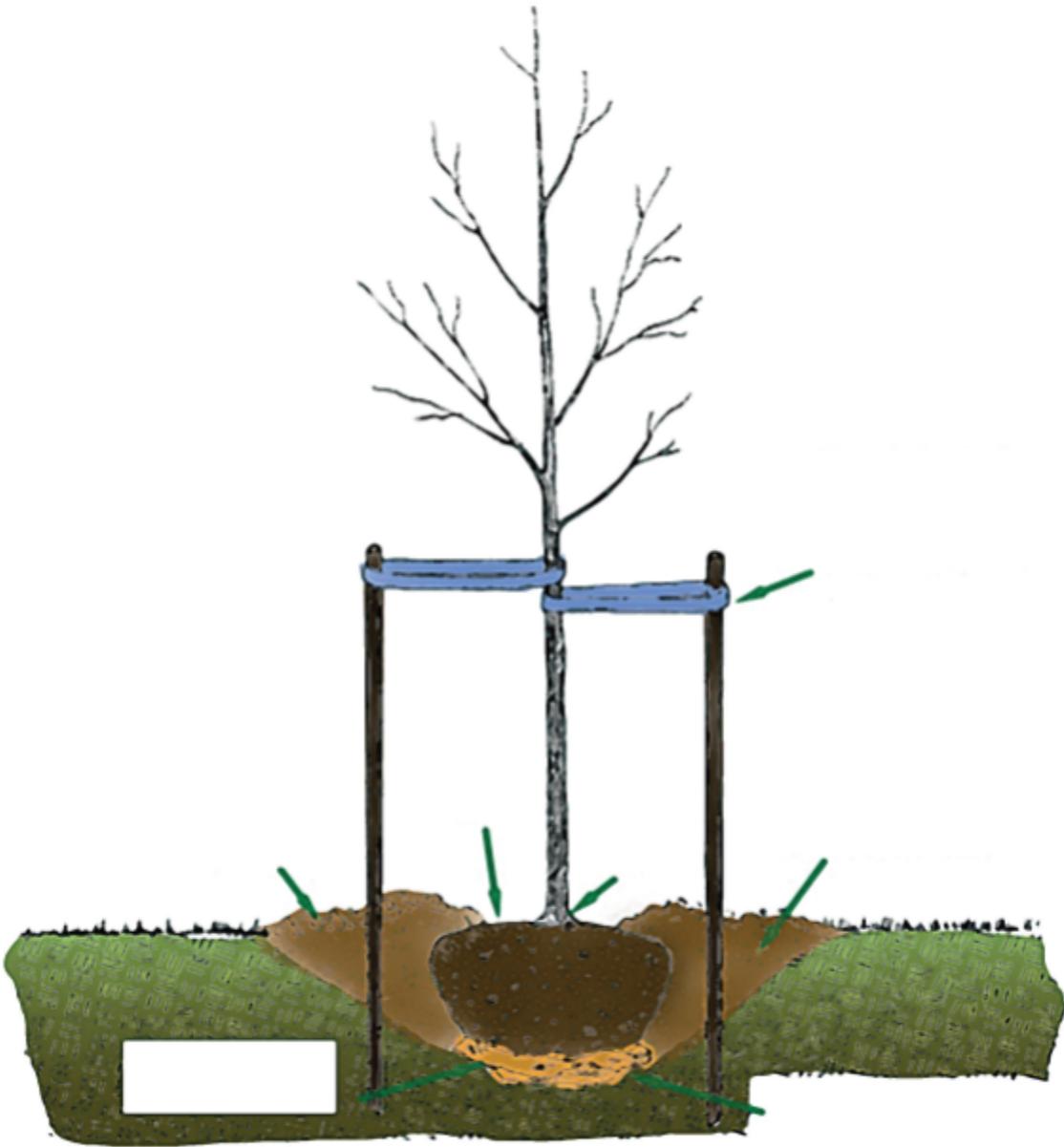
7. Stake the tree, if necessary. Trees establish more quickly and develop stronger trunk and root systems if they are not staked at the time of planting. Staking may be required, however, when planting bare root stock or planting on windy sites. Stakes protect against lawn mower damage. One or two stakes used with a wide, flexible tie material on the lower half of the tree will hold the tree upright and minimize injury to the trunk (see Figure 1), yet still allow movement. **Remove support staking and ties after the first year of growth.**

8. Mulch the base of the tree. Mulch is organic matter spread around the base of a tree to hold moisture, moderate soil temperature extremes, and reduce grass and weed competition. Common mulches include shredded and composted leaves, pine straw, shredded bark, peat moss, or composted wood chips. Use 2-3 inches of mulch; more may reduce oxygen and moisture levels. Leave a mulch-free area 3 inches in diameter around the base of the tree. Piling mulch up against the trunk of a tree will cause bark decay and allow unhealthy root growth.

9. Provide follow-up care. Keep the soil moist, but not water-logged. Water trees at least once a week, barring rain, and more frequently during hot, windy weather. When the soil is dry below the surface of the mulch, it is time to water. Continue until mid-fall, tapering off as lower temperatures require less-frequent watering. During dry periods, new trees require at least 25 gallons of water weekly. Watering can be done by using 25 gallon bags (“gator bags”) attached to the trunk, or by watering the ground directly at a very slow rate. Bag use is preferred to save time.

Other follow-up care may include minor pruning of branches damaged during the planting process. Delay structural pruning until a full season of growth has occurred. Do not fertilize.

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Appendix B.

Pruning Guide

Reasons For Pruning

The main reasons for pruning ornamental and shade trees include safety, health, and aesthetics. Pruning for safety involves removing branches that could fall and cause injury or property damage, trimming branches that interfere with lines of sight on streets or driveways, and removing branches that grow into utility lines. Safety pruning can be largely avoided by carefully choosing species that will not grow beyond the space available to them, and have characteristics that are suited to the site.

Pruning for health involves removing diseased or insect-infested wood, thinning the crown to increase airflow, and removing crossing and rubbing branches. Pruning can encourage trees to develop a strong structure and reduce the likelihood of damage during severe weather. Removing broken or damaged limbs encourages wound closure.

Pruning for aesthetics involves enhancing the natural form and character of trees. Pruning for form can be important on open-grown trees that do very little self-pruning.

All woody plants shed branches in response to shading and competition. The resulting wounds are sealed by callus. Branches that are poorly attached may be broken off by wind and accumulation of snow and ice, resulting in large, ragged wounds that rarely seal. Pruning can be used to supplement or replace these natural processes and increase the strength and longevity of plants.

Trees have many forms, but the most common types are pyramidal and spherical. Trees with pyramidal crowns, most conifers, have a strong central stem and lateral branches that are more or less horizontal

and do not compete with the central stem for dominance. Trees with spherical crowns, most hardwoods, have many lateral branches that may compete for dominance.

To reduce the need for pruning it is best to complete structural pruning when the tree is young. Also, consider a tree's natural form. It is very difficult to impose an unnatural form on a tree without constant maintenance.

Producing strong structure should be the emphasis when pruning young trees. As trees mature, the aim of pruning is maintaining tree structure, form, health and appearance.

Always prune at a node, the point at which one branch or twig attaches to another.

Pruning Young Trees

Pruning a young tree saves money. Removing small branches is fairly easy compared with waiting until limbs are large, when pruning can be costly and a bigger risk to the tree. Correctly pruning a tree when it's young will help it develop a strong, well-balanced crown. Prune **one year after planting**, to ensure:

- **There is one central leader.** Most trees will be strongest if they have one central leader. Unless your tree is an arborvitae or fruit tree, choose one leader to keep, and prune off the competitors.
- **Good spacing between branches.** Vertical space between branches should eventually be 12 inches for small deciduous trees and 18 inches for medium and large deciduous trees. Try to space branches equally around the tree. Remove any crossing or rubbing branches.
- **Enough clearance between the ground and first branch.** As a tree grows taller, branches remain at the same height. Branches located low on the trunk may get in the way of sidewalk paths or lawn mowing as the tree gets bigger. Over time, gradually remove low branches by cutting them at the trunk.
- **Good crown height.** The crown of a deciduous tree should be at least 60 percent of the total tree height.

- **Removal of dead or weak branches.** Remove dead branches, branches which cross and rub, and branches with included bark between the lower branch and trunk (these branches are weak and may later break off).

Do not remove more than 25 percent of the tree's live branches in one growing season.

Pruning Techniques

Cut branches just outside the branch collar. The branch collar contains tissue that should not be damaged or removed. If the trunk collar has grown out on a dead limb, cut just beyond the collar. Do not cut into the collar or the bark ridge (a ridge of bark that may be on the upper portion of the branch where it joins the trunk).

Support the branch with one hand while you make the cut to prevent the bark from tearing. If the branch is too large to support, use the three-step method, as follows:

1. Reduce the weight of the limb by making an undercut about 12 inches from the limb's point of attachment to the trunk.
2. Make a second cut from the top, a few inches farther out on the limb. Doing this removes the limb without tearing the bark on the trunk, leaving a stub.
3. Remove the stub by cutting just outside the branch collar and bark ridge. Begin the cut just outside of the branch bark ridge, and angle down away from the trunk. Stay close to the trunk collar without cutting into it.

Establishing a Strong Scaffold Structure

Establish a good structure of primary branches while the tree is young. These branches, called scaffold branches, are a mature tree's framework. Properly trained young trees will develop a strong structure that requires less corrective pruning as they mature. The goal in training young trees is to establish a strong, central trunk with sturdy, well-spaced branches.

For most young trees, maintain a single dominant leader growing upward. Do not prune the tip of this leader or allow secondary branches to outgrow it. Sometimes a tree develops double leaders. This can cause structural weakness and alter the form of the tree. Remove or shorten the one which is off-center.

A tree's secondary branches contribute to the development of a sturdy, well-tapered trunk. When numerous branches should be removed, retain some for a year or two to promote the tree's growth.

Do not paint the wounds caused by pruning. Wood dressings do not reduce decay or speed wound closure; in fact, decay increases after the dressing material cracks, allowing moisture to enter and be retained.

Ensure, after several years, that limbs overhanging streets, sidewalks, and parking areas are removed up to 10-12 feet.

Pruning Mature Trees

Specific types of pruning may be necessary to maintain a mature tree in a healthy, safe, and attractive condition.

- **Cleaning** is removal of dead, dying, diseased, weakly attached, and low-vigor branches from the crown of a tree. This includes removing watersprouts (weak, upright twigs on the top of limbs) and suckers (similar twigs at the base of the tree or on the trunk). Remove any stubs caused by improper prior pruning.

- **Thinning** is selective branch removal to improve structure and to increase light penetration and air movement through the crown. Proper thinning opens the foliage of a tree, reduces weight on heavy limbs, and helps retain the tree's natural shape.
- **Raising** removes the lower branches from a tree to provide clearance for buildings, vehicles, pedestrians, and vistas. However, make sure that at least 2/3 of the tree remains; if less will remain, remove lower branches over a period of years.
- **Reduction** reduces the size of a tree, often for utility line clearance. Reducing a tree's height or spread is best accomplished by pruning back the leaders and branch terminals to secondary branches that are large enough to assume the terminal roles (at least one-third the diameter of the cut stem). Always cut diagonally away from the secondary branch, just beyond the beginning of the branch. Reduction helps maintain the form and structural integrity of the tree.
If branches are touching wires, call the electric company to perform reduction.
- **Topping** severely damages trees and ruins their form. It should never be done.

Pruning Conifers

Conifers require little pruning other than to remove dead or damaged branches, and competing leaders. Pruning can generally be done at any time except during hot weather months.

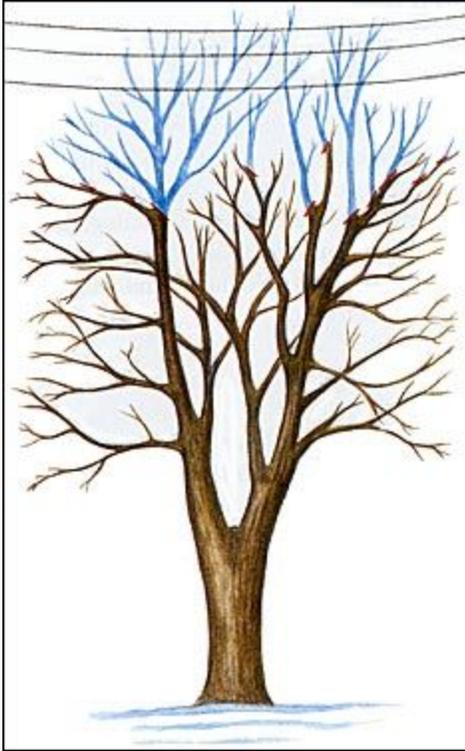


Figure 2. Crown reduction



A. U-shaped strong union **B. V-shaped weak union**

Figure 3. Types of branch unions

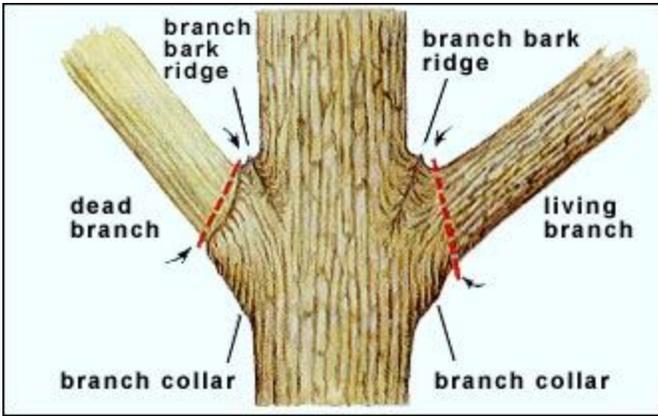


Figure 3. Where to cut.

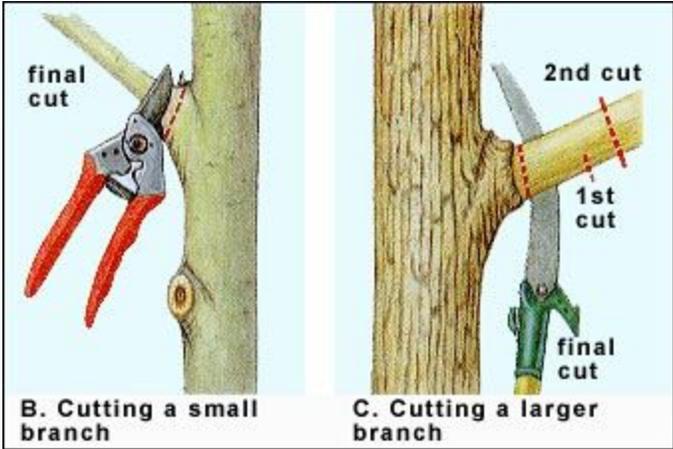


Figure 4. Appropriate tools

Maintaining trees includes many different functions:

- Inspections – note
 - Bark or trunk decay
 - Exposed roots (cover with mulch), or roots circling the trunk (cut)
 - Crown dieback
 - Discolored, dead, or wilted leaves
 - Poor growth
 - Dead or broken limbs
 - Invasive vines
 - Conflicts with walkways, parking areas, overhead wires, or buildings
 - Hazardous conditions
 - Dry soil needing watering
 - Stakes installed at planting which need removal after one year
 - Mulch layers less than 3 inches deep
 - Volcano mulch (mulch piled up on the trunk) needing removal (except when roots are well established in the “volcano”)

If any of these conditions exists, other maintenance actions may be required, such as pruning, watering, mulching, removal of vines, tree removal, or engaging an arborist to evaluate the tree and determine a course of action. Note: well-established trees that are not mulched do not require mulch.

- Pruning – follow the guide in Appendix C.
- Mulching - Mulching can reduce environmental stress by providing trees with a root environment that has fewer temperature and moisture extremes than the surrounding soil. Mulch reduces competition from weeds and grass and prevents mechanical damage by keeping lawn care equipment away from the tree’s base. Mulches made from shredded leaves, pine straw, peat moss, or composted wood chips add nutrients to the soil as they decompose and help improve

overall soil biology. Place mulch around the tree, 3 inches deep, and extending approximately 3 feet from the trunk. Keep mulch 3 inches away from the trunk. Mulch placed (or, worse, piled up on) the trunk retains moisture which can cause tree rot, or insect infestation. Mulch as needed – do not add mulch beyond the 3-inch depth. When adding wood chips, first rake existing chips to prevent formation of a solid layer of wood which would prevent water from reaching the soil.

- Watering – for the first 3 years after planting, water weekly during dry weather (winter, as well as summer if needed; roots can die if they become too dry). Small trees need about 25 gallons of water weekly. Place 25-gallon “gator” bags around the base of the trunk and fill them weekly. It is not practical to water large trees except those adjacent to critical buildings (e.g., senior officers’ quarters, chapels). Do this by placing a hose near the dripline of the tree and let water run slowly. Move the hose after several hours to the other side of the tree, and continue this until most of the area under the tree is saturated.

Appendix D. How To Save A Tree

1. Do not top trees. Tree heights should be lowered by proper crown reduction.
2. When a tree is young, select one of competing upright branches to be the main branch and cut the others off.
3. Remove branches that cross and rub in order to prevent bark wounds.

4. Monitor for insects and diseases and treat appropriately if they are found.
5. Do not use anything to cover pruning cuts or wounds – trees seal their own wounds.
6. Cut broken branches off at the branch bark collar.
7. Use herbicides that will not damage trees.
8. Mulch around the tree to avoid hitting the tree trunk with lawn or edging equipment and to protect surface roots.
9. Dig around roots whenever possible but when not, make a clean pruning cut on the tree side of the root.
10. Know how big a tree will grow (height and width) and plant accordingly away from houses and other obstacles.
11. If you must attach a wire or line to the trunk, use a nail or screw. The tree will seal around the small wound thus made.
12. Cut branches back to laterals so you don't leave stubs which will die back to the branches.
13. Do not make flush cuts. Cut on the outside of the branch bark collar.
14. Stakes generally aren't needed on small trees, but if they are, remove them after one year to avoid any damage.
15. Do not wrap the trunk with anything except a wide wire cage if animals are a problem.
16. Do not let mulch contact the trunk, and pile mulch only 2 to 3 inches over the roots.
17. Do not put any type of fabric or plastic material under your mulch.
18. Do not stack items atop the roots; they cause soil compaction.

19. Before planting, take off any roping around the tree trunk. If the tree is in a container, remove the container.

20. Divert water from the roots of trees that don't like wet soil, but when you water, water deeply to encourage deep root growth.

21. Remove all wire and wrapping from root balls before planting.

22. Dig the hole for planting at least twice as wide as the root system to encourage lateral root growth from the root ball. Do not amend backfill for individual tree holes. Only amend if the entire planting area can be equally amended.

23. Dig your planting hole only as deep as the root system and do not put gravel in the bottom of the hole.