1.15 SELECTION AND OBSERVATION OF PLANTS

A. The Owner's Representative may review all plants subject to approval of size, health, quality, character, etc. Review or approval of any plant during the process of selection, delivery, installation and establishment period shall not prevent that plant from later rejection in the event that the plant quality changes or previously existing defects become apparent that were not observed.

B. Plant Selection: The Owner's Representative reserves the right to select and observe all plants at the nursery prior to delivery and to reject plants that do not meet specifications as set forth in this specification. If a particular defect or substandard element can be corrected at the nursery, as determined by the Owner's Representative, the agreed upon remedy may be applied by the nursery or the Contractor provided that the correction allows the plant to meet the requirements set forth in this specification. Any work to correct plant defects shall be at the contractor's expense.

1. The Owner's Representative may make invasive observation of the plant's root system in the area of the root collar and the top of the root ball in general in order to determine that the plant meets the quality requirements for depth of the root collar and presence of roots above the root collar. Such observations will not harm the plant.

2. Corrections are to be undertaken at the nursery prior to shipping.

C. The Contractor shall bear all cost related to plant corrections.

D. All plants that are rejected shall be immediately removed from the site and acceptable replacement plants provided at no cost to the Owner.

E. Submit to the Owner's Representative, for approval, plant sources including the names and locations of nurseries proposed as sources of acceptable plants, and a list of the plants they will provide. The plant list shall include the botanical and common name and the size at the time of selection. Observe all nursery materials to determine that the materials meet the requirements of this section.

F. The Contractor shall require the grower or re-wholesale supplier to permit the Owner's Representative to observe the root system of all plants at the nursery or job site prior to planting including random removal of soil or substrate around the base of the plant. Observation may be as frequent and as extensive as needed to verify that the plants meet the requirements of the specifications and conform to requirements.

G. Where requested by the Owner's Representative, submit photographs of plants or representative samples of plants. Photographs shall be legible and clearly depict the plant specimen. Each submitted image shall contain a height reference, such as a measuring stick. The approval of plants by the Owner's Representative via photograph does not preclude the Owner's Representative's right to reject material while on site.

1.16 PLANT SUBSTITUTIONS FOR PLANTS NOT AVAILABLE

A. Submit all requests for substitutions of plant species, or size to the Owner's Representative, for approval, prior to purchasing the proposed substitution. Request for substitution shall be accompanied with a list of nurseries contacted in the search for the required plant and a record of other attempts to locate the required material. Requests shall also include sources of plants found that may be of a smaller or larger size, or a different shape or habit than specified, or plants of the same genus and species but different cultivar origin, or which may otherwise not meet the requirements of the specifications, but which may be available for substitution.

1.17 SITE CONDITIONS

A. It is the responsibility of the Contractor to be aware of all surface and sub-surface conditions, and to notify the Owner's Representative, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.

1. Should subsurface drainage or soil conditions be encountered which would be detrimental to growth or survival of plant material, the Contractor shall notify the Owner's Representative in writing, stating the conditions and submit a proposal covering cost of corrections. If the Contractor fails to notify the Owner's Representative of such conditions, he/she shall remain responsible for plant material under the warranty clause of the specifications.

B. It is the responsibility of the Contractor to be familiar with the local growing conditions, and if any specified plants will be in conflict with these conditions. Report any potential conflicts, in writing, to the Owner's Representative.

C. This specification requires that all Planting Soil and Irrigation (if applicable) work be completed and accepted prior to the installation of any plants.

1. Planting operations shall not begin until such time that the irrigation system is completely operational for the area(s) to be planted, and the irrigation system for that area has been preliminarily observed and approved by the Owner's Representative.

D. Actual planting shall be performed during those periods when weather and soil conditions are suitable in accordance with locally accepted horticultural practices.

1. Do not install plants into saturated or frozen soils. Do not install plants during inclement weather, such as rain or snow or during extremely hot, cold or windy conditions.

1.18 PLANTING AROUND UTILITIES

A. Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.

B. Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.

C. Notification of Local Utility Locator Service, Sunshine 811, is required for all planting areas: The Contractor is responsible for knowing the location and avoiding utilities that are not covered by Sunshine 811.

PART 2 PRODUCTS

2.1 PLANTS: GENERAL

A. Standards and measurement: Provide plants of quantity, size, genus, species, and variety or cultivars as shown and scheduled in contract documents.

1. All plants including the root ball dimensions or container size to trunk caliper ratio shall conform to ANSI Z60.1 "American Standard for Nursery Stock" latest edition, unless modified by provisions in this specification. When there is a conflict between this specification and ANSI Z60.1, this specification section shall be considered correct.

2. Plants larger than specified may be used if acceptable to the Owner's Representative. Use of such plants shall not increase the contract price. If larger plants are accepted the root ball size shall be in accordance with ANSI Z-60.1. Larger plants may not be acceptable if the resulting root ball cannot be fit into the required planting space.

3. If a range of size is given, no plant shall be less than the minimum size and not less than 50 percent of the plants shall be as large as the maximum size specified. The measurements specified are the minimum and maximum size acceptable and are the measurements after pruning, where pruning is required.

B. Proper Identification: All trees shall be true to name as ordered or shown on planting plans.

C. Compliance: All trees shall comply with federal and state laws and regulations requiring observation for plant disease, pests, and weeds. Observation certificates required by law shall accompany each shipment of plants.

D. Plant Quality:

1. **General**: Provide healthy stock, grown in a nursery and reasonably free of die-back, disease, insects, eggs, bores, and larvae. At the time of planting all plants shall have a root system, stem, and branch form that will not restrict normal growth, stability and health for the expected life of the plant

2. **Plant quality above the soil line:**

a. Plants shall be healthy with the color, shape, size and distribution of trunk, stems, branches, buds and leaves normal to the plant type specified. Tree quality above the soil line shall comply with the Florida Grades and Standards tree grade Florida Fancy or Florida #1 and the following:

1.) Crown: The form and density of the crown shall be typical for a young specimen of the species or cultivar pruned to a central and dominant leader.

a.) Crown specifications do not apply to plants that have been specifically trained in the nursery as topiary, espalier, multi-stem, clump, or unique selections such as contorted or weeping cultivars.

2.) Leaves: The size, color, and appearance of leaves shall be typical for the time of year and stage of growth of the species or cultivar. Trees shall not show signs of prolonged moisture stress or over watering as indicated by wilted, shriveled, or dead leaves.

3.) Branches: Shoot growth (length and diameter) throughout the crown should be appropriate for the age and size of the species or cultivar. Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.

a.) Main branches shall be distributed along the central leader not clustered together. They shall form a balanced crown appropriate for the cultivar/species.

b.) Branch diameter shall be no larger than two-thirds (one-half is preferred) the diameter of the central leader measured 1 inch above the branch union.

c.) The attachment of the largest branches (scaffold branches) shall be free of included bark.

4.) Trunk: The tree trunk shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks (fungal fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions (mechanical injury).

3. Trees shall have one central leader. If the leader was headed, a new leader (with a live terminal bud) at least one-half the diameter of the pruning cut shall be present.

1.) All trees are assumed to have one central leader trees unless a different form is specified in the plant list or drawings.

4. All graft unions, where applicable, shall be completely closed without visible sign of graft rejection. All grafts shall be visible above the soil line.

5. Trunk caliper and taper shall be sufficient so that the lower five feet of the trunk remains vertical without a stake. Auxiliary stake may be used to maintain a straight leader in the upper half of the tree.

3. **Plant quality at or below the soil line:**

a. Plant roots shall be normal to the plant type specified. Root observations shall take place without impacting tree health. Root quality at or below the soil line shall comply with the project Root Acceptance details and the following:

1.) The roots shall be reasonably free of scrapes, broken or split wood.

2.) The root system shall be reasonably free of injury from biotic (e.g., insects and pathogens) and abiotic (e.g., herbicide toxicity and salt injury) agents. Wounds resulting from root pruning used to produce a high quality root system are not considered injuries.

3.) A minimum of three structural roots reasonably distributed around the trunk (not clustered on one side) shall be found in each plant. Root distribution shall be uniform throughout the root ball, and growth shall be appropriate for the species.

a.) Plants with structural roots on only one side of the trunk (J roots) shall be rejected.

4.) The root collar shall be within the upper 2 inches of the substrate/soil. Two structural roots shall reach the side of the root ball near the top surface of the root ball. The grower may request a modification to this requirement for species with roots that rapidly descend, provided that the grower removes all stem girdling roots above the structural roots across the top of the root ball.

5.) The root system shall be reasonably free of stem girdling roots over the root collar or kinked roots from nursery production practices.

6.) At time of observations and delivery, the root ball shall be moist throughout. Roots shall not show signs of excess soil moisture conditions as indicated by stunted, discolored, distorted, or dead roots.

E. Submittals: Submit for approval the required plant quality certifications from the grower where plants are to be purchased, for each plant type. The certification must state that each plant meets all the above plant quality requirements.

1. The grower's certification of plant quality does not prohibit the Owner's Representative from observing any plant or rejecting the plant if it is found to not meet the specification requirements.

2.2 ROOT BALL PACKAGE OPTIONS: The following root ball packages are permitted. Specific root ball packages shall be required where indicated on the plant list or in this specification. Any type of root ball packages that is not specifically defined in this specification shall not be permitted.

A. BALLED AND BURLAPPED PLANTS

2. All Balled and Burlapped Plants shall be field grown, and the root ball packaged in a burlap and twine and/or burlap and wire basket package.

3. Plants shall be harvested with the following modifications to standard nursery practices.

a. Prior to digging any tree that fails to meet the requirement for maximum soil and roots above the root collar, carefully removed the soil from the top of the root ball of each plant, using hand tools, water or an air spade, to locate the root collar and attain the soil depth over the structural roots requirements. Remove all stem girdling roots above the root collar. Care must be exercised not to damage the surface of the root collar and the top of the structural roots.

b. Trees shall be dug for a minimum of 4 weeks and a maximum of 52 weeks prior to shipping. Trees dug 4 to 52 weeks prior to shipping are defined as hardened-off. Digging is defined as cutting all roots and lifting the tree out of the ground and either moving it to a new location in the nursery or placing it back into the same hole. Tress that are stored out of the ground shall be placed in a holding area protected from extremes of wind and sun with the root ball protected by covering with mulch or straw and irrigated sufficiently to keep moisture in the root ball above wilt point and below saturation

c. If wire baskets are used to support the root ball, a "low profile" basket shall be used. A low profile basket is defined as having the top of the highest loops on the basket no less than 4 inches and no greater than 8 inches below the shoulder of the root ball package. The basket shall be removed completely at time of planting.

1.) At nurseries where sandy soils prevent the use of "low profile baskets", baskets that support the entire root ball, including the top, are allowable.

d. Twine and burlap used for wrapping the root ball package shall be natural, biodegradable material. If the burlap decomposes after digging the tree then the root ball shall be re-wrapped prior to shipping if roots have not yet grown to keep root ball intact during shipping.

SPADE HARVESTED AND TRANSPLANTED

1. Spade Harvested and Transplanted Plants shall meet all the requirements for field grown trees. Root ball diameters shall be of similar size as the ANSI Z60.1 requirements for Balled and Burlapped plants.

2. Trees shall be harvested prior to leafing out (bud break) in the spring or during the fall planting period except for plants know to be considered as fall planting hazards. Plants that are fall planting hazards shall only be harvested prior to leafing out in the spring.

3. Trees shall be moved and planted within 48 hours of the initial harvesting and shall remain in the spade machine until planted.

C. CONTAINER (INCLUDING ABOVE-GROUND FABRIC CONTAINERS AND BOXES) PLANTS

4. Container plants may be permitted only when indicated on the drawing, in this specification, or approved by the Owner's Representative.

5. Provide plants shall be established and well rooted in removable containers.

6. Container class size shall conform to ANSI Z60.1 for container plants for each size and type of plant.

D. BARE ROOT PLANTS

7. Harvest bare root plants while the plant is dormant and a minimum of 4 weeks prior to leaf out (bud break).

8. The root spread dimensions of the harvested plants shall conform to ANSI Z60.1 for nursery grown bare root plants for each size and type of plant. Just prior to shipping to the job site, dip the root system into a slurry of hydrogel (cross linked polyacrylamide) and water mixed at a rate of 15 oz. of hydrogel in 25 gallons of water. Do not shake off the excess hydrogel. Place the root system in a pleated black plastic bag and tie the bag snugly around the trunk. Bundle and tie the upper branches together.

9. Keep the trees in a cool dark space for storage and delivery. If daytime outside temperatures exceeds 70 degrees F, utilize a refrigerated storage area with temperature between 35 and 50 degrees.

10. Where possible, plan time of planting to be before bud break. For trees to be planted after bud break, place the trees before bud break in an irrigated bed of pea gravel.

a. The pea gravel bed shall be 18 inches deep over a sheet of plastic.

b. Space trees to allow the unbundled branches to grow without shading each other.

c. Once stored in pea gravel, allow the trees sufficient time for the new root system to flush and spring growth of leaves to fully develop before planting.

d. Pea gravel stored trees may be kept for up to one growing season.

e. Pea gravel stored trees shall be dipped, packaged and shipped similar to the requirements for freshly dug bare root trees above.

2.3 ANNUAL FLOWERING AND SEASONAL COLOR PLANTS

E. Container or flat-grown plants should be sized as noted in the planting plan. Plants shall be well-rooted and healthy.

2.4 PALMS

F. Except as modified below or where the requirements are not appropriate to the specification of palms, palms shall meet all the requirements of the plant quality section above.

G. Defronding, tying, and hedging:

5. In preparing palm trees for relocation, all dead fronds shall be removed.

6. All remaining fronds above horizontal shall be lifted up and tied together around the crown in an upright position. Do not tie too tightly, bind or injure the bud. Jute binder twine shall be used in tying up the fronds; wire will not be permitted. Fronds shall be untied immediately after planting.

C. Digging the root ball:

1. When digging out the root ball, no evacuation shall be done closer than 24 Inches to the trunk at ground level and the excavation shall extend below the major root system to a minimum depth of 3.5 feet. The bottom of the root ball shall be cut off square and perpendicular to the trunk below the major root system.

D. The Contractor shall not free-fall, drag, roll or abuse the tree or put a strain on the crown (bud area) at any time. A protective device shall be used around the trunk of the tree while lifting and relocating so as not to injure the bud, or scar or skin the trunk in any way.

2.5 PLANTING SOIL

Planting Soil shall contain a mixture of 1/3 sand, $\frac{1}{3}$ topsoil and $\frac{1}{3}$ peat humus. Sand shll be clean, salt-free and containing no extraneous matter. Topsoil shall be friable fertile soil with representative characteristics of area soils. it should be free of heacy silt, stone, excess lime, shell rock, plant roots, debris or other foreign matter. It shall not contain noxious plant growth (such as bermuda, torpedo or nut grass). it shall test between the ph range of 5.0 to 7.0 unless otherwise specified and contain no toxic residue or substances that would endanger plant growth. if topsoil is not available on site, it shall be imported from local sources with similar soil characteristics to that found at project site. obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth not less than 4". Peat humus shall be decomposed peat with no identifiable fibers or if available, muck may be substituted and shall be free from stones, excessive plant roots, debris or other foreign matter. muck shall not be overly saturated with water.

2.6 MULCH

A. Mulch shall be Melaleuca or Eucalyptus and shall cover all landscape bed areas in a 3" minimum layer. Do not let mulch pile up on root ball or around trunks of trees plants. Submit supplier's product specification data sheet and a one gallon sample for approval.

2.7 TREE STAKING AND GUYING MATERIAL

A. Tree guying to be flat woven polypropylene material, 3/4 inch wide, and 900 lb. break strength. Color to be Green. Product to be ArborTie manufactured by Deep Root Partners, L.P. or approved equal.

B. Stakes shall be lodge pole stakes free of knots and of diameters and lengths appropriate to the size of plant as required to adequately support the plant.

C. Below ground anchorage systems to be constructed of 2 x 2 dimensional untreated wood securing (using 3 inch long screws) horizontal portions to 4 feet long vertical stakes driven straight into the ground outside the root ball.

D. Submit manufacturer's product data for approval.

2.9 WATERING BAGS

E. Plastic tree watering bags holding a minimum of 15 gallons of water and with a slow drip hole(s) water release system, specifically designed to water establishing trees. Water should release over a several day period, not within a few hours

F. Watering bags shall be:

1. Treegator Irrigation Bags sized to the appropriate model for the requirements of the plant, manufactured by Spectrum Products, Inc., Youngsville, NC 27596.

2. Ooze Tube sized to the appropriate model for the requirements of the plant, manufactured by Engineered Water Solutions, Atlanta, GA.

3. Or approved equal.

C. Submit manufacturer's product data for approval.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Protect materials from deterioration during delivery and storage. Adequately protect plants from drying out, exposure of roots to sun, wind or extremes of heat and cold temperatures. If planting is delayed more than 24 hours after delivery, set plants in a location protected from sun and wind. Provide adequate water to the root ball package during the shipping and storage period.

1. All plant materials must be available for observation prior to planting.

2. Using a soil moisture meter, periodically check the soil moisture in the root balls of all plants to assure that the plants are being adequately watered. Volumetric soil moisture shall be maintained above wilting point and below field capacity for the root ball substrate or soil.

B. Do not deliver more plants to the site than there is space with adequate storage conditions. Provide a suitable remote staging area for plants and other supplies.

1. The Owner's Representative or Contractor shall approve the duration, method and location of storage of plants.

C. Provide protective covering over all plants during transporting.

3.2 ADVERSE WEATHER CONDITIONS

A. No planting shall take place during extremely hot, dry, windy or freezing weather.

3.3 COORDINATION WITH PROJECT WORK

A. The Contractor shall coordinate with all other work that may impact the completion of the work.

B. Prior to the start of work, prepare a detailed schedule of the work for coordination with other trades.

C. Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Owner's Representative of any conflicts encountered.

3.4 LAYOUT AND PLANTING SEQUENCE

A. Relative positions of all plants and trees are subject to approval of the Owner's Representative.

B. Notify the Owner's Representative, one (1) week prior to layout. Layout all individual tree and shrub locations. Place plants above surface at planting location or place a labeled stake at planting location. Layout bed lines with paint for the Owner's Representative's approval. Secure the Owner's Representative's acceptance before digging and start of planting work.

C. When applicable, plant trees before other plants are installed.

D. It is understood that plants are not precise objects and that minor adjustments in the layout will be required as the planting plan is constructed. These adjustments may not be apparent until some or all of the plants are installed. Make adjustments as required by the Owner's Representative including relocating previously installed plants.

3.5 SOIL PROTECTION DURING PLANT DELIVERY AND INSTALLATION

A. Protect soil from compaction during the delivery of plants to the planting locations, digging of planting holes and installing plants.

1. Where possible deliver and plant trees that require the use of heavy mechanized equipment prior to final soil preparation and tilling. Where possible, restrict the driving lanes to one area instead of driving over and compacting a large area of soil.

2. Till to a depth of 6 inches, all soil that has been driven over during the installation of plants.

3.6 SOIL MOISTURE

A. Volumetric soil moisture level, in both the planting soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilting point and below field capacity for each type of soil texture within the following ranges.

Soil type	Permanent wilting point	Field capacity
Sand, Loamy sand, Sandy loam	5 - 8%	12-18%
Loam, Sandy clay, Sandy clay loam	14 - 25%	27-36%
Clay loam, Silt loam	11 - 22%	31 - 36%
Silty clay, Silty clay loam	22 - 27%	38 - 41%

1. Volumetric soil moisture shall be measured with a digital moisture meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent.

B. The Contractor shall confirm the soil moisture levels with a moisture meter. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity.

3.7 INSTALLATION OF PLANTS: GENERAL

C. Observe each plant after delivery and prior to installation for damage of other characteristics that may cause rejection of the plant. Notify the Owner's Representative of any condition observed.

D. No more plants shall be distributed about the planting bed area than can be planted and watered on the same day.

E. The root system of each plant, regardless of root ball package type, shall be observed by the Contractor, at the time of planting to confirm that the roots meet the requirements for plant root quality in Part 2 Products: Plants General: Plant Quality. The Contractor shall undertake at the time of planting, all modifications to the root system required by the Owner's Representative to meet these quality standards.

1. Modifications, at the time of planting, to meet the specifications for the depth of the root collar and removal of stem girdling roots and circling roots may make the plant unstable or stress the plant to the point that the Owner's Representative may choose to reject the plant rather than permitting the modification.

2. Any modifications required by the Owner's Representative to make the root system conform to the plant quality standards outlined in Part 2 Products: Plants General: Quality, or other requirements related to the permitted root ball package, shall not be considered as grounds to modify or void the plant warranty.

3. The resulting root ball may need additional staking and water after planting. The Owner's Representative may reject the plant if the root modification process makes the tree unstable or if the tree is not healthy at the end of the warranty period. Such plants shall still be covered under the warranty

4. The Contractor remains responsible to confirm that the grower has made all required root modifications noted during any nursery observations.

F. Container and Boxed Root Ball Shaving: The outer surfaces of ALL plants in containers and boxes, including the top, sides and bottom of the root ball shall be shaved to remove all circling, descending, and matted roots. Shaving shall be performed using saws, knives, sharp shovels or other suitable equipment that is capable of making clean cuts on the roots. Shaving shall remove a minimum of one inch of root mat or up to 2 inches as required to remove all root segments that are not growing reasonably radial to the trunk.

G. Exposed Stem Tissue after Modification: The required root ball modifications may result in stem tissue that has not formed trunk bark being exposed above the soil line. If such condition occurs, wrap the exposed portion of the stem in a protective wrapping with a white filter fabric. Secure the fabric with biodegradable masking tape. DO NOT USE string, twine, green nursery ties or any other material that may girdle the trunk if not removed.

H. Excavation of the Planting Space: Using hand tools or tracked mini-excavator, excavate the planting hole into the Planting Soil to the depth of the root ball measured after any root ball modification to correct root problems, and wide enough for working room around the root ball or to the size indicated on the drawing or as noted below.

1. For trees and shrubs planted in soil areas that are NOT tilled or otherwise modified to a depth of at least 12 inches over a distance of more than 10 feet radius from each tree, or 5 feet radius from each shrub, the soil around the root ball shall be loosened as defined below or as indicated on the drawings.

a. The area of loosening shall be a minimum of 3 times the diameter of the root ball at the surface sloping to 2 times the diameter of the root ball at the depth of the root ball.

b. Loosening is defined as digging into the soil and turning the soil to reduce the compaction. The soil does not have to be removed from the hole, just dug, lifted and turned. Lifting and turning may be accomplished with a tracked mini excavator, or hand shovels.

2. If an auger is used to dig the initial planting hole, the soil around the auger hole shall be loosened as defined above for trees and shrubs planted in soil areas that are NOT tilled or otherwise modified.

3. The measuring point for root ball depth shall be the average height of the outer edge of the root ball after any required root ball modification.

4. If motorized equipment is used to deliver plants to the planting area over exposed planting beds, or used to loosen the soil or dig the planting holes, all soil that has been driven over shall be tilled to a depth of 6 inches.

H. For trees to be planted in prepared Planting Soil that is deeper than the root ball depth, compact the soil under the root ball using a mechanical tamper to assure a firm bedding for the root ball. If there is more than 12 inches of planting soil under the root ball excavate and tamp the planting soil in lifts not to exceed 12 inches.

I. Set top outer edge of the root ball at the average elevation of the proposed finish. Set the plant plumb and upright in the center of the planting hole. The tree graft, if applicable, shall be visible above the grade. Do not place soil on top of the root ball.

J. The Owner's Representative may request that plants orientation be rotated when planted based on the form of the plant.

K. Backfill the space around the root ball with the same planting soil or existing soil that was excavated for the planting space. See Specification Section Planting Soil, for requirements to modify the soil within the planting bed.

L. Brace root ball by tamping Planting Soil around the lower portion of the root ball. Place additional Planting Soil around base and sides of ball in six-inch (6") lifts. Lightly tamp each lift using foot pressure or hand tools to settle backfill, support the tree and eliminate voids. DO NOT over compact the backfill or use mechanical or pneumatic tamping equipment. Over compaction shall be defined as greater than 85% of maximum dry density, standard proctor or greater than 250 psi as measured by a cone penetrometer when the volumetric soil moisture is lower than field capacity.

1. When the planting hole has been backfilled to three quarters of its depth, water shall be poured around the root ball and allowed to soak into the soil to settle the soil. Do not flood the planting space. If the soil is above field capacity, allow the soil to drain to below field capacity before finishing the planting. Air pockets shall be eliminated and backfill continued until the planting soil is brought to grade level.

M. Where indicated on the drawings, build a 4 inch high, level berm of Planting Soil around the outside of the root ball to retain water. Tamp the berm to reduce leaking and erosion of the saucer.

N. Thoroughly water the Planting Soil and root ball immediately after planting.

O. Remove all nursery plant identification tags and ribbons as per Owner's Representative instructions. The Owner's Representative's seals are to remain on plants until the end of the warranty period.

P. Remove corrugated cardboard trunk protection after planting.

Q. Follow additional requirements for the permitted root ball packages.

3.8 Permitted Root ball packages and Special planting requirements

A. The following are permitted root ball packages and special planting requirements that shall be followed during the planting process in addition to the above General planting requirements.

B. BALLED AND BURLAPPED PLANTS

1. After the root ball has been backfilled, remove all twine and burlap from the top of the root ball. Cut the burlap away; do not fold down onto the Planting Soil.

2. If the plant is shipped with a wire basket that does not meet the requirements of a "Low Rise" basket, remove the top 6 - 8 inches of the basket wires just before the final backfilling of the tree.

3. Earth root balls shall be kept intact except for any modifications required by the Owner's Representative to make root package comply with the requirement in Part 2 Products.

C. SPADE HARVESTED AND TRANSPLANTED PLANTS

1. After installing the tree, loosen the soil along the seam between the root ball and the surrounding soil out to a radius from the root ball edge equal to the diameter of the root ball to a depth of 8 - 10 inches by hand digging to disturb the soil interface.

2. Fill any gaps below this level with loose soil.

D. CONTAINER (INCLUDES BOXED AND ABOVE-GROUND FABRIC CONTAINERS) PLANTS

1. This specification assumes that most container plants have significant stem girdling and circling roots, and that the root collar is too low in the root ball.

2. Remove the container.

3. Perform root ball shaving as defined in Installation of Plants: General above.

4. Remove all roots and substrate above the root collar and the main structural roots according to root correction details so root system conforms to root observations detail.

5. Remove all substrate at the bottom of the root ball that does not contain roots.

6. Using a hose, power washer or air excavation device, wash out the substrate from around the trunk and top of the remaining root ball and find and remove all stem girdling roots within the root ball above the top of the structural roots.

E. BARE ROOT PLANTS

1. Dig the planting hole to the diameter of the spread of the roots to a depth in the center that maintains the root collar at the elevation of the surrounding finished grade and slightly deeper along the edges of the hole.

2. Spread all roots out radial to the trunk in the prepared hole making the hole wider where needed to accommodate long roots. Root tips shall be directed away from the trunk. Prune any broken roots removing the least amount of tissue possible.

3. Maintain the trunk plumb while backfilling soil around the roots.

4. Lightly tamp the soil around the roots to eliminate voids and reduce settlement.

3.9 GROUND COVER, PERENNIAL AND ANNUAL PLANTS

A. Assure that soil moisture is within the required levels prior to planting. Irrigation, if required, shall be applied at least 12 hours prior to planting to avoid planting in muddy soils.

B. Assure that soil grades in the beds are smooth and as shown on the plans.

C. Plants shall be planted in even, triangularly spaced rows, at the intervals called out for on the drawings, unless otherwise noted. The first row of Annual flower plants shall be 6 inches from the bed edge unless otherwise directed.

D. Dig planting holes sufficiently large enough to insert the root system without deforming the roots. Set the top of the root system at the grade of the soil.

E. Schedule the planting to occur prior to application of the mulch. If the bed is already mulched, pull the mulch from around the hole and plant into the soil. Do not plant the root system in the mulch. Pull mulch back so it is not on the root ball surface.

F. Press soil to bring the root system in contact with the soil.

G. Spread any excess soil around in the spaces between plants.

H. Apply mulch to the bed being sure not to cover the tops of the plants with or the tops of the root ball with mulch.

I. Water each planting area as soon as the planting is completed. Apply additional water to keep the soil moisture at the required levels. Do not over water.

3.10 PALM PLANTING

A. Palm trees shall be placed at grade making sure not to plant the tree any deeper in the ground than the palm trees originally stood.

B. The trees shall be placed with their vertical axis in a plumb position.

C. All backfill shall be native soil except in cases where planting in rock. Water-settle the back fill.

D. Do not cover root ball with mulch or topsoil.

E. Provide a watering berm at each palm. Berms shall extend a minimum of 18 inches out from the trunk all around and shall be a minimum of (6) inches high.

F. Remove twine which ties fronds together after placing palm in planting hole and securing it in the upright position.

3.11 STAKING AND GUYING

A. Do not stake or guy trees unless specifically required by the Contract Documents, or in the event that the Contractor feels that staking is the only alternative way to keep particular trees plumb.

6. The Owner's Representative shall have the authority to require that trees are staked or to reject staking as an alternative way to stabilize the tree.

7. Trees that required heavily modified root balls to meet the root quality standards may become unstable. The Owner's Representative may choose to reject these trees rather than utilize staking to temporarily support the tree.

B. Trees that are guyed shall have their guys and stakes removed after one full growing season or at other times as required by the Owner's Representative.

C. Tree guying shall utilize the tree staking and guying materials specified. Guying to be tied in such a manner as to create a minimum 12-inch loop to prevent girdling. Refer to manufacturer's recommendations and the planting detail for installation.

1. Plants shall stand plumb after staking or guying.

2. Stakes shall be driven to sufficient depth to hold the tree rigid.

D. For trees planted in planting mix over waterproofed membrane, use dead men buried 24 inches to the top of the dead man, in the soil. Tie the guy to the dead man with a double wrap of line around the dead man followed by a double half hitch. When guys are removed, leave the dead men in place and cut the guy tape 12 inches above the ground, leaving the tape end covered in mulch.

3.12 STRAIGHTENING PLANTS

A. Maintain all plants in a plumb position throughout the warranty period. Straighten all trees that move out of plumb including those not staked. Plants to be straightened shall be excavated and the root ball moved to a plumb position, and then re-backfilled.

B. Do not straighten plants by pulling the trunk with guys.

3.13 INSTALLATION OF FERTILIZER AND OTHER CHEMICAL ADDITIVES

A. Do not apply any soluble fertilizer to plantings during the first year after transplanting unless soil test determines that fertilizer or other chemical additives is required. Apply chemical additives only upon the approval of the Owner's Representative.

B. Controlled release fertilizers shall be applied according to the manufacturer's instructions and standard horticultural practices.

3.14 PRUNING OF TREES AND SHRUBS

A. Prune plants as directed by the Owner's Representative. Pruning trees shall be limited to addressing structural defects as shown in details; follow recommendations in "Structural Pruning: A Guide For The Green Industry" published by Urban Tree Foundation, Visalia CA.

B. All pruning shall be performed by a person experienced in structural tree pruning.

C. Except for plants specified as multi-stemmed or as otherwise instructed by the Owner's Representative, preserve or create a central leader.

D. Pruning of large trees shall be done using pole pruners or if needed, from a ladder or hydraulic lift to gain access to the top of the tree. Do not climb in newly planted trees. Small trees can be structurally pruned by laying them over before planting. Pruning may also be performed at the nursery prior to shipping.

E. Remove and replace excessively pruned or malformed stock resulting from improper pruning that occurred in the nursery or after.

F. Pruning shall be done with clean, sharp tools.

G. No tree paint or sealants shall be used.

3.15 MULCHING OF PLANTS

A. Apply 3 inches of mulch before settlement, covering the entire planting bed area. Install no more than 1 inch of mulch over the top of the root balls of all plants. Taper to 2 inches when abutting pavement.

B. For trees planted in lawn areas the mulch shall extend to a 5 foot radius around the tree or to the extent indicated on the plans.

C. Lift all leaves, low hanging stems and other green portions of small plants out of the mulch if covered.

3.16 PLANTING BED FINISHING

A. After planting, smooth out all grades between plants before mulching.

B. Separate the edges of planting beds and lawn areas with a smooth, formed edge cut into the turf with the bed mulch level slightly lower, 1 and 2 inches, than the adjacent turf sod or as directed by the Owner's Representative. Bed edge lines shall be a depicted on the drawings.

3.17 WATERING

A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants from the point of installation until the date of Substantial Completion Acceptance. The Contractor shall adjust the automatic irrigation system, if available, and apply additional or adjust for less water using hoses as required.

B. Hand water root balls of all plants to assure that the root balls have moisture above wilt point and below field capacity. Test the moisture content in each root ball and the soil outside the root ball to determine the water content.

3.18 CLEAN-UP

A. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.

1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.

B. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The Owner's Representative's seals are to remain on the trees and removed at the end of the warranty period.

C. Make all repairs to grades, ruts, and damage by the plant installer to the work or other work at the site.

D. Remove and dispose of all excess planting soil, subsoil, mulch, plants, packaging, and other material brought to the site by the Contractor.

3.19 PROTECTION DURING CONSTRUCTION

A. The Contractor shall protect planting and related work and other site work from damage due to planting operations, operations by other Contractors or trespassers. Maintain protection during installation until Substantial Completion Acceptance. Treat, repair or replace damaged work immediately.

B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain, including roots, trunk or branches of large existing trees, soil, paving, utilities, lighting, irrigation, other finished work and surfaces including those on adjacent property, shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Owner's Representative shall determine when such cleaning, replacement or repair is satisfactory.

3.20 PLANT MAINTENANCE PRIOR TO SUBSTANTIAL COMPLETION ACCEPTANCE

A. During the project work period and prior to Substantial Completion Acceptance, the Contractor shall maintain all plants.

B. Maintenance during the period prior to Substantial Completion Acceptance shall consist of pruning, watering, cultivating, weeding, mulching, removal of dead material, repairing and replacing of tree stakes, tightening and repairing of guys, repairing and replacing of damaged tree wrap material, resetting plants to proper grades and upright position, and furnishing and applying such sprays as are necessary to keep plantings reasonably free of damaging insects and disease, and in healthy condition. The threshold for applying insecticides and herbicide shall follow established Integrated Pest Management (IPM) procedures. Mulch areas shall be kept reasonably free of weeds, grass.

3.21 SUBSTANTIAL COMPLETION ACCEPTANCE

A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete.

1. Notification shall be at least 7 days prior to the date the contractor is requesting the review.

B. The date of substantial completion of the planting shall be the date when the Owner's Representative accepts that all work in Planting, Planting Soil, and Irrigation installation sections is complete.

C. The Plant Warranty period begins at date of written notification of substantial completion from the Owner's Representative. The date of substantial completion may be different than the date of substantial completion for the other sections of the project.

3.22 MAINTENANCE DURING THE WARRANTY PERIOD by others

A. After Substantial Completion Acceptance, the Contractor shall make sufficient site visits to observe the Owner's maintenance and become aware of problems with the maintenance in time to request changes, until the date of End of Warranty Final Acceptance.

1. Notify the Owner's Representative in writing if maintenance, including watering, is not sufficient to maintain plants in a healthy condition. Such notification must be made in a timely period so that the Owner's Representative may take corrective action.

a. Notification must define the maintenance needs and describe any corrective action required.

2. In the event that the Contractor fails to visit the site and or notify, in writing, the Owner's Representative of maintenance needs, lack of maintenance shall not be used as grounds for voiding or modifying the provisions of the warranty.

3.23 MAINTENANCE DURING THE WARRANTY PERIOD by the plant installer

A. During the warranty period, provide all maintenance for all plantings to keep the plants in a healthy state and the planting areas clean and neat.

B. General requirements:

1. All work shall be undertaken by trained planting crews under the supervision of a foreman with a minimum of 5 years experience supervising commercial plant maintenance crews.

2. All chemical and fertilizer applications shall be made by licensed applicators for the type of chemicals to be used. All work and chemical use shall comply with all applicable local, provincial and federal requirements.

3. Assure that hoses and watering equipment and other maintenance equipment does not block paths or be placed in a manner that may create tripping hazards. Use standard safety warning barriers and other procedures to maintain the site in a safe manner for visitors at all times.

4. All workers shall wear required safety equipment and apparel appropriate for the tasks being undertaken.

5. The Contractor shall not store maintenance equipment at the site at times when they are not in use unless authorized in writing by the Owner's Representative.

6. Maintenance vehicles shall not park on the site including walks and lawn areas at any time without the Owner's Representative's written permission.

7. Maintain a detailed log of all maintenance activities including types of tasks, date of task, types and quantities of materials and products used, watering times and amounts, and number of each crew. Periodically review the logs with the Owner's Representative, and submit a copy of the logs at the end of each year of the maintenance agreement.

8. Meet with the Owner's Representative a minimum of three times a year to review the progress and discuss any changes that are needed in the maintenance program. At the end of the warranty period attend a hand over meeting to formally transfer the responsibilities of maintenance to the Owner's Representative. Provide all information on past maintenance activities and provide a list of critical tasks that will be needed over the next 12 months. Provide all maintenance logs and soil test data. Make the Contractor's supervisor available for a minimum of one year after the end of the warranty period to answer questions about past maintenance.

C. Provide the following maintenance tasks:

1. Watering; Provide all water required to keep soil within and around the root balls at optimum moisture content for plant growth.

a. Maintain all watering systems and equipment and keep them operational.

b. Monitor soil moisture to provide sufficient water. Check soil moisture and root ball moisture with a soil moisture meter on a regular basis and record moisture readings. Do not over water.

2. Soil nutrient levels: Take a minimum of 4 soil samples from around the site in the spring and fall and have them tested by an accredited agricultural soil testing lab for chemical composition of plant required nutrients, pH, salt and % organic matter. Test results shall include laboratory recommendations for nutrient applications. Apply fertilizers at rates recommended by the soil test.

a. Make any other soil test and/or plant tissue test that may be indicated by plant conditions that may not be related to soil nutrient levels such as soil contaminated by other chemicals or lack of chemical uptake by the plant.

3. Plant pruning: Remove cross over branching, shorten or remove developing co dominant leaders, dead wood and winter-damaged branches. Unless directed by the Owner's Representative, do not shear plants or make heading cuts.

4. Restore plants: Reset any plants that have settled or are leaning as soon as the condition is noticed.

5. Guying and staking: Maintain plant guys in a taught position. Remove tree guys and staking after the first full growing season unless directed by Owner's Representative.

6. Weed control: Keep all beds free of weeds. Hand-remove all weeds and any plants that do not appear on the planting plan. Chemical weed control is permitted only with the approval of the Owner's Representative. Schedule weeding as needed to maintain weed free beds.

7. Trash removal: Remove all trash and debris from all planting beds and maintain the beds in a neat and tidy appearance.

8. Plant pest control: Maintain disease, insects and other pests at manageable levels. Manageable levels shall be defined as damage to plants that may be noticeable to a professional but not to the average person. Use least invasive methods to control plant disease and insect outbreaks.

a. The Owner's Representative must approve in advance the use of all chemical pesticide applications.

9. Plant replacement: Replace all plants that are defective as defined in the warranty provisions, as soon as the plant decline is obvious and in suitable weather and season for planting as outlined in above sections. Plants that become defective during the maintenance period shall be covered and replaced under the warranty provisions.

10. Mulch: Refresh mulch once a year to maintain complete coverage but do not over mulch. At no time shall the overall mulch thickness be greater that 3 inches. Do not apply mulch within 6 inches of the trunks or stems of any plants. Replacement mulch shall meet the requirements of the original approved material. Mulch shall be no more than one inch on top of the root ball surface.

11. Bed edging: Check and maintain edges between mulch and lawn areas in smooth neat lines as originally shown on the drawings.

12. Leaf, fruit and other plant debris removal: Remove fall leaf, spent flowers, fruit and plant part accumulations from beds and paved surfaces. Maintain all surface water drains free of debris. Debris removal shall be undertaken at each visit to weed or pick up trash in beds.

13. Damage from site use: Repair of damage by site visitors and events, beyond normal wear, are not part of this maintenance. The Owner's Representative may request that the Contractor repair damage beds or plantings for an additional cost. All additional work shall be approved in advance by the Owner's Representative.

3.27 END OF WARRANTY FINAL ACCEPTANCE / MAINTENANCE OBSERVATION

A. At the end of the Warranty and Maintenance period the Owner's Representative shall observe the work and establish that all provisions of the contract are complete and the work is satisfactory.

1. If the work is satisfactory, the maintenance period will end on the date of the final observation.

2. If the work is deemed unsatisfactory, the maintenance period will continue at no additional expense to the Owner until the work has been completed, observed, and approved by the Owner's Representative.

B. FAILURE TO PASS OBSERVATION: If the work fails to pass final observation, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged to the Contractor at the prevailing hourly rate of the Owners Representative.

END OF SECTION 32 9300

insite studio
planning + landscape architecture
8144 Okeechobee Blvd. Suite A, West Palm Beach, FL 33411
phone: 561-249-0940 | email: info@insitestudio.com
www.insitestudio.com | License#:LC26000606

Consultants:

Revisions:

Delray Place South
City of Delray Beach, Florida

7/11/19

BRYAN ROBERT DONAHUE, PLA
LICENSE # LA6667130

Drawn By:	SMT
Drawing #:	1049
Date:	12/3/2018

LANDSCAPE SPECIFICATIONS

SHEET # LP.4