cherrylake

INSTALLATION
BEST PRACTICES

FOR CONTAINER TREE ESTABLISHMENT

TABLE OF CONTENTS

Cherrylake has created Container Tree Establishment – Installation Best Practices both as a marketing and educational tool. The recommendations contained in this guide are based on the experiences of many contributors in the landscape industry over time. This guide is intended to be used as a reference. Its use does not guarantee any particular result in the field nor does its use imply that the user has undergone formal training in the subject matter.

Cherrylake welcomes any comments or suggestions regarding the contents of this guide. Please send your feedback to trees@cherrylake.com. Thank you.

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PRE-INSTALLATION CONSIDERATIONS

Tree Selection

When selecting trees for a particular site, many factors should come into consideration. It is important to understand the planting site(s). Ask the following questions:

- Will the tree you select thrive in the environment where it is planted?
- Is there adequate space, sunlight and water?
- Have you taken into account the eventual mature height and spread of the tree(s) being selected?
- Will this tree impact, or be impacted by, adjacent buildings, streets, sidewalks, overhead utility lines, road signs or streetlights?
- Will the tree tolerate the maximum and minimum temperatures of the area being consid -ered?

Some other things to consider:

- Growth habit and shape of the tree
- Flowering and fruiting trees - will flower and fruit drop be problematic
- Fall leaf color
- Bark texture
- Evergreen or deciduous

Additionally, does the site have unusual site considerations? Such as:

- Salt spray
- Drought periods
- Slope
- Root space restrictions

Job Site Maintenance

On projects where large numbers of trees are to be delivered and received, but not installed immediately, it becomes necessary to set up and maintain a secure holding area. This area should always be set up so that trees are stable enough not to blow over in winds, and it is imperative to have a reliable watering source and method. It is absolutely essential that trees not being installed immediately be maintained as if they were still in the nursery. Failure to properly prepare the site for holding trees for extended periods of time (more than one day) can jeopardize the project long term, trees that are not maintained stable and hydrated will decline.

Shipping and Receiving Trees

When purchasing and shipping trees, it pays to do diligent planning before receiving them. Some things to consider before ordering and receiving trees:

- Were the trees tagged prior to ordering?
- Who is responsible for accepting/rejecting the trees - the owner, landscape contractor, landscape architect or landscape Inspector?
- Is the project site ready for planting? Are tree holes pre-dug?
- Is your water supply secure and functioning?
- Do you have an adequate staging area, based on safety and efficiency?
- What type of truck will be delivering the trees?
- Do you have adequate personnel to handle receiving the trees safely?
- Have you specified and secured the proper equipment to handle the job?

When trees arrive, load should be secure and trees covered with tarp.

Trees should be visually inspected for damage to trunks or branches before offloading.

Proper equipment and safety gear should be used.

INSTALLING THE TREE

Preparing the Planting Site

1. If the native soil at the planting site has been adversely altered, remove as much undesirable back fill as possible and replace with native soil. Planting islands should be totally renovated of undesirable backfill to a depth of 1.5 times the height of the root ball. Restore renovated areas to the landscape grade and remove all weeds and grass.

2. Test the soil at the planting site to determine its pH level. Based on the tree's tolerance of soil (pH) ranges, the soil (pH) may need to be adjusted or another type of tree selected in order to better accommodate the existing soil (pH) conditions.

3. Test soil drainage capabilities by performing a percolation test ('perc test'), this should be done when the soil is neither extremely wet nor extremely dry. Create a 'perc test' by digging a hole 12" deep and filling it with water, then check it regularly for the next 24 hours. If the test hole drains in less than 4 hours, drainage is good; 5-12 hours means moderate drainage; 12-24 hours indicates poor/slow drainage.

4. If a planting site is vulnerable to submerged or high water table soil conditions, a site evaluation should be conducted for possible drainage improvements. Roots of most tree species will die due to lack of oxygen when planted in saturated soils. If planting in poorly drained or submerged soils is inevitable, careful consideration in selecting a tree that has anaerobic qualities and altering the planting technique is imperative to achieving a successful landscape planting.

5. Referencing tree description sources such as Cherrylake's Tree Guide, Horticopia, Arbor Day Foundation, etc., regarding soil (pH) and other environmental preferences for trees, is essential for selecting trees that will yield peak performance for designated planting sites.

Preparing the Root Ball

1. Thoroughly wet root ball. During transportation, soil moisture is reduced and optimum soil moisture levels may not be maintained adequately if the tree is stored prior to planting. When container soil becomes dehydrated, it is sometimes difficult to re-wet. If this occurs, water may move through the root ball profile in channels, leaving dry pockets of soil. Slowly apply water to the root ball until optimum soil moisture is achieved.

2. Remove plastic wrapping or container from the root ball. For large trees, remove the container by either: placing the tree horizontally to the ground near the planting hole and rolling it toward the planting hole while simultaneously pulling the container from the root ball, or placing the tree horizontally to the ground wrapping a well padded sling around the tree's trunk near the soil line, lifting the tree mechanically and pulling the container from the root ball.

3. Remove soil from the top of the root ball to expose the tree's root flare. Cut any girdling roots that may be around the tree's trunk.

4. Loosen the soil at the root ball's periphery by gently tapping with a blunt object, massaging with hands or by using moderate pressure from a water hose. Cut any circling roots that may be exposed at the root ball's periphery by either using a hand held cutting tool or driving a sharp digging spade through the entire root ball's circumference to shave-off one inch from its periphery after the tree is in the planting hole.

Planting the Tree

1. Excavate the planting hole one foot wider than the root ball's diameter. Dig the planting hole to a depth 4 to 6 inches less than the root ball's height.

2. Place the tree's root ball in the center of the planting hole by:
   - Manually lifting or rolling the tree into the planting hole.
   - Mechanically placing forks underneath the root ball and gently sliding it into the plant ing hole.
   - Wrapping a well padded sling around the tree's trunk near the canopy, hanging it from a front-end loader's boom and mechanically moving the tree into the planting hole (place protective padding between the tree and hard surfaces).

3. Rotate the tree to achieve optimum viewing.

4. Verify that the tree's root flare is 4 to 6 inches above the landscape's grade. If the planting hole is too deep or too shallow, leaning the tree, add or remove soil from the bottom of the planting hole as necessary.

5. Add and compact some soil around the root ball to stabilize the tree, while simultaneously plumb the tree for vertical alignment.

6. Using a shovel, cut undisturbed soil from the sides of the planting hole and backfill around the root ball, enlarging the hole to a pit three times the root ball's width, making the pit shallower as it is widen, simultaneously watering the backfill to settle the soil and prevent air pockets.

7. Extensively water the entire planting site (for large trees, use a water stake to drive water deep into the planting hole). The idea is to snugly connect the native soil with the root ball without compacting the soil to the degree that would inhibit root establishment.

8. If the tree must be irrigated by manual or other high water volume means, construct a 3" or higher soil berm around the planting hole (pit) circumference creating a catchment basin. This will direct water into the root ball and the surrounding soil to maximize root establishment in the native soil. When tree is safely established, the soil berm should be removed. Catchment basin should only be used when necessary as they might inhibit proper root development outside the root ball. Properly designed and maintained irrigation bubblers offer the best solution for optimizing tree establishment.

9. We highly recommend the use of bubblers with a catchment basin, but care must be taken to ensure that irrigation mechanism will work appropriately in your specific context. Note that catchment basin irrigation and bubblers can be limited in providing optimum root zone coverage in coarse well-drained soils. The design and maintenance of bubblers on your jobsite

Placing the tree into the planting hold can be done using a front end loader boom.

A proper irrigation system is vital to the plant materials short and long term success.

is a critical step to ensuring success. When bubblers are used to establish trees, catchment basin must contain the necessary volume of water to allow water penetration through the entire area of the root ball. The most optimal situation is to have the tree bubblers on a completely separate zone from the common irrigation system.

10. Cover the entire planting area with a mulch layer following the mulch guidelines below.

Planting in Clay Soils

Clay soils are a challenge because they tend not to drain well and can be compacted. Compact soil causes moisture to be slowly absorbed, and when saturated it may take a long time to dry out. In addition, compacted soils make it hard for tree's roots to penetrate and establish well.

Prior to planting on clay soil:

- Perform a soil pH test. Clay soils tend to be acidic, but not always.
- Perform a perc test. If the test hole drains in less than 12 hours (moderate to good drainage), trees should be planted approximately 4-6" above grade. If it drains in between 12 to 24 hours (poor drainage); trees should be planted with 2/3 of the root ball above landscape grade

Mound soil around the root ball's exposed sides creating a mound three times the root ball's width. Till the soil out from the mound to a diameter five times the root ball's width. Special attention should be given to monitoring soil moisture due to increased drying potential of root ball and mound.

Planting on Slopes

When planting trees on slopes, planning is important relative to the eventual planting depth. Planting to grade on the topside of the slope creates a protrusion on the low side of the slope, causing a steep grade subject to erosion, and if in a turf area, a difficult mowing situation. Planting to grade on the bottom of the slope creates a situation where the backside of the root ball sits well below the topside of the slope. This causes the tree to sit deep in the slope and can cause soil erosion onto the root ball. This situation will often cause erosion to the point that the root ball becomes over-filled and buried. This also can create unsafe conditions in high-use pedestrian areas or for landscape maintenance personnel. This is especially a problem in turf areas. The steeper the slope, the more dramatic this will be.

Expanding the tree planting area well beyond normal standards will assist in preventing one or both of the above situations. The result is that trees planted on slopes will require a much larger tree ring or mulch ring than trees planted on level ground.

Create a flat terrace on the hillside three times the root ball's width by carving soil away from the slope above the planting location and shifting it to the slope below the planting location. Dig the planting hole in the center of the terrace. Plant the tree following the above planting procedure and verify that the tree's root flare is at or above the original soil level.

To retain water on the tree's root ball, build a shallow basin on the tree's uphill side and a soil berm on the downhill side, at the edge of the planting hole.

Once the tree is watered in and all air pockets removed, place all excess remaining excavated soil at the tree's downhill side to enlarge the terrace. Compact the soil to strengthen the berm. Rake the entire planting area to gradually transition into the landscape grade the depression that would normally occur on the top and bottom of the planting terrace.

Planting on soil with inadequate drainage

When planting in sites vulnerable to be submerged or with high water table, plant the tree with most of the root ball above soil grade.

Mark off a planting area at least 5 times the diameter of the tree's root ball. Instead of digging a hole, loosen and break up the soil in the area to a depth of 12 inches with a shovel or tiller. Dig a shallow saucer in the center of the prepared area to set the tree with most of the root ball above the landscape grade. Mount soil around the exposed root ball, using water to settle the soil and prevent air pockets.

Special attention should be given to monitoring soil moisture due to increased drying potential of root ball and mound.

CARING FOR THE TREE

Providing Immediate Post-Planting Care

1. Tree Anchoring

In determining whether anchoring is necessary, or which tree support system is appropriate for optimum tree establishment, one should evaluate the following conditions: planting site (wind and soil conditions), tree size, tree form, canopy density, root ball size and weight, public safety, appearance, and overall reliability and maintenance of the tree support system.

Stabilizing the root ball in the ground is critical to root development of a newly planted tree. Movement of the root ball within the ground will continuously break new roots entering the native soil, causing slow establishment and possible mortality. If it is determined that conditions merit anchoring the tree, the systems should hold the root ball firm in the soil, while allowing for some movement of the trunk. Anchoring devices should be properly designed and installed to withstand harsh wind conditions appropriate for the tree size, structure and canopy density. Materials that attach to the tree should be wide and smooth to avoid trunk damage. There are specifically designed materials for this purpose.

Optional Anchoring methods include:

a. Tree anchoring method: Flat straps (metal cables with tree protective collars for large trees) looped around the tree's leading trunk in a non-binding manner. Extend straps (cables) to three (four for large trees) earth anchors and adjust tautness with adjust able handle or turnbuckle.

b. Root ball anchoring method: Two pair of vertical stakes at the root ball's periphery driven into solid ground at the bottom of the planting hole with horizontal stakes going over the top of the root ball attached to the vertical stakes. Or, flat straps attached to four earth anchors tightened with adjust able handle over two horizontal stakes go ing over the top of the root ball.

c. Two pole method: Two poles driven into solid ground outside of planting hole with flexible attachments from top of the poles looped around the tree's trunk in a non-binding manner.

d. Brace and batten method: Three (four for larger trees) batten clamped over burlap around the tree's trunk attached to wood -en brace and anchored into solid ground

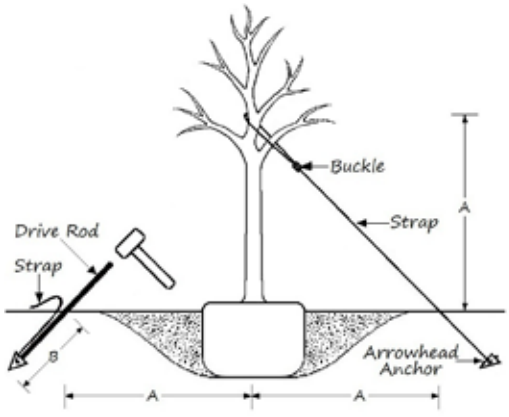
This is an example of a tree anchoring method. It helps the tree reach optimum establishment without the worry of windy conditions or public safety.

outside the planting hole.
Test tree's firmness by shaking the tree in a circular motion and checking for cracks in the soil due to root ball movement. Re-tension straps if root ball movement is observed. Monitoring and appropriate maintenance adjustments of the tree support systems are essential during establishment

Cherrylake recommends the Tree Anchoring Method with three earth anchors and polypropylene straps, 3000lb tear strength, for anchoring trees up to and including 100-gallon size; and four earth anchors and braided galvanized cables, 3000lb tensile strength, for trees including 200-gallon to 670-gallon size. Refer to the Tree Anchoring Table to find the appropriate height to loop straps/cables around tree's leading trunk and distance from the tree to place the earth anchors.

TREE ANCHORING TABLE

Tree height	Distance (A)
8'	5' 6"
10'	6' 8"
12'	8'
14'	9' 4"
16' +	10' 6"



This is an example of an Arrowhead tree anchoring method.

2. Mulching

Research has proven that second to water management of newly transplanted trees, proper mulching will give the greatest return on tree growth and establishment.

The direct benefits of proper mulching are:

- Control or suppression of weed growth, including turf grass from the tree's first-year root establishment zone
- Conserve soil moisture
- Buffer soil temperature extremes
- Replenish organic matter and soil nutrients
- Prevent soil compaction
- Provide erosion control
- Reduce soil moisture evaporation
- Improve water percolation and air movement through the soil
- Reduce fertilizer run-off

The combined effect of these benefits is an improved soil environment that is conducive to improved root development.

Optimum mulching practices involve:

- The use of composted organic materials and aged wood chips (green wood products consume nitrogen, which could cause nutritional problems). Other organic materials could include pine needles, peanut hulls, etc.
- Determine the planting site soil's drainage adequacy. Apply a 1 to 2 inches mulch layer on clayey poor-drained planting sites. Apply a 3 to 4 inches mulch layer on sandy well-drained planting sites.
- Only apply a one inch mulch layer on the tree's root ball, starting 4 inches away from the tree's trunk. Never place mulch on the root flare or against the tree's trunk. A thin layer of mulch over root ball is best, thick layers of mulch over root balls and touching the trunk can cause bark disease, matted roots around trunk, oxygen deprivation and repel water from reaching roots.
- Increase the size of the mulched area as the tree grows until fully established. Under fully established trees, maintain mulch to the tree's drip line. When tree anchoring systems are used, extend the mulch out around the anchors.

3. Fertilizing

Refer to the Fertilizer Reference Table for fertilizer rates. Fertilizer rates are the same high performance rates recommended by manufacturers of slow release fertilizers and utilized by progressive growers of ornamental trees. We feel these rates are appropriate for high performance

container root systems for maintaining nursery vigor and uninterrupted growth progression during the first year of landscape establishment.

a. Fertilizer recommendation is based on an annual rate of 4 pounds of nitrogen per thousand square feet per year, which is also the equivalent of 175 pounds of nitrogen per acre per year. Fertilizer should be applied to the outside portion of the root ball and outside the root ball up to 12" beyond the edge of the root ball.

b. Rate per square foot of area to fertilize is calculated for a 12-4-12 (with minors) blend of slow release fertilizer evenly broadcast over the defined area per tree canopy size (see fertilizer reference table)

c. Soluble fertilizer is not recommended

d. Application is at or shortly after planting for a one-year establishment period.

e. Fertilizer rate is for trees that do not systematically receive turf fertilizer.

f. For restricted root zone areas, such as planters, sidewalks and street curbs apply recommended rate divided by multiples of applications (2 or 3).

g. Cherrylake recommends fertilizer at planting to maintain tree vigor and to promote an uninterrupted growth progression.

Note: Specific site and landscape variables may require flexibility in fertilizer needs.

Fertilizer Reference Table

(for a 12-month period utilizing a slow release blend of 12-4-12 with minors)

Diameter of canopy	1.5X canopy diameter	Square feet of fertilizer area	Rate per tree
3'	4.5'	15.89	.53 lbs
4'	6'	28.26	.946 lbs
5'	7.5'	44.15	1.47 lbs
6'	9'	63.58	2.12 lbs
7'	10.5'	86.54	2.89 lbs
8'	12'	113.04	3.78 lbs
9'	13.5'	143.06	4.78 lbs
10'	15'	176.62	5.91 lbs
11'	16.5'	213.71	7.15 lbs
12'	18'	254.34	8.51 lbs

Following Irrigation Requirements

1. Developing proper irrigation design, scheduling, and monitoring can enhance tree establishment by influencing rapid root growth. Published irrigation guidelines based on tree size, gallons per tree, irrigation intervals, hardiness zones and seasonal conditions are just a starting point to adapt to the many variable circumstances that exist within a new tree planting. Proper irrigation after transplanting involves monitoring climate, soil, and tree conditions, and then adapting irrigation delivery based on the needs of the tree.

2. Variable circumstances that influence irrigation design and scheduling are:
    - Water requirements for each tree species
    - Climatic season and weather pattern within the season
    - Total tree mass in relation to size and condition of root ball
        - The larger the tree mass in relation to the root ball size, the greater the irrigation frequency requirements.
        - The poorer the root structure (large spiraling roots), the greater the irrigation frequency requirements.
    - Evapo-transpiration potential
        - Tree canopies with new tender succulent foliage require more water than canopies with hardened-off foliage
        - Deciduous trees in dormancy require less water
    - Daily evapo-transpiration rates
    - Soil type
        - Coarse, well drained
        - Very fine, compacted, and saturated.
    - Size of plant material
        - Small, i.e. 3- gallon
        - Large, i.e. 670- gallon
    - Frequency of irrigation is influenced by the production method used to grow the tree and the hardening-off practices applied or not applied for stabilizing field grown, fabric container or air-pot/fabric bottom grown trees. Hardened-off field-grown trees are said to require the least frequent irrigation. Solid plastic containers, self-contained air-pots, air-pots with fabric bottoms, fabric containers and freshly dug field grown trees require the most frequent irrigation.

3. Frequency of irrigation cannot be over emphasized. Critical to maintaining nursery vigor and an uninterrupted growth progression in the landscape is the avoidance of unfavorable moisture depletion levels and saturation levels at any time during tree establishment. The best starting point for establishing irrigation frequency is to follow the irrigation frequency and rate that was applied at the nursery. Then adjust frequency and rate based on variable site conditions.

4. Directing water to 100% of the root ball in a manner that water can be absorbed into the root ball when water is needed is critical to optimum tree establishment. Proper irrigation immediately after transplant will influence root growth; therefore the diameter of the tree's irrigation pattern should increase, especially for sandy soils, as the tree's roots expand into the native soil.

5. The most critical time for optimum soil moisture within the planting site is just before darkness. If a tree has optimum soil moisture at this time, the tree's cells have the opportunity to replenish and process water and nutrients without loss from the extreme evapo-transpiration that occurs earlier in the day. Put your trees to bed happy if possible.

6. Critical to scheduling irrigation for newly transplanted trees is the systematic monitoring of soil moisture within the root ball profile, the soil moisture in the adjacent native soil, and the visible hydration level of the tree's foliage. There is no substitute for monitoring soil and tree condition. Soil moisture is monitored for too wet or too dry conditions. Both can contribute to poor tree establishment and/or tree decline. Irrigation should not be applied to a saturated root ball. Fixed irrigation schedules without appropriate monitoring and action can be costly.

Irrigating Guidelines

1. Adjust rates based on the soil moisture within the root ball profile, the soil moisture in the adjacent native soil, and the visible hydration level of the tree's foliage.

2. Water should be delivered to the root ball in a slow manner to allow adequate penetration and absorption.

3. Irrigation rates should be increased with warmer temperatures and decreased with cooler temperatures.

4. Irrigation rates should be reduced during tree dormancy.

5. Establishment rates are based on 6 months per inch of trunk caliper.

6. An optimum root ball soil moisture profile can be better maintained if water is applied in multiple irrigation cycles during the day.

Establishment rates provided below are guidelines. Actual establishment is considered complete once the roots have successfully penetrated the native soils to a point where they can support the tree without supplemental anchoring and irrigation.

Irrigation Guidelines: Hardiness Zones 7 - 8

Water rates are based on 2 gallons of water per caliper inch (University of Florida Research).

Container size	Gallons of water	Schedule	Months to establish
15gal	3	Daily for 1-2 weeks. Every other day for 2 months.	6-12 Months
30gal	5	Daily for 2 weeks. Every other day for 3 months.	12-24 Months
45gal	6	Daily for 2 weeks Every other day for 3 months.	12-24 Months
65gal	7	Daily for 2 weeks. Every other day for 3 months.	12-24 Months
100gal	9	Daily for 2-4 weeks. Every other day for 3 months.	24-36 Months
200gal	11	Daily for 2-4 weeks. Every other day for 3 months.	24-36 Months
300gal	13	Daily for 2-4 weeks. Every other day for 3 months.	24-36 Months
670gal	20	Daily for 2-4 weeks. Every other day for 3 months.	24-36 Months
1,400gal	100	Daily for 2-4 weeks. Every other day for 5 months.	24-36 Months

Irrigation Guidelines: Hardiness Zones 9 - 11

Water rates are based on 3 gallons of water per caliper inch (University of Florida Research).

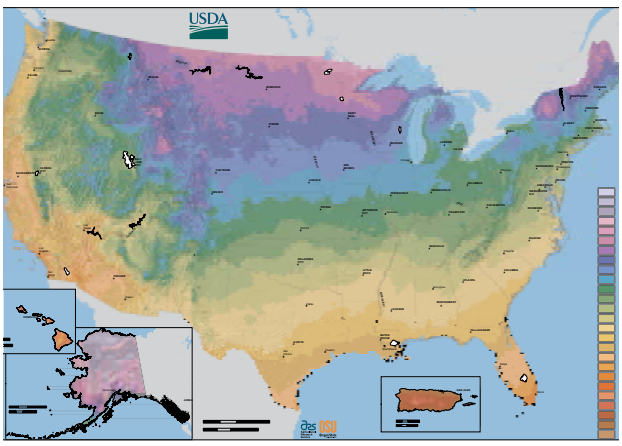
Container size	Gallons of water	Schedule	Months to establish
15gal	4.5	Daily for 2-4 weeks. Every other day for 2 months.	6 months
30gal	7.5	Daily for 1-2 months. Every other day for 4 months.	6-12 Months
45gal	9	Daily for 1-2 months. Every other day for 4 months.	6-12 Months
65gal	10.5	Daily for 1-2 months. Every other day for 4 months.	6-12 Months
100gal	13.5	Daily for 2 months. Every other day for 5 months.	12-24 Months
200gal	16.5	Daily for 2 months. Every other day for 5 months.	12-24 Months
300gal	19.5	Daily for 2 months. Every other day for 5 months.	12-24 Months
670gal	30	Daily for 2 months. Every other day for 5 months.	12-24 Months
1,400gal	100	Daily for 2 months. Every other day for 5 months.	12-24 Months

GLOSSARY OF TERMS

1. Air-pots – a three dimensional air-pruning container designed to achieve optimal root structure during propagation and production stages.
2. Anaerobic – the absence of free oxygen.
3. Anchoring – the process by which trees are stabilized to protect against wind or other forces. Stabilizing systems have many variations.
4. Backfill – refers to putting soil back into the planting hole during planting of trees.
5. Batten – a strip of wood used to hold something in place.
6. Brace – a device that supports and makes stronger or firmer.

Air-pot

7. Catchment basin – area where water converges at a lower elevation.
8. Caliper – instrument used to measure the diameter of a tree, or other object. The measurement is taken 6 inches above the ground on trees up to and including 4" in caliper, and 12 inches above the ground for larger trees.
9. Canopy density – the observed denseness of the tree's canopy, visually and structurally.
10. Deciduous – shedding foliage at the end of the growing season.
11. Dormancy – relatively inactive or resting condition in which some processes are slowed down or suspended; with trees, the end of the growing season.
12. Evapo-transpiration (ET) – the process by which water is pulled out of the tree through the stomata in the leaves. ET rates are dependent of environmental conditions, including light, temperature, wind and humidity.
13. Facing – at time of installation, the positioning or rotating of the tree in the hole to show its most significant or prominent surface to the dominant viewing side.
14. Field-grown/balled and burlap – refers to the nursery production method of growing trees in native soil; balled and burlap trees are taken out of the ground with a ball of soil around the roots and then wrapped in burlap for support.
15. Girdling root – a root that grows around the trunk of a tree thus tending to strangle the tree.
16. Hardening-off – refers to balled & burlap trees that have been held for an extended period of time, under optimum irrigation, until new roots have begun to regenerate.



Hardiness zones

17. Hardiness zones – Developed by the United States Department of Agriculture, the Hardiness Zone Map divides the U.S. into 11 Plant Hardiness Zones based upon average minimum temperatures.
18. Hydration – ability to use water; the act of being hydrated refers to a plant or tree's ability to uptake and use water.
19. Native soil – refers to soil that occurs naturally on a site, not imported material.
20. Percolation – passing of water through a porous zone (or soil).
21. Percolation test (Perc Test) – the practice of digging test holes in the field and checking the rate of drainage by filling the hole and observing the speed of the water absorbing into the soil.
22. Plumb – exactly vertical; in a vertical or perpendicular line.
23. pH - [P(otential of) H(ydrogen)] A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with higher alkalinity and decreasing with higher acidity.
24. Root ball profile – the soil mixture used in potting containers.

Turnbuckle

25. Root flare – the portion of the tree where the trunk widens at the base as it transitions to the root system. The flare occurs at the natural grade of the soil.
26. Scarify – the process of loosening the sides of the tree root ball with a jagged object or pressurized water to disturb the edge of the root ball where it interfaces with the native soil in the planting hole.
27. Soil berm – a ridge made with soil around a planting hole to retain water and deliver it to the tree's roots.
28. Soil moisture profile – drainage and moisture capabilities of soil, based on porosity, particle size and soil types.
29. Sub-grade – the volume of soil below the surface and above the bedrock.
30. Turnbuckle - A coupling with female screw treads used to connect two rods and regulate their length or tension.
31. Water Stake – metal pipe devise used attached to a garden hose to deliver water deep into the planting hole.