



PZ23-12000017

03/05/2025

PRODUCTS

PLANTS: GENERAL

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 minimum size 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.

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

5. 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.

6. Plant Quality:

1. General: Provide healthy stock, grown in a nursery and reasonably free of die-back, disease, insects, eggs, borers, and larvae. At the time of planting all plants shall have a root system, stem, and branch form that will 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 of 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, multistem, 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, cones (fungi fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions (mechanical injury).

5. 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.

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

7. Trunk caliper and taper shall be sufficient so that the lower five feet of the trunk remains vertical without a stake. Auxiliary stakes 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 substratesoil. 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 above the top of the root ball.

- 5.) The root system shall be reasonably free of stem girdling roots over the root collar or kninked 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

1. 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 remove 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. Trees 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 similar in 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 known 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 that 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 plastic 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, plant 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 unbudded 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

1. 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.

2. Defolioning, 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 lifted immediately after planting.

- C. Digging the root ball:

1. When digging out the root ball, no excavation shall be done closer than 24 inches to the 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

1. Planting Soil shall contain a mixture of 1/3 sand, 1/3 topsoil and 1/3 peat humus. Sand shall 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 heavy 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 roots or substances that would endanger plant growth. If topsoil is not available, 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 the plant as required to adequately support the plant.

- C. Below ground anchor 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 27566.

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

- O. Or approved equal.

- P. Submit manufacturer's product data for approval.

- 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 excess 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 and 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, Silty 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, DSM5M90 by the 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 stem 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 6 - 10 inches by hand digging to the soil surface.

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.