PLANTING GUIDELINE FOR OPTIMUM ESTABLISHMENT

Preparing The Planting Site:

1- If native soil at the planting site has been adversely altered, remove undesirable backfill and replace with native soil. Remove as much undesirable backfill as possible. The minimum recommended amount would be two to three times the diameter of the root ball and one and one half the depth of the root ball. Planting islands should be totally renovated of undesirable backfill to a depth of one and one half the depth of the root ball. Restore renovated areas to landscape grade and remove all weeds and grass. Awareness of soil (ph) at the planting site is recommended. Based on the trees tolerance level to soil (ph) ranges, the soil (ph) may need to be amended, or another tree selection made to better accommodate the existing soil (ph) conditions.

2-Liberally excavate the planting hole with widely sloping sides making certain the depth of the hole is not greater than the depth of the root ball. It is better to have the hole slightly shallower than the root ball than slightly deeper than the root ball.

3- Recommended planting hole diameter is dependent on the soil type and condition. If soils are heavy, fine textured and compacted, special care should be taken to dig the planting hole two to three times the diameter of the root ball or, till the soil to a depth of 16" out from a smaller planting hole that is two to three times the diameter of the root ball. If soils are light, coarse textured and optimally aerated, the planting hole can be one and one half times the diameter of the root ball. Critical to optimum tree establishment and tree survival is a properly aerated soil around the root ball that will provide adequate oxygen for roots to develop.

4- If water is in the planting hole, soil must be added to the hole and packed until water is covered. This condition would place the root ball above grade therefore a raised mound of appropriate proportions should be constructed from similar type-site soil. Root balls should never be placed in water.

5- Planting on a slope requires the root flare be slightly higher than the grade on the uphill side. Similar type soil will need to be added to the down hill side of the slope. The amount of soil to add will depend on the slope and the diameter of the root ball.

Preparing The Root Ball For Planting:

1- Remove the tree from the container without cinching the trunk.
   a. Large container trees can be placed horizontally near the planting hole and rolled to the planting hole while simultaneously pulling the container from the root ball, then rolled into the hole in a semi-vertical position.
   b. Another method of removing the container is to place the tree horizontal, place a well padded sling underneath the trunk at the soil line, lift the tree mechanically and pull the container from the root ball. Next place the sling higher on the trunk and pull to vertical position. Once in a vertical position forks can be used to place the tree in the planting hole.
2- Remove any soil or fibrous roots that may be matted around the trees trunk down to the trees crown root flares.
3- Remove container soil from the outer edges of the root ball by gently tapping with a blunt object, massaging with hands or by using moderate pressure from water hose. The objective is to expose roots to be in contact with the native soil where water-holding capacity is greater. Care should be exercised not to

detach or damage roots. The removal of container soil is recommended to the older practice of slicing roots.

4- Thoroughly wet root ball prior to planting. During transportation soil moisture will be reduced and optimum soil moisture levels may not be maintained adequately if the tree is stored at job site prior to planting. When container soil becomes dehydrated it is sometimes difficult to re-wet. If this occurs you may experience water moving through the root ball profile in channels leaving dry pockets. Steps 2 and 3 will assist in evaluating soil moisture status of the root ball. Slowly apply water to the root ball until optimum soil moisture is achieved.

PLANTING HOLE REFERENCE TABLE			
Container Size (Rootball Diameter)	**Planting Hole Diameter 1.5x**	**Planting Hole Diameter 2x**	**Planting Hole Diameter 3x**
15g / 17"	25.5”	34”	51”
30g / 23"	34.5”	46”	69”
45g / 30"	45”	60”	90”
65g / 35"	52.5”	70”	105”
100g / 42"	63”	84”	126”
200g / 48"	72”	96”	144”
300g / 58"	87”	116”	174”
72” Box / 72" x 72”	105”	140”	210”

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Planting The Tree:

1- Place root ball in the center of the hole by-- manually lifting the root ball into the hole,--manually rolling the root ball into the hole,-- or mechanically placing forks underneath the root ball and gently sliding into hole. Do not cinch trunk to place tree in hole.
2- Key your sight on the crown root flare (crown root flares have been exposed in previous steps), making certain the root flare is slightly higher than landscape grade. The top most terminal roots at the outer diameter of the root ball should be even with landscape grade. If the planting hole is too deep or too shallow lean the tree and add or remove soil as necessary. Repeat this procedure for each side of the root ball; simultaneously plumb the tree for vertical alignment during this process. When alignment is complete place a small amount of backfill around the root ball to stabilize. Add water and backfill to planting site while making slicing cuts with deep nursery spade or jet water stake. Soil needs to be snugly connected to the root ball to establish the connection of the roots and the soil-water system. Extensively water the entire planting site to remove all large air pockets; small air pockets could be beneficial by allowing more air to reach the roots. 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.
3- If the tree must be irrigated by manual or other high water volume means, construct a 3” or higher water ring twice the diameter of the root ball. 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 water rings should be removed. Water rings should only be used when necessary. Water rings can inhibit proper root development outside the root ball. Properly designed and sized spray stakes will provide better root establishment.

Immediate Post Plant Care:

1-Staking: In many cases, staking is not necessary. Staking should be done if root ball and/or tree canopy are vulnerable to shifting and or breakage from wind conditions. Optional staking methods are:

a. Tripod Method: Padded ropes or flat ¾” strapping attached to the tree in a non-binding manner. Extend ropes or strapping to three anchor points and adjust tautness with adjustable handle. Monitor tautness of attachments during establishment to avoid trunk damage and blow downs.
b. Two Pole Method: Two poles planted outside of root ball with flexible attachments from poles to tree trunk.
c. Root Ball Staking: Two pair of vertical stakes driven in ground outside of root ball with horizontal stakes going over the top of the root ball attaching to vertical stakes.
d. Root Ball Staking: Two or three vertical wood dowels driven through outer edge of root ball.

2- Mulch: Apply a 3” layer of mulch to an area of two feet diameter per caliper inch of tree trunk. Minimum diameter should be six feet for trees with less than three-inch trunk caliper. A thin layer of mulch should be over the outer half of the root ball with no mulch touching the trunk.

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3- Fertilizer Recommendation for 12 Months Establishment Period Basis for application rate at planting is calculated based on one application of 12-4-12, slow release fertilizers with minors that would provide the equivalent of 400 lbs of nitrogen per acre per year. Area to fertilize is based on applying fertilizer to the area that is the size of the tree canopy. (Fixed canopy size per count size) Application at planting is broadcast over the defined area at the prescribed rate listed within reference table. **NOTE: Rate is for trees that do not receive turf fertilizer**. For restricted root zone areas planters, side walks, street curbs, etc. apply recommended rate divided by multiples of application (2 or 3). After 1-year establishment period trees can be maintained at a rate of 270 lbs of nitrogen per acre per year. Applied to an area that is 1.5 X s the tree canopy.

Fertilizer Reference Table	
Tree Canopy	**Lbs. 12-14-12 Fertilizer**
3’	0.54
4’	0.96
5’	1.5
6’	2.16
7’	2.94
8’	3.84
9’	4.87
10’	6.01
11’	7.27
12’	8.65
13’	10.15
14’	11.77
15’	13.52

Irrigation Requirements For Establishment:

1. Tree establishment can be enhanced as well as financially and personally rewarding with the proper irrigation design, irrigation scheduling and irrigation monitoring If the many irrigation variables of newly planted trees are addressed.
2. Published irrigation guidelines based on tree size, gallons per tree, irrigation intervals, hardiness zones and seasonal conditions are just a starting point for one to adapt to the many variable circumstances that exist within a new tree planting.
3. Variable circumstances that influence irrigation design and scheduling—
   a. Water requirements for each tree species.
   b. Climatic season and weather pattern within the season.
   c. 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 requirements. The poorer the root structure (large spiraling roots), the greater the irrigation requirements.
   d. Trees evapo-transporation potential—large tree canopy with new tender succulent foliage—small tree canopies with hardened off foliage—or deciduous trees in dormancy.
   e. Daily evapotransporation rates.
   f. Soil type from coarse well drained to very fine compacted and saturated.
   g. Size of plant material from 3- gallon to 72” Box.

4. Directing water where it’s needed when its needed is important for optimum tree establishment. Proper irrigation after transplanting will influence rapid root growth therefore the diameter of the trees irrigation pattern should increase as the trees roots expand into native soils.

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5. The most critical time for optimum soil moisture within the planting site is just before darkness. If trees have optimum soil moisture at this time tree establishment will be enhanced. The trees cells have the opportunity to replenish and process water and nutrients without loss from extreme evapo-transporation conditions during this time. 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 trees foliage. There is no substitute for monitoring soil and tree condition. Soil moisture is monitored for too wet or too dry conditions too wet can contribute to poor tree establishment and or tree decline as well as too dry. Irrigation should not be applied to a saturated root ball. Fixed irrigation schedules without appropriate monitoring and action can be costly.

Irrigation Guidelines (Hardiness Zones 7-8)

Container Size	Gallons of Water	Schedule	Months to Establish
15 gal	3	Daily for 1-2 weeks. Every other day for 2 months. Weekly until established	12 months
30 gal	5	Daily for 2 weeks. Every other day for 3 months. Weekly until established.	12-24 months
45 gal 24” Box	6	Daily for 2 weeks. Every other day for 3 months. Weekly until established.	12-24 months
65 gal 30” Box	7	Daily for 2 weeks. Every other day for 3 months. Weekly until established.	12-24 months
95/100 gal 42” Box	9	Daily for 2 weeks. Every other day for 3 months. Weekly until established.	24-36 months
200 gal 48” Box	11	Daily for 2 weeks. Every other day for 3 months. Weekly until established.	24-36 months
300 gal 54” Box	13	Daily for 2 weeks. Every other day for 3 months. Weekly until established.	24-36 months
72” Box	20	Daily for 2 weeks. Every other day for 3 months. Weekly until established.	24-36 months

- Water rates are based on 2 gallons of water per caliper inch (University of Florida Research). Adjust rates plus or minus based on soil moisture profile within root ball and or condition of canopy. Water should be delivered to the root ball in a slow manner to allow for penetration and absorption. Irrigation rates increase with warmer temperatures and decrease with cooler temperatures. Irrigation rates are reduced during tree dormancy.
- Establishment rates are based on 6 months per inch of trunk caliper. Optimum root ball soil moisture profile can be better maintained if water is applied in multiple irrigation cycles during the day.

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Irrigation Guidelines (Hardiness Zones 9-11)			
Container Size	**Gallons of Water**	**Schedule**	**Months to Establish**
15 gal	4.5	Daily for 2-4 weeks. Every other day for 2 months. Weekly until established	6 months
30 gal	7.5	Daily for 1-2 months. Every other day for 4 months. Weekly until established	6-12 months
45 gal 24” Box	9	Daily for 1-2 months. Every other day for 4 months. Weekly until established	6-12 months
65 gal 30” Box	10.5	Daily for 1-2 months. Every other day for 4 months. Weekly until established	6-12 months
95/100 gal 42” Box	13.5	Daily for 2 months. Every other day for 5 months. Weekly until established	12-24 months
200 gal 48” Box	16.5	Daily for 2 months. Every other day for 5 months. Weekly until established	12-24 months
300 gal 54” Box	19.5	Daily for 2 months. Every other day for 5 months. Weekly until established	12-24 months
72” Box	30	Daily for 2 months. Every other day for 5 months. Weekly until established	12-24 months

Irrigation Guidelines (Hardiness Zones 9-11)

- Water rates are based on 3 gallon of water per caliper inch (University of Florida Research)
- Adjust rates plus or minus based on soil moisture profile within root ball and or condition of canopy
- Water should be delivered to the root ball in a slow manner to allow for penetration and absorption
- Irrigation rates increase with warmer temperatures and decrease with cooler temperatures
- Irrigation rates are reduced during tree dormancy
- Establishment rates are based on 3 months per inch of trunk caliper.. Optimum root ball soil moisture profile can be better maintained if water is applied in multiple irrigation cycles during the day

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