CITY OF MOORE

CONTRACT SPECIFICATIONS RFQ# 2026-005

LANDSCAPING ABATEMENT

PRE-QUALIFICATION APPLICATION DUE JANUARY 20, 2026, 5:00 PM

ADDENDUM #1

RELEASED WEDNESDAY, JANUARY 14, 2026

Based on questions and discussions that took place at the Pre-Application meeting on Jan. 13, 2026 at 9:00 am, with the following questions:

1. Will the City allow utilizing nurseries in other parts of Oklahoma in addition to Central Oklahoma? ***Yes, the intent is to use locally grown and/or responsibly sourced plant materials that will thrive in Central Oklahoma. Any reputable nursery or tree farm in Oklahoma is acceptable.***

2. Because trees/shrubs should not be planted in extreme weather conditions, would the City extend the planting period beyond April 15? ***The City will take weather and temperatures into account during the planting period and can extend the planting period until May or beyond as long as weather conditions permit responsible planting. The City will coordinate with the contractor(s) to determine the most favorable weather conditions for planting.***

3. Are the ANSI A300 Part 6 Standards for Tree Selection, Planting, Etc. required to be followed? ***The City will make this document a part of the contract specifications and it is included in the addendum. The City reserves the right to waive or amend any parts of the standards at any time.***

4. Is staking required for the trees? ***Staking is required for all trees. Stakes may be of wood or metal. Staking is not generally required for shrubs, excepting tree-form crape myrtles, unless site or weather conditions are such that staking is necessary. The City will determine when shrubs need to be staked. The attached "Staking Standards" shall be made part of this contract, and the City shall determine if 2 or 3 stakes are necessary.***

ANSI A300 (Part 6)-2012
Revision of ANSI A300 (Part 6)-2005

American National Standard

for Tree Care Operations –

Tree, Shrub, and Other Woody Plant Management
Standard Practices (Planting and Transplanting)

ANSI A300 (Part 6)-2012 Planting and Transplanting
Revision of ANSI A300 (Part 6)-2005

TCIA®
VOICE OF TREE CARE

Approved American National Standard
ANSI

American National Standard
for Tree Care Operations –

Tree, Shrub, and Other Woody Plant Management– Standard Practices *(Planting and Transplanting)*

Secretariat
Tree Care Industry Association, Inc.

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Contents

Foreword This foreword is not part of American National Standard A300(Part 6)-2012 *Planting and Transplanting*.

ANSI A300 Standards are divided into multiple parts, each focusing on a specific aspect of woody plant management (e.g. Pruning, Soil Management, Supplemental Support Systems, etc).

These standards are used to develop written specifications for work assignments. They are not intended to be used as specifications in and of themselves. Management objectives may differ considerably and therefore must be specifically defined by the user. Specifications are then written to meet the established objectives and must include measurable criteria.

ANSI A300 standards apply to professionals who provide for, or supervise the management of, trees, shrubs, and other woody landscape plants. Intended users include businesses, government agencies, property owners, property managers, and utilities. The standard does not apply to agriculture, horticultural production, or silviculture, except where explicitly noted otherwise.

This standard has been developed by the Tree Care Industry Association (TCIA), an ANSI-accredited Standards Developing Organization (SDO). TCIA is secretariat of the ANSI A300 standards, and develops standards using procedures accredited by the American National Standards Institute (ANSI).

Consensus for standards writing was developed by the Accredited Standards Committee on Tree, Shrub, and Other Woody Plant Management Operations – Standard Practices, A300 (ASC A300).

Prior to 1991, various industry associations and practitioners developed their own standards and recommendations for tree care practices. Recognizing the need for a standardized, scientific approach, green industry associations, government agencies and tree care companies agreed to develop consensus for an official American National Standard.

The result – ANSI A300 standards – unify and take authoritative precedence over all previously existing tree care industry standards. ANSI requires that approved standards be developed according to accepted principles, and that they be reviewed and, if necessary, revised every five years.

TCIA was accredited as a standards developing organization with ASC A300 as the consensus body on June 28, 1991. ASC A300 meets regularly to write new, and review and revise existing, ANSI A300 standards. The committee includes industry representatives with broad knowledge and technical expertise from residential and commercial tree care, utility, municipal and federal sectors, landscape and nursery industries, and other interested organizations.

Suggestions for improvement of this standard should be forwarded to: ANSI A300 Secretary, c/o Tree Care Industry Association, Inc., 136 Harvey Road - Suite 101, Londonderry, NH 03053.

ANSI A300 (Part 6)-2012 *Planting and Transplanting* was approved as an American National Standard by ANSI on February 7, 2012. ANSI approval does not require unanimous approval by ASC A300.

(Continued)

The ASC A300 has the following members as of February 7, 2012:

Dane Buell, Chair
(SavATree, Inc.)

Bob Rouse, Secretary
(Tree Care Industry Association, Inc.)

Organizations Represented	***Name of Representative***
Alliance for Community Trees	*Michael Galvin*
	Carrie Gallagher (Alt.)
American Forests	*Guy Meilleur*
	Joseph Murray (Alt.)
American Nursery and Landscape Association	*Warren Quinn*
	Craig J. Regelbrugge (Alt.)
American Society of Consulting Arborists	*Stephen Miller*
American Society of Landscape Architects	*Ron Leighton*
Asplundh Tree Expert Company	*Geoff Kempter*
	Peter Fengler (Alt.)
Bartlett Tree Expert Company	*Peter Becker*
	Dr. Thomas Smiley (Alt.)
Davey Tree Expert Company	*Chris Klinas*
	Grant Jones (Alt.)
International Society of Arboriculture	*Dr. Richard Hauer*
	Sharon Lilly (Alt.)
Professional Grounds Management Society	*Thomas Shaner*
Professional Land Care Network	*Alice Carter*
	Sabeena Hickman (Alt.)
Society of Municipal Arborists	*Gordon Mann*
	Nolan Rundquist (Alt.)
Tree Care Industry Association	*Mark Stennes*
	Steve Mays Jr. (Alt.)
USDA Forest Service	*Keith Cline*
	Ed Macie (Alt.)
Utility Arborist Association	*Matthew Simons*
	Bill Rees (Alt.)

Additional organizations and individuals:

Peter Gerstenberger (Observer)
Andy Hillman (Observer)
Tim Johnson (Observer)
Myron Laible (Observer)
Beth Palys (Observer)
Richard Rathjens (Observer)
Mary Reynolds (Observer)
Richard Roux (NFPA-780 Liaison)
Donald Zimar (Observer)

ASC A300 mission statement:

Mission: To develop consensus performance standards based on current research and sound practice for writing specifications to manage trees, shrubs, and other woody plants.

American National Standard
for Tree Care Operations –

Part 6 Planting and transplanting

Subclause 1.1 to 1.3 excerpted from ANSI A300 (Part 1) *Pruning*

1 ANSI A300 standards

1.1 Scope

ANSI A300 standards present performance standards for the care and management of trees, shrubs, and other woody plants.

1.2 Purpose

ANSI A300 performance standards are intended for use by federal, state, municipal and private entities including arborists, property owners, property managers, and utilities for developing written specifications.

1.3 Application

ANSI A300 performance standards shall apply to any person or entity engaged in the management of trees, shrubs, or other woody plants.

60 Part 6 – Planting and transplanting standards

60.1 Purpose

The purpose of this document is to provide standards for developing specifications for planting and transplanting trees and shrubs.

60.2 Reason

Planting and transplanting is performed to relocate landscape plants to meet specific objectives. Horticultural production or silvicultural purposes are exempt from this standard.

60.3 Implementation

60.3.1 Specifications for planting and transplanting should be written and administered by an arborist or landscape professional.

60.3.2 Specifications for planting and transplanting should include location, objectives, plant acceptance criteria, preparation method, materials, backfill, planting hole, post-planting care.

60.3.3 Planting and transplanting specifications shall be adhered to.

60.4 Safety

60.4.1 This performance standard shall not take precedence over applicable industry safe work practices.

60.4.2 Planting and transplanting shall be performed by an arborist or landscape professional familiar with the practices and hazards of planting and transplanting and the equipment used in such operations.

60.4.3 Performance shall comply with applicable Federal and State Occupational Safety and Health Administration (OSHA) standards, ANSI Z133, Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Federal Environmental Protection Agency (EPA) regulations as well as state and local regulations.

60.4.4 The sites shall be inspected for hazards prior to implementing any planting and transplanting operations within the root zones of trees and woody plants.

60.4.5 The location of utilities and other obstructions both below and above ground shall be taken into consideration prior to planting and transplanting operations. Utilities and other obstructions include, but are not limited to, gas, electric, communications, sewer, drainage, and signage.

61 Normative references

The following standards contain provisions that, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

ANSI Z60, *Nursery Stock*

ANSI Z117.1, Safety Requirements for Confined Spaces

ANSI Z133, Arboriculture – Safety Requirements

ASME B30, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings.

29 CFR 1910, General Industry [1)]

29 CFR 1910.146, Permit-required Confined Spaces (PRCS) [1)]

29 CFR 1910.268, Telecommunications [1)]

29 CFR 1910.269, Electric Power Generation & Distribution [1)]

29 CFR 1910.331-335, Electrical Safety [1)]

[1)] Available from U.S. Department of Labor, 200 Constitution Ave., NW, Washington, DC 20210.

62 Definitions (Definitions are considered part of the ANSI A300 Part 6 standard)

62.1 arborist: An individual engaged in the profession of arboriculture who, through experience, education and related training, possesses the competence to provide for, or supervise the management of, trees and other woody plants.

62.2 arborist trainee: An individual undergoing on-the-job training to obtain the experience and the competence required to provide for, or supervise the management of, trees and woody plants. Such trainees shall be under the direct supervision of an arborist.

62.3 balled and wrapped: Plants established in the ground that have been prepared for planting and transplanting by digging so that the soil immediately around the roots remains undisturbed. The ball of earth containing the roots of the plant is then bound up.

62.4 bare root (B.R.): Harvested plants from which the soil or growing medium has been removed.

62.5 boxed: A method for protecting roots that includes digging a trench, constructing and installing a box around the roots, and then using the box to lift, transport, and install the landscape plant.

62.6 burlap: A loose-weave fabric that is used to protect plant parts and/or add support to rootballs during planting and transplanting operations.

62.6.1 chemically-treated burlap: A fabric treated with chemical preservative that biodegrades at a very slow rate.

62.6.2 combination burlap: A fabric with both natural and synthetic fibers that biodegrades at a slow rate.

62.6.3 natural burlap: A material that is 100 percent biodegradable.

62.6.4 synthetic burlap: A material that is not biodegradable.

62.7 caliper: In the landscape or nursery trade, this is the diameter of a tree, measured at a point 6 inches (15 cm) above the ground line if the resulting measurement is no more than 4 inches (10 cm). If the resulting measurement is more than 4 inches (10 cm), the measurement is made at a point 12 inches (30 cm) above the ground line. Caliper measurement is the smallest measurement of a caliper range. In example, 8-inch caliper includes trees with calipers within the 8-inch to 9-inch range (up to, but not including, 9-inch caliper measurement). This is in contrast to the method used to measure caliper in the timber industry, which is to make the measurement at a point 4-1/2 feet (1.4 m) above the ground line, or the “diameter at breast height” (dbh).

62.8 crown: Upper part of a tree, measured from the lowest branch, including all the branches and foliage.

62.9 dbh [diameter at breast height]: Measurement of trunk diameter taken at 4-1/2 feet (1.4 m) off the ground.

62.10 digging spade: A specially designed shovel used to dig, shape and form a rootball.

62.11 drum lace: A specific pattern for tying that holds and supports the rootball when planting and transplanting landscape plants with the balled and wrapped method.

62.12 foam protection: A pre-formed soft foam sheet, pad, or pipe insulation.

62.13 grade: a datum or reference level, specifically ground level.

62.14 guy: A steel cable or synthetic-fiber cable system installed between a tree and an external anchor to provide supplemental support.

62.15 installation site: The location at which the landscape plant will be installed.

62.16 landscape plants: Trees and woody shrubs.

62.17 lifting chain, certified: A chain certified for a rated load capacity.

62.18 lifting sling, certified: A sling certified for a rated load capacity.

62.19 lifting strap, certified: A strap certified for a rated load capacity.

62.20 nursery stock: Plants grown in or obtained from a nursery.

62.21 percolation test: As used in this standard, a field test conducted to determine water infiltration rate.

62.22 planting: Installing a plant in the landscape.

62.23 protective material: Fabric or device used to limit injury to any portion of the landscape plant during preparation and planting and transplanting operations.

62.24 rootball: The root mass of a tree or shrub after digging or removal from a container.

62.25 root collar: The transition zone between the trunk and the root system.

62.26 root pruning: The cutting of roots to meet specific goals and objectives.

62.26.1 selective root pruning: The pruning of individual roots using hand-tools following careful excavation using least-injurious methods.

62.27 roots, circling: Roots that encircle a rootball.

62.28 roots, girdling: Roots that impede proper development of other roots, trunk flare, and/or trunk.

62.29 shall: As used in this standard denotes a mandatory requirement.

62.30 should: As used in this standard denotes an advisory recommendation.

62.31 soil amendment: A material incorporated into the soil that improves physical characteristics.

62.32 soil anchor: A device driven, buried, or otherwise inserted into the ground to which a guy is attached.

62.33 specifications: A detailed, measurable plan or proposal for performing a work activity or providing a product; usually a written document.

62.34 spreader bar: An apparatus used to spread the lifting chain or strap to avoid damage to the rootball and crown.

62.35 standard, ANSI A300: The performance parameters established by industry consensus as a rule for the measure of extent, quality, quantity, value or weight used to write specifications.

62.36 tensiometer: An instrument for determining the moisture content of soil.

62.37 thimble: An oblong galvanized or stainless steel fitting with flared margins and an open-ended base.

62.38 transplanting: The process of relocating an existing plant in the landscape.

62.39 tree spade: Equipment used to transplant large trees.

62.40 tree wrap: Material installed on a tree trunk to protect it from injury.

62.41 trunk flare: 1. The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots. 2. The area of transition between the root system and the stem or trunk.

62.42 turnbuckle: A drop-forged, closed eye device for adjusting tension.

62.43 wire basket: A balled and wrapped method (see **62.3**) using a pre-fabricated wire mesh basket for support of the rootball.

62.44 wire-wrapped: A balled and wrapped method (see **62.3**) using wire or a wire mesh for support of the rootball.

63 Transplanting practices

63.1 Clause **63** shall apply to trees and woody shrubs and vines to be transplanted, exception: nursery stock trees, nursery stock woody shrubs, and nursery stock woody vines.

63.2 Transplanting objectives

Transplanting objectives shall be established prior to beginning operations.

63.2.1 Potential conflict with utilities, lines of sight, buildings, and other infrastructure should be avoided. Tall-growing trees shall not be planted directly under overhead primary distribution and transmission electric lines.

63.3 Plant and site inspections for transplanting

63.3.1 The requirements of the individual trees and shrubs shall be considered.

63.3.2 Compass orientation of trees and shrubs shall be considered.

63.3.3 Root pruning should be considered prior to transplanting.

63.3.4 A feasibility and suitability assessment shall be conducted prior to recommending transplanting. See **Annex A and B**.

63.3.4.1 The assessment should include a determination of adequate rootball size, see subclause **63.5.2**.

63.3.5 Soil at the installation site should be analyzed and tested for pH, structure, texture, density, nutrients, and percolation.

63.3.6 Drainage should be adequate for the species being transplanted.

63.3.7 If a condition is observed while the work is being performed requiring attention beyond the original scope of work, the condition shall be reported to an immediate supervisor, the owner, or person responsible for authorizing the work.

63.3.8 Transplanting specifications

63.3.8.1 Specifications for transplanting should be based on the feasibility and suitability assessment (**63.3.4**).

63.3.8.2 rootball size shall be specified (**63.5.2**).

63.3.8.3 If applicable, moving and storage methods should be specified (**63.7**).

63.3.8.3.1 For bare root transplanting method, moving and storage methods shall be specified (**63.7.3**).

63.4 Tools and equipment

63.4.1 Equipment and work practices that cause damage to the plant, beyond the scope of the work, should be avoided.

63.4.2 Digging and root pruning tools shall be sharp in order to cut without breaking, crushing, or tearing roots.

63.4.3 Mechanical digging and root pruning equipment shall be maintained according to manufacturers' recommendations to minimize root damage.

63.4.4 Lifting cables, chains, straps, and/or slings shall be inspected and certified. See **Annex C**.

63.4.5 Certified lifting cables, chains, straps, and slings shall be used according to manufacturers' instructions and specifications.

63.5 Preparing the plant for transplanting

63.5.1 Timing of transplanting

63.5.1.1 Season and phenology of the tree or shrub shall be taken into consideration.

63.5.1.2 Transplanting should occur during a favorable time of year for the species.

63.5.2 Rootball Size

63.5.2.1 Determining rootball size (exception: palms)

Ball sizes should be of a diameter and depth to

encompass enough of the root system as necessary for establishment. ANSI Z60 provides a reference for nursery stock caliper sizes under 8 inches (20 cm).

63.5.2.1.1 Trees larger than 8 inches (20 cm) caliper should have a minimum 8 inches (20 cm) or more of rootball diameter for every inch (2.54 cm) of trunk diameter. See **Annex F** for details and definitions **62.7** and **62.9** for clarification.

63.5.2.2 Determining rootball size (palms only)

The minimum rootball radius should be 6 inches (15 cm) from the base of the trunk at ground level. rootballs larger than the minimum radius shall be preferred.

63.5.2.2.1 The rootball should have adequate mass and depth to structurally support the palm.

63.5.2.2.2 The rootball depth should be at least 1.5 times the rootball diameter or width.

63.5.2.3 The rootball size specification should be adjusted to address planting objectives and plant species, size, and condition.

63.5.3 Digging the tree or shrub

63.5.3.1 The following shall be considered prior to digging:

a. root pruning;
b. corrective root pruning (i.e. girdling/adventitious roots);
c. crown pruning;
d. trunk flare depth;
e. moisture content;
f. storage;
g. support systems;
h. transport; and,
i. soil management.

63.5.3.2 Sites shall be prepared to accept digging operations.

63.5.3.3 Rootball, trunk, and crown shall be protected from damage beyond the scope of the work.

63.5.3.4 Trunk should be centered in the rootball.

63.5.4 Transplanting methods

63.5.4.1 The following methods should be considered when specifying a tree or shrub for relocation:

Balled and wrapped;
Bare root;
Boxed; and,
Tree spade.

63.5.4.2 Mechanical and hand digging operations should start outside the finished rootball size; exception: Mechanical tree spade.

63.5.4.3 Balled and wrapped

63.5.4.3.1 Methods and materials used to protect or secure the rootball shall hold the ball firmly.

63.5.4.4 Bare root

See **Annex A-4 Bare-root information**

63.5.4.5 Boxed

63.5.4.5.1 Box sides shall be tight against the rootball.

63.5.4.5.2 Box sides should be fastened together to limit movement.

63.5.4.5.3 Box bottom, if installed, shall be tight against the rootball.

63.5.4.5.4 Box top shall be installed if the box will be tilted during transport.

63.5.4.6 Tree spade

63.5.4.6.1 Damage beyond the scope of the work to the tree or shrub shall be avoided.

63.5.4.6.2 Tree spades should be free of fluid leaks.

63.5.4.6.3 Tree spades shall be maintained according to manufacturers specifications.

63.5.4.6.4 Adjustments shall be made for differences between slope of the old and new site.

63.6 Lifting

63.6.1 Prior to lifting rootballs, roots should be separated from the surrounding soil.

63.6.2 The system used for lifting shall prevent damage to the rootball, trunk, and crown.

63.6.3 Spreader bars should be used to distribute forces away from the rootball and to provide crown clearance.

63.7 Moving and storage

63.7.1 The system used to move and store the plant shall minimize dessication and other damage to crown, trunk, and rootball.

63.7.2 The health and vigor of the trees or shrubs shall be maintained during storage.

63.7.3 When trees are dormant, the moving and storage methods specified shall include practices intended to manage dormancy.

63.7.3.1 Specifications for bare root tree moving and storage should include: minimum humidity; maximum temperature; maximum light exposure; and, methods to conserve moisture.

64 Planting practices

64.1 Planting objectives

Planting objectives shall be established prior to beginning operations.

64.1.1 Potential conflict with utilities, lines of sight, buildings, and other infrastructure should be avoided. Tall-growing trees shall not be planted directly under overhead primary distribution and transmission electric lines.

64.2 Plant and site inspections for planting

64.2.1 Trees shall meet the planting objective.

64.2.2 Tree condition, quality, and acceptance criteria for planting should be specified in writing.

64.2.2.1 Tree condition, quality, and acceptance criteria should include, but are not limited to, one or more of the following:

a. general health;

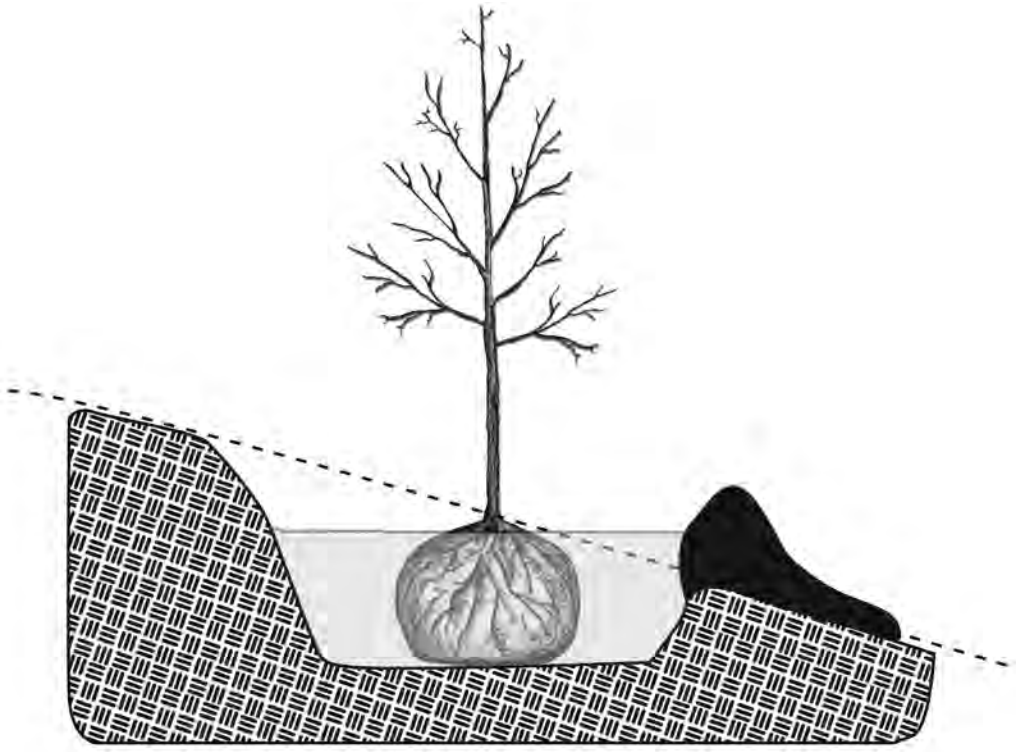


Figure 63.5.4.6.4 Example of an adjustment for difference in slope.

b. general structural condition;
c. root collar/trunk flare condition and location;
d. crown shape;
e. size of rootball/quality of root system;
f. foliage color or density; and,
g. any other related issue that will impact the estimated rate of success.

64.2.3 Trees that do not meet the condition, quality, and acceptance criteria should be rejected for planting.

64.2.4 Soil at the installation site should be analyzed and tested for pH, structure, texture, density, nutrients, and percolation.

64.2.5 Drainage should be adequate for the species being planted.

64.2.6 If a condition is observed while the work is being performed requiring attention beyond the original scope of work, the condition shall be reported to an immediate supervisor, the owner, or person responsible for authorizing the work.

64.3 Tools and equipment

64.3.1 Equipment and work practices that cause damage to the plant, beyond the scope of the work, should be avoided.

64.3.2 Digging and root pruning tools shall be sharp in order to cut without breaking, crushing, or tearing roots.

64.3.3 Mechanical digging and root pruning equipment shall be maintained according to manufacturers' recommendations to minimize root damage.

64.3.4 Lifting cables, chains, straps, and/or slings shall be inspected and certified. See **Annex C**.

64.3.5 Certified lifting cables, chains, straps, and slings shall be used according to manufacturers' instructions and specifications.

64.4 Digging the hole

64.4.1 The final depth of the planting hole is

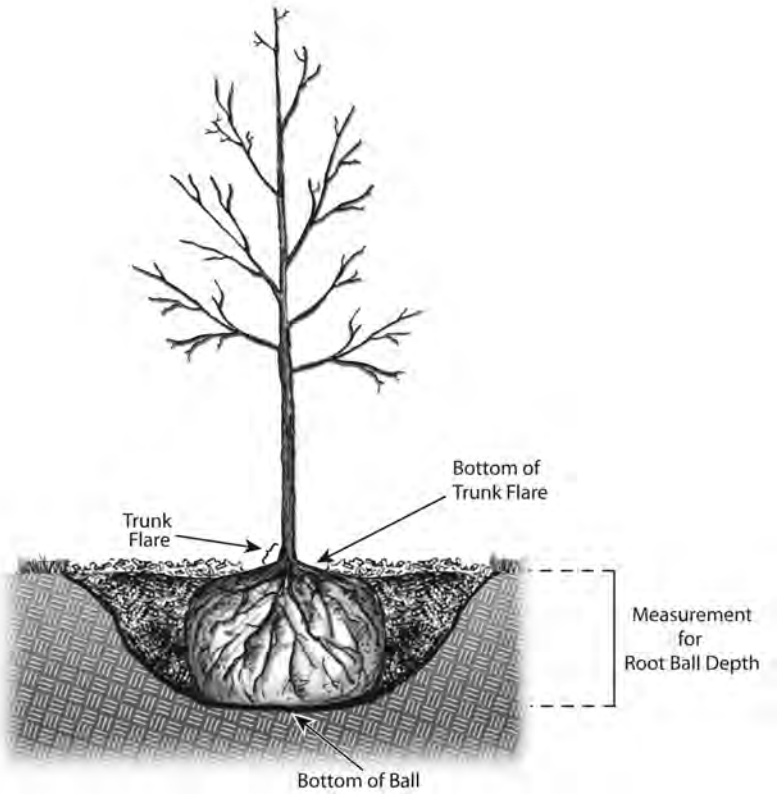


Figure 64.4.2. Measurement for root-ball depth.

determined by the depth and firmness of the rootball and other characteristics of the site and shall not exceed the depth of the rootball.

64.4.2 The depth of the rootball shall be measured from the bottom of the trunk flare to the bottom of the ball.

64.4.3 The soil directly beneath the rootball should be undisturbed or prepared to prevent settling.

64.4.4 The planting hole width should be a minimum of 1.5 times the diameter of the rootball, or soil surrounding the upper 1/3 of the planting hole should be loosened to a width of 1.5 times the rootball diameter.

64.4.5 The sides of the planting hole should be loose.

64.5 Installing woody plants

64.5.1 Circling and kinked roots should be straightened or severed.

64.5.2 Trees or shrubs should be placed in the same compass orientation from which they originated, if known.

64.5.3 Bare-root plants should be installed so that their root system is evenly distributed in the planting hole.

64.5.4 The bottom of the trunk flare shall be at or above the finished grade.

64.5.5 All rootball supporting materials should be cut off from the top third of the rootball and removed from the planting hole prior to final back filling.

64.5.6 Installing container stock

64.5.6.1 The container shall not be removed by pulling or leveraging the trunk of the tree. Appropriate removal methods include, but are not limited to, bending, wiggling, and/or cutting the container.

64.5.6.2 Fabric grow bags must be removed

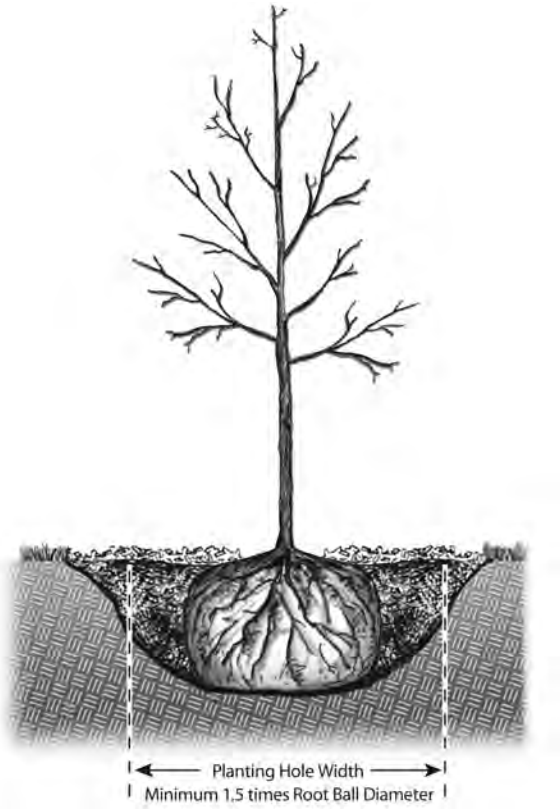


Figure 64.4.4a Minimal planting-hole width indicated by vertical dotted lines.

from the sides. Bags should be cut away after setting the tree in place.

64.5.6.3 Paper/pulp type containers should be removed. Pulp containers that do not slide off readily should be cut.

64.5.6.4 Container cutting method

64.5.6.4.1 If it is possible to cut the container, the bottom should be cut and removed first, then the tree should be set in place, and finally the side walls should be cut and removed.

64.5.6.5 Prior to planting, the container rootball should be managed, methods include, but are not limited to, slicing the rootball, shaving the rootball, and redirecting roots. See **Annex A**.

64.5.7 Backfill

64.5.7.1 Backfill should be similar to the soil at the planting site or amended to meet a specific objective.

64.5.7.2 Organic amendments incorporated into backfill and/or surrounding soil should not exceed 10 percent by volume.

64.5.7.3 The back-fill soil shall be installed and settled in layered sections to limit future settling and prevent air pockets.

64.5.7.4 Backfill shall not be compacted to a density that inhibits root growth.

64.5.8 Water should be added to the root zone and surrounding soil to bring the root zone to field capacity.

64.5.9 Mulch should be applied near, but not touching, the trunk out to the perimeter of the planting. Initial depth of organic mulch should be between 2 and 4 inches (5 and 10 cm).

64.5.10 Mulch type shall be specified to meet an objective.

64.5.11 Trunks should be protected when damage from sunlight, animals, or other causes is likely.

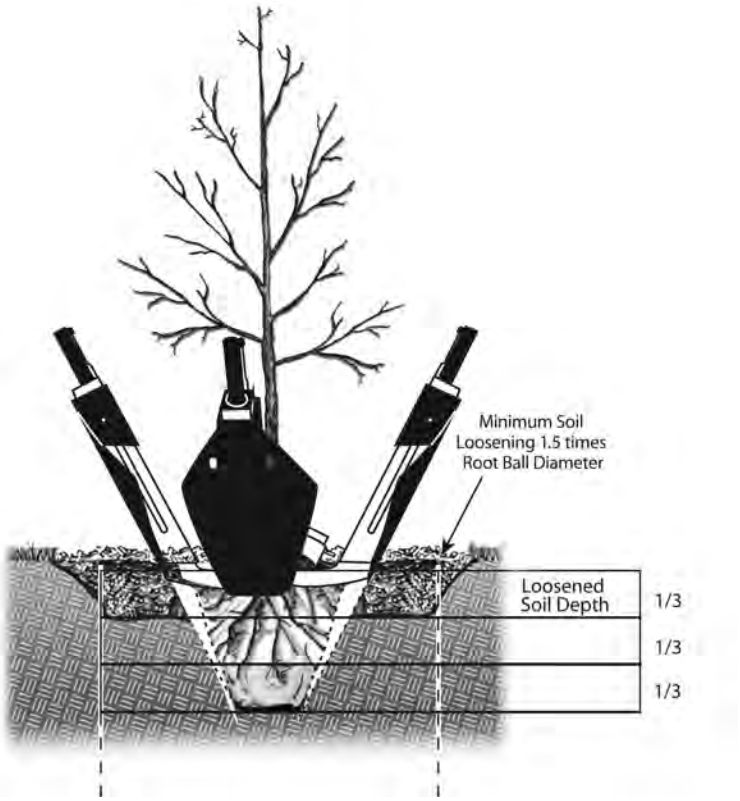


Figure 64.4.4b Minimum planting-hole loosening for tree spade applications.

64.6 Support systems

64.6.1 Support systems shall not be specified or installed except when needed.

64.6.1.1 When needed, support systems shall be installed according to ANSI A300 Part 3 – *Supplemental Support Systems*.

64.7 Post-planting care practices

64.7.1 Post-planting care shall be specified for an appropriate period of time based on the region, site conditions, and species.

64.7.2 Post-planting care for a minimum of one year should be considered.

64.7.3 Specifications for post-planting care should consist of, but are not limited to, one or more of the following:

a. soil moisture management;
b. mulching;
c. integrated pest management;
d. pruning (see ANSI A300 Part 1 – *Pruning* standard);
e. monitoring;
f. soil management (see ANSI A300 Part 2 – *Soil Management* standard); and,
g. maintenance/removal of tree support systems (see ANSI A300 Part 3 – *Supplemental Support Systems* standard).

Annex A – Planting and transplanting information

(This annex is not part of the ANSI A300 Part 6 standard.)

A-1 Plants with significant defects may not be considered acceptable candidates for planting and transplanting.

A-2 Initial assessment checklist:

a. general health of the landscape plant(s) including foliage color and density, signs of insect and disease, and past care;
b. general structural condition of the landscape plant(s) including the root system, present defects, past injuries, crown shape, and growing environment. See **Annex C**, **Tree structure assessment** checklist;
c. species data for tolerance of transplanting;
d. crown shape;
e. size of rootball/quality of root system;
f. foliage color or density;
g. effects of pruning before transplanting; and,
h. any other related issue that will impact the estimated rate of success.

A-3 Evaluate the following items during the initial assessment of the existing site and the installation site:

a. above and below ground hazards;
b. access;
c. soil conditions;
d. obstacles;
e. slope;
f. utilities; and,
g. critical structures, i.e. rooftop plantings.

A-4 Bare-root information

A-4.1 In general, small caliper trees (1.25 to 2 inch) are used when planting bare root for best success.

A-4.2 Some species are less successful than others when planted bare root. Check regional guides for species that respond best to bare-root planting and transplanting in your region.

A-4.2.1 If bare-root stock is dug in a state of dormancy, address and consider specifying practices required to manage dormancy.

A-4.3 Roots of bare-root stock may be dipped in hydrogel or muddy water and then stored in pleated plastic bags until planting. Trees may be stored for up to one week in a cool environment before planting.

A-4.4 If roots are not dipped in hydrogel or muddy water, they may be soaked in water for 12 to 24 hours prior to planting.

A-4.5 When applicable, plant bare-root trees at a favorable time of the year for the plant species.

A-5 Rootball management

A-5.1 If possible, remove paper/pulp containers. These containers may be slow to decompose and may complicate soil texture, creating root/soil interface issues.

A-5.2 The outer 1 to 1.5 inch (2.5 to 3.8 cm) of the rootball may be shaved with a knife, saw, or pruners to mitigate root problems, such as “circling” roots.

A-6 Soil management of newly planted or transplanted trees, woody shrubs, and woody vines.

A-6.1 Please refer to ANSI A300 Part 2 – *Soil Management* for current standards and recommendations before modifying soil, adjusting soil pH, or fertilizing on or nearby newly transplanted or planted trees, woody shrubs, and woody vines.

Annex B – Tree structure assessment checklist

(This annex is not part of the ANSI A300 Part 6 standard.)

Notice: This annex also appears in ANSI A300 Part 9 – *Tree Risk Assessment* standard.

B-1 Visual tree assessments may include, but are not limited to:

1) Dead parts

2) Weakly attached branches and codominant stems
- broken hanging branches
- branch aspect ratio
- included bark
- multiple branches at one point
- epicormic branches and shoots

3) Codominant stems
- included bark

4) Cracks into or through the wood; ribs, seams

5) Wood decay
- missing or decayed wood
- potential indicators of decay
- abnormal growth patterns
- positive indicators of decay
- cavities and other openings
- fungal fruiting structures
- carpenter ants
- termites

6) Cankers

7) Tree architecture
- unusual tree architecture or taper
- live crown ratio
- height-to-diameter ratio
- lean
- branch distribution
- crown position – dominant, codominant, intermediate, suppressed

8) Root and Root collar
- severed
- decay
- restrictions to growth
- girdling
- root plate lifting, soil cracks
- undermined
- broken
- basal flare
- related soil issues

B-2 Decay assessments may include, but are not limited to:

1) Sounding for bark separation and wood hollows
- mallets

2) Probing for decay
- increment borer
- small diameter drill bits
- resistance recording drill

3) Sonic measurements
- two point sonic devices
- multipoint sonic devices – Picus tomography

4) Other methods under development
    radar, tree and soil applications
    thermograph
    x-ray, gamma ray
5) Root collar and root inspection
6) Aerial inspection
7) Pull testing
8) Modeling wind pattern and force – Wind Rose
9) Interpreting results of advanced assessment
    weather extremes – wind, snow, and ice levels that trees can withstand
    stem and branch strength loss/decay formula
    asymmetric decay
    guideline for action
    root loss assessment

Annex C – Lifting chain and sling, proper inspection and record-keeping protocol
(This annex is not part of the ANSI A300 Part 6 standard.)

C-1 Each sling must be affixed with a permanent tag clearly showing the sling's working load limit, type, size, serial number, and manufacturer.

C-2 Each sling should have its own record-keeping file.

C-3 Each sling must have a proof test certificate kept on file for inspectors and company use showing the sling's working-load limit, type, size, serial number, lot number, and manufacturer. The proof test shows that the sling is fully OSHA compliant.

C-4 Each sling must have an annual inspection card filed in order to comply with OSHA standards. Each sling must be inspected at least once a year for nicks, gouges, and other defects that might make it unsafe. The inspection card is proof that a qualified person has made these inspections.

Annex D – Sample procurement specification for quality nursery trees

(This annex is not part of the ANSI A300 Part 6 standard.)

This annex is based on published works by, and with permission from, Gordon Mann, Jay Banks, and Len Phillips

D-1 Forward: The following document is a sample specification that purchasers of trees can use to purchase a high-quality product. This specification may be copied and pasted into your bid documents or quote sheets, and edited to match your agency needs and format. It is imperative that you adapt this sample to meet the objectives of your procurement needs. For those purchasers using preferred nurseries, send them a copy of this specification and put them on notice that in "X" number of years (one to three?) your agency or organization plans to use this specification to purchase trees. Nurseries will need to be in compliance with these specifications.

Key traits of nursery trees are identified and described to provide growers and buyers with the information they need to distinguish acceptable quality stock from unacceptable quality stock. Structural and health characteristics are described, as well as labeling, compliance with laws and regulations, and inspection of nursery stock. If a particular defect or substandard element can be corrected easily, appropriate remedies may be performed prior to accepting delivery. Unacceptable trees will contain defects and substandard elements that cannot be easily corrected.

This draft specification is based on the *Calfire Nursery Specs and Tree Production Strategies* for guiding nurseries to grow high-quality plant material.

D-2 Sample procurement specifications for quality nursery trees

These specifications describe the difference between acceptable and unacceptable nursery stock.

D-2.1 Glossary

D-2.1.1 central leader: Also referred to as leader or the dominant leader. A dominant, typically upright stem – usually the main trunk. There can be several leaders in one tree, however the central leader, if present, is a continuation of the main trunk located more or less in the center of the crown, beginning at the lowest main scaffold branch and extending to the top of the tree.

D-2.1.2 clear trunk: The portion of the trunk below the main crown which may include shortened temporary branches.

D-2.1.3 codominant branches/codominant leaders: Branches or stems arising from a common junction, having nearly the same size diameter. (Often they are more vigorous, upright branches that originate from a common point, usually where the leader was lost or removed. Codominant stems are unacceptable in most installations.)

D-2.1.4 cultivar: A named plant selection from which identical or nearly identical plants can be produced, usually by vegetative propagation or cloning.

D-2.1.5 included bark: Bark embedded in the union between a branch and the trunk or between two or more stems that prevents the formation of a normal branch bark ridge. Included bark is unacceptable.

D-2.1.6 kinked root: A main root that is sharply bent. Kinked roots are unacceptable.

D-2.1.7 scaffold branch: A primary branch that forms part of the main structure of the crown.

D-2.1.8 taper: The thickening of a trunk or branch toward its base.

D-2.1.9 temporary branch: A small branch that is temporarily retained along the lower trunk of young trees.

D-2.1.10 trunk: The main woody part of a tree, beginning at and including the trunk flare and extending up into the crown from which scaffold branches grow.

D-2.2 Sample specifications – general

D-2.2.1 Proper Identification: All trees must be true to name as ordered or shown on planting plans and must be labeled individually or in groups by species and cultivar (as appropriate).

D-2.2.2 Compliance:

All trees must comply with federal and state laws and regulations requiring inspection for plant diseases, pests, and weeds. Inspection certificates required by law must accompany each shipment of plants. Clearance from the local county agricultural commissioner, if required, must be obtained before planting trees originating outside the county in which they are to be planted. Even though trees may conform to county, state, and federal laws, the buyer may impose additional requirements that pertain to local issues.

D-2.2.3 Trees are to be grown (when applicable) and graded according to ANSI Z60 *Nursery Stock* standards.

D-2.3 Sample tree specifications

These specifications apply to deciduous, broadleaf evergreen, and coniferous species. They do not apply to palms. Note that leaf characteristics will not be evident on deciduous trees during the dormant season.

D-2.3.1 Crown:

The form and density of the crown must be typical for a young specimen of the species/cultivar. Changes in form caused by wind, pruning practices, pests, or other factors must not substantially alter the form for the species/cultivar. These crown specifications do not apply to plants that have been specifically trained in the nursery to be: topiary, espalier, multi-stem, or clump; or unique selections such as contorted or weeping cultivars.

D-2.3.1.1 Trees must have a single, relatively straight trunk, and central leader. They must be free of codominant stems and vigorous, upright branches that compete with the central leader. If the original leader has been headed, a new leader at least one-half of the diameter of the original leader must be present.

D-2.3.1.2 Main branches must be well-distributed along the central leader, not clustered together. They must form a balanced crown appropriate for the age of the species/cultivar.

D-2.3.1.3 Branch diameter must be no larger than two-thirds (one-half is preferred) the diameter of the central leader measured 1 inch (2.5 cm) above where the branch is attached.

D-2.3.1.4 The attachment of the largest scaffold branches must be free of included bark.

D-2.3.1.5 Temporary branches, unless otherwise specified, may be present along the lower trunk below the lowest scaffold branch, particularly for trees less than 1 inch (2.5 cm) in caliper. These branches may be no greater than 3/8 inch (1 cm) diameter. Clear trunk must be no more than 30 percent of the total height of the tree.

D-2.3.2 Trunk:

The tree trunk must be relatively straight, vertical, and free of wounds, except properly made pruning cuts, which must be closed over or less than 3/4 inch (2 cm) diameter open, sunburned areas, conks (fungal fruiting bodies), wood cracks, bleeding areas, signs of boring insects, galls, cankers, stem-girdling ties, or lesions (mechanical injury).

D-2.3.2.1 Trunk caliper and taper must be sufficient so that the tree will remain vertical without a stake. Trunk caliper at 6 inches (15 centimeters) above the soil media (substrate) surface must be within the diameter range shown for each container size below and as specified in current edition of ANSI Z60 *Nursery Stock*.

For example:

Container Size	**Trunk Diameter**	
# 5	0.5" to 0.75"	(1.2 to 2 cm)
# 15	0.75" to 1.5"	(2 to 4 cm)
24-inch box	1.5" to 2.5"	(4 to 6.5 cm)

D-2.3.2.2 The cut made when re-growing the top may be just above the major structural roots. The “shank” that results from this procedure may be at a consistent height above the structural roots and no longer than 5 inches (12 cm), to ensure that the trees are consistently planted at the correct depth. The base of the trunk may not have a large pruning cut from re-growing the top.

D-2.3.3 Roots:

The root system must be substantially free of injury from biotic (e. g., insects and pathogens) and abiotic (e. g., herbicide toxicity and salt injury) agents.

D-2.3.3.1 The uppermost roots or root collar must be within the upper 2 inches (5 cm) of the soil media (substrate). Depth of the root-ball must be measured from the top of the ball, which in all cases must begin at the trunk flare. Soil above the trunk flare must not be included in the root-ball depth measurement, and must be removed.

D-2.3.3.2 The root collar and the inside portion of the root-ball must be free of defects, including circling, kinked, and stem-girdling roots. Soil removal or root washing near the root collar may be necessary to inspect for root defects.

D-2.3.3.3 Roots on the periphery and bottom of the root-ball must be less than 1/4 inch (.65 cm) in diameter while 1/8 inch (.3 cm) is preferred.

D-2.3.3.4 The tree must be well rooted in the soil media (substrate). Root distribution must be uniform throughout the soil or media. Structure and growth must be appropriate for the species/cultivar. When the burlap or container is removed, the root-ball must remain intact. When the trunk is lifted both the trunk and root system must move as one.

D-2.3.3.5 Trees may have several lateral roots or many fibrous roots spaced evenly around the trunk to provide support so the trees are stable when planted. A large percentage of small roots is preferred. These roots are key to the uptake of sufficient water and nutrients. Fibrous roots can be achieved by root-pruning, using air-pruning containers, or under-cutting or root pruning

and transplanting at any stage of production.

D-2.3.3.6 As a general rule for young nursery-grown trees, two or more structural roots are located within 1-3 inches (2.5-7.5 cm) of the soil surface. “First order lateral roots” is another term that has been used for these roots. If the roots are deeper than 3 inches (7.5 cm), the stock must be rejected if the rootball is undersized as specified in current edition of ANSI Z60.

D-2.3.3.7 Field-grown trees for balled and burlap delivery must have the roots pruned at least 6 inches (15 cm) inside the final rootball size performed within adequate time for the tree to develop fibrous roots at the outer edge of the root-ball prior to harvest and delivery.

D-2.3.4 Leaves:

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

D-2.3.5 Branches:

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

D-2.4 Inspection

The buyer reserves the right to reject trees that do not meet these specifications. If a particular defect or substandard element or characteristic can be easily corrected, appropriate remedies must be performed by the nursery to move the plants into compliance. If destructive inspection of a rootball or balls is to be done, the buyer and seller must have an agreement as to the time and place of inspection, number or percent of trees or species/cultivars to be inspected, care of acceptable trees following inspection, and financial responsibility for the acceptable inspected trees.

At the time of inspection and delivery, the rootball must be moist throughout. If in leaf, the crown must show no signs of moisture stress or branch dieback. The roots must show no signs of excess soil moisture as indicated by poor root growth, root discoloration, distortion, death, or foul odor.

D-2.5 Delivery

The buyer must stipulate the date of requested delivery. The nursery must stipulate how many days prior to delivery that notification must be received, and any special considerations for care between requested delivery date and installation.

D-2.6 Delivery Inspection:

If the trees have not been inspected at the nursery prior to delivery, a representative number of trees may have the rootballs washed free of soil to inspect the root system care when the trees were moved from smaller containers to larger containers in the nursery. The soil must be washed completely off the rootball. The roots must be maintained moist and inspected for correct root pruning and root development from the seed, graft, or liner stages per C-2 above. If acceptable, the tree may be planted as a bare-root tree. If unacceptable, more trees may be inspected, or the delivery may be rejected.

D-2.7 Additional information

For additional information and guidelines about growing and inspecting quality nursery products, visit “Guiding Principles for Growing Quality Trees for the Landscape” at the following links:
http://www.fire.ca.gov/resource_mgt/downloads/NurseryTreeSpecs10_09[1].pdf
http://www.fire.ca.gov/resource_mgt/downloads/NurseryTreeProductionStrategies_10_2009[1].pdf

Annex E – Sample specification for tree planting projects

(This annex is not part of the ANSI A300 Part 6 standard.)

Note: The following is a sample tree planting spec that a municipality or larger organization might use. It is not intended to be used as-is. It is provided as a reference. Acutal live planting specs should be developed according to the unique objective of each job.

E-1 Notice

E-1.1 All work will be done according the ANSI A300 Part 6 – *Planting and Transplanting* standards and, based on tree management standards in the ANSI A300 Tree Care Management series of standards

E-2 Inspect the tree

E-2.1 Carefully remove the soil at the top of the container to locate the trunk flare. Check for girdling roots and damage to the root system and lower trunk.

E-2.2 Until a relationship is established with the supplying nursery, randomly select one tree, or an acceptable sample for large quantities, in the delivery. Inspect the root system by taking the rootball out of the container, and remove/wash all the soil from the root system. Inspect the inner roots to verify that the roots were properly pruned when moved from the initial container to the next larger size. Keep the root system moist during the check. If the roots were properly pruned during container transfer, the tree can be planted as a bare root tree.

E-2.3 If the trees are acceptable, each tree must be removed from the container and the depth of the rootball from the trunk flare to the bottom of the rootball must be measured. This measurement, less 1 inch (2.5cm), yields the depth of the center of the planting hole. The roots must be kept moist.

E-3 Dig the hole

E-3.1 Shave and discard grass and weeds from the planting site.

E-3.2 The hole may be a minimum three times the diameter of the container diameter.

E-3.2.1 Square containers must be dug with a circular hole three times the container measurement.

E-3.3 Dig the hole, leaving an undisturbed “pedestal” in the center.

E-3.4 The center of the planting hole must be excavated to the depth measurement determined in subclause **E-2.3**.

E-4 Rootball preparation

E-4.1 Loosen and straighten outside and bottom roots prior to placing the rootball in the hole. The rootball (where the trunk meets the roots) may be up to 1 inch (2.5 cm) above ground level.

E-4.2 Winding and girdling roots must be pruned to either the point they are perpendicular to the rootball, or a point where they can be straightened and placed perpendicular to the rootball.

E-4.3 Keep the roots moist during this process so they do not dry out.

E-5 Backfill

E-5.1 Hold the tree so the trunk and central leader are in a straight upright position.

E-5.2 Place backfill soil around the base of the pedestal and rootball so the tree stands in the upright position

E-5.3 Backfill the hole with the soil you removed. Fill the entire hole level with existing soil grade. Backfill soil must not be placed on top of the rootball.

E-5.4 Build a berm at the outside edge of the rootball. The berm must be a minimum 3 inches (7.5 cm) high and 3 inches (7.5 cm) wide.

E-5.5 Cover the remainder of the backfill soil in the excavated area outside the berm with 4 inches (10 cm) of mulch.

E-6 Staking

E-6.1 Remove the nursery stake (the thin stake attached to the trunk) tied to the tree.

E-6.2 Install two stakes on the windward and leeward side of the tree, set at least 2 feet (.6 m) into the native soil outside the rootball.

E-6.2.1 If the area is exceptionally windy, high traffic, or when specified, install three or four stakes spaced evenly around the circumference, outside the rootball.

E-6.3 One tie per stake must be placed at the lowest point on the trunk where the tree crown stands upright. Ties must be placed using a “figure 8” crossing pattern wrapped around the trunk and firmly tied or attached to the stake.

E-6.3.1 Ties must be loose enough so the tree crown moves up to three times the trunk diameter in the wind, and taut enough that the trunk does not rub the stakes during movement.

E-6.4 The stakes must be cut off above the tie point so branches do not rub the stake above the tie point.

E-6.5 Check the stakes and ties periodically, removing them when the tree is able to stand on its own.

E-7 Mulch

E-7.1 Apply 4 inches (10 cm) of wood chips or other organic mulch over the planting hole excavated soil.

E-7.2 Mulch may be placed inside the berm and must remain at least 4 inches (10 cm) away from the trunk flare.

E-7.3 The soil area of the planting hole must be kept clear of grass and landscape plantings.

E-8 Water and irrigation

E-8.1 Apply water using a low pressure application, trickle from a hose, or soaker hose.

E-8.2 Use low water volume to apply the water. Add water long enough to saturate the root-ball and planting area.

E-8.2.1 Lawn sprinklers are not considered an acceptable method of applying irrigation to newly planted trees.

E-8.3 The initial watering frequency must be checked by monitoring the soil moisture. Based on the temperature and humidity, learn how long the soil retains the moisture.

E-8.4 After the soil is below field capacity, and before it dries out, repeat the watering process.

E-8.4.1 As the weather and seasons change, the irrigation frequency may change. Water needs must be evaluated by checking soil moisture following water application.

E-8.4.1.1 For example: Irrigation may be effectively applied twice a week during the fall, except in cool or rainy weather. Irrigation may need to be applied every two days during hot dry summer periods.

E-8.5 Irrigation must be continued for the first three years after planting.

E-8.5.1 Avoiding drying out the soil and rootball is crucial to the growth and establishment of the tree.

E-9 Protecting the trunk

E-9.1 Avoid damage from mowers and string trimmers to the tender bark of the young tree.

E-9.2 Maintain a clear area free of vegetation around the trunk in the excavated area of the planting hole.

E-9.3 Keep the 4 inches (10 cm) mulch coverage for the area around the tree.

E-10 Pruning newly planted trees

E-10.1 Broken and dead branches must be pruned.

E-10.2 A central leader must be identified and pruned so it is taller than any other branch.

E-10.3 All low, temporary branches on the lower trunk must be retained and, if needed, shortened for clearance.

E-10.4 Codominant leaders must be reduced in length (removing greater than 20 percent of the total original foliage) or removed as necessary for improving the tree structure.

Annex F Rootball size

(This annex is not part of the ANSI A300 Part 6 standard.)

F-1 Rootball dimensions

F-1.1 As trees get larger, rootball dimensions may be adjusted based on transportation requirements/limitations such as road or shoulder weight limits, clearance limits, oversize load restrictions, and related considerations.

F-2 The following rootball size table is provided as sample guidance only:

Caliper	Rootball Size
0-6 inches (0-15 cm)	> 12 inches (> 30.5 cm per inch caliper)
6-12 inches (15-30.5 cm)	10 inches (25.5 cm)
12-18 inches (30.5-46 cm)	9 inches (23 cm)
18 inches (46 cm) and greater	8 inches (20.5 cm)

Note: If using metric measuremnets with this table, a conversion factor divisor of 2.54 must be used in your calibration.

Annex G – Staking and root washing information

(This annex is not part of the ANSI A300 Part 6 standard.)

G-1 Supporting newly planted trees

Staking may not be necessary to support trees that are grown to ANSI Z60 and installed to ANSI A300 Part 6 standards. However, newly installed woody plants can be prone to uprooting, or "soil failure," due to many factors. Among these are: large crown volumes, circling roots, dense branching after heading in the nursery, small root zones, vandalism, lack of root adhesion to soil, lack of trunk taper, and exposure to weather events. If staking is necessary, it may be used to stabilize the tree so it does not uproot or break under loading (loading can be casued by, but is not limited to: wind; vandals; and, new growth of a top-heavy tree).

The purpose of staking is to stabilize the tree root system and trunk so the tree can establish and grow a healthy root system, trunk, and branches. Staking should allow trunk movement, which increases taper by thigmomorphogenesis, growth response to movement. Once the tree is stable and able to self-support, the stakes are removed. Temporary support systems with stakes and guys typically are intended to last one to three years.

A splint is an external support for a branch or portion of the stem. Materials such as a bamboo pole, thin wood dowel, or fiberglass rod are aligned with the branch or stem, using at least two ties to straighten or stabilize the branch or stem section in a desired direction. Straightening a central leader to a vertical position can be accomplished by splinting.

Staking methods include, but are not limited to: two vertical stakes parallel with the trunk, three small stakes angled in the ground and guyed above the lower branches, and "root staples" comprised of pairs of underground stakes connected by horizontal sections that rest on the upper roots.

G-2 Vertical tree staking

G-2.1 Two tall stakes can support most containerized and balled and burlapped trees. To begin, remove any wrapping material, including the nursery stake (the thin stake attached to the trunk), tied to the tree. Thin stakes can be used as anchors in splinting systems.

G-2.2 Install one stake on the side of the prevailing or common storm winds, and one opposite, both set at least two feet (61 cm)into the undisturbed native soil outside the rootball. Use a pole pounder or stake driver. Hardhats and safety glasses must be worn at all times when driving stakes.

G-2.3 If the area is exceptionally windy, high traffic, or when specified, three or four stakes may be spaced evenly around the circumference, outside the rootball. To limit grazing by herbivores, stakes may be spaced outside of the rootball and branches and the stakes wrapped with fencing.

G-2.4 One tie per stake is placed at the highest point on the trunk where the tree crown stands upright. Ties are placed using a "figure 8" crossing pattern wrapped around the trunk, and attached to the stake.

G-2.4.1 Ties must be loose enough so the tree crown moves up to three times the trunk diameter in the wind, and taut enough that the trunk does not contact the stakes. Low temporary branches may be allowed to rub against the stake during movement.

G-2.5 Cut the stakes off above the ties, to avoid damage.

G-2.6 Check the stakes and ties periodically. Adjust or replace them before bark is damaged. Remove stakes and ties when the tree is able to stand on its own. Wiggle and carefully pull out the stakes, using leg muscles, or cut them off at ground level using a saw. Some staking requires the use of a ladder. When a ladder is required always follow the rules of ladder safety.

G-3 Root stapling

G-3.1 There are a number of root stapling methods. The method detailed in this annex uses untreated pine 2-inch (5 cm) by 2-inch wood stakes or equivalent.

G-3.2 Two sections of 2x2 are cut 3 inches (7.5 cm) longer than the root ball width. Note: Measure the root ball width 3 inches (7.5 cm) from the trunk. Orient the 2x2's where practical so that screws will be driven parallel to the wood rays in the grain.

G-3.3 Cut four 2x2's, that are at least the height of the root ball plus two feet (61 cm), to a point and drive them into the ground alongside the root ball with at least 3 inches (7.5 cm) remaining above ground. Align the horizontal 2x2's (**G-3.2**) evenly to meet the vertical 2x2's.

G-3.4 Drill a small pilot hole through both sections where they meet to prevent splitting. Secure the horizontal 2x2's to the vertical 2x2's, using one 3-inch (7.5 cm) #8 Phillips head screw per attachment.

G-3.5 Cut off any vertical 2x2 remaining above the horizontal 2x2's. Mulch to cover the 2x2's, following specifications. Mulch should remain at a distance from the trunk that is consistent with ANSI A300 Part 2 *Soil Management* standards.

G-4 Root washing

Trees are naturally secured by the adhesion of the roots with the soil. Many nursery trees are grown in solid-walled containers, resulting in roots that follow the shape of the container and have less contact with soil. One planting method that maximizes root-soil contact, straighter root alignment, and plant tissue hydration is known as root washing. A general root washing procedure follows:

G-4.1 Remove the tree from the container and place it in a container filled with enough water to cover the entire root ball. Soak for 24 hours or until full hydration is reached.

G-4.2 Agitate, rinse and flex the root ball so the planting medium falls away from the roots. Pull the roots away from the trunk to straighten them, while continuing to wash away the growing medium.

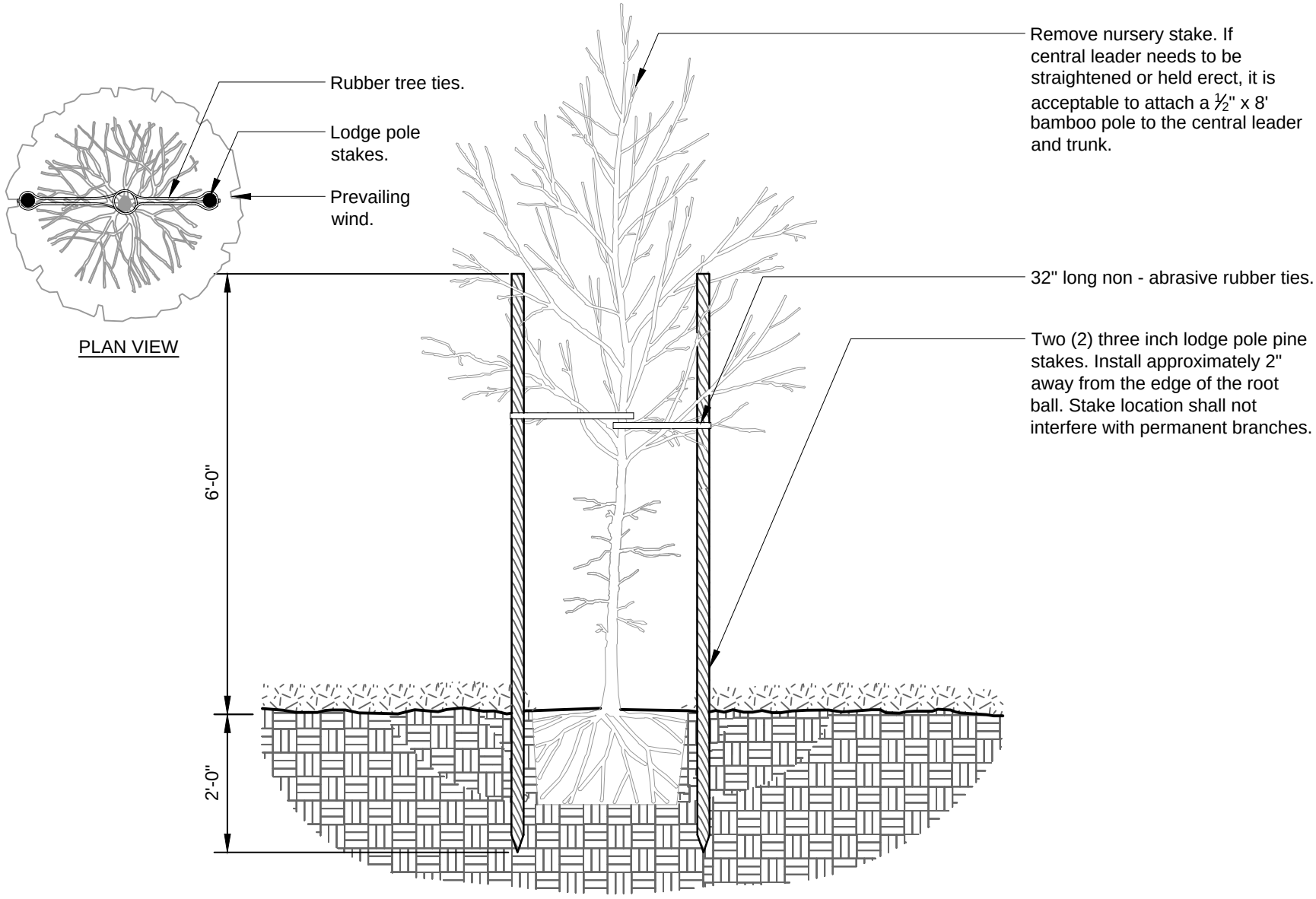
G-4.3 Rinse and repeat, until the roots cannot be straightened any more without damage. Prune roots that girdle the stem or buttress, or are kinked. Roots growing straight from the trunk in a spoke-like manner are preferred. Avoid removing more than 20 percent of the roots unless necessary to remove girdling or kinked roots.

G-4.4 Blend the washed nursery soil with native soil and specified soil amendments, see ANSI A300 (Part 2) *Soil Management*. Set the tree in its new location, holding roots extended while adding the blended backfill. Per ANSI A300 (Part 6) *Planting and Transplanting* standard, set the trunk flare to grade or higher, and settle the backfill in layers. Agitate to "burp" the backfill and remove air pockets. A thick slurry of the native soil backfill normally provides for growth and support.

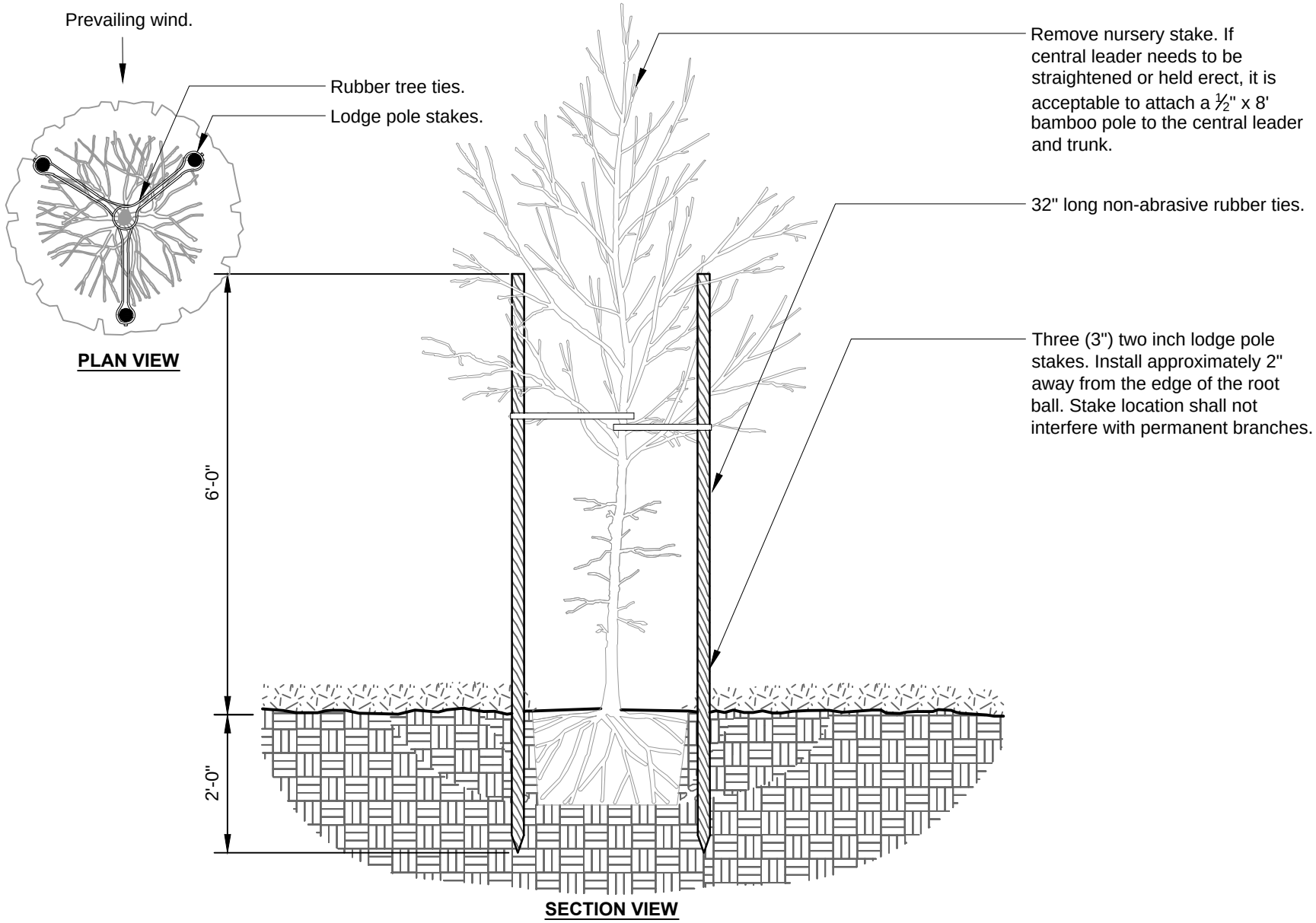
G-4.5 The adhesion of the roots to the soil is increased by the activity of bacteria and other

microorganisms, which produce natural adhesive byproducts such as glomulin. Modify or amend the backfill when needed, per ANSI A300 (Part 2) *Soil Management* **14.6.1**, "…appropriate for the physical and chemical characteristics of the site soil and to meet the objective…" and **14.6.2**: "Organic matter shall be incorporated uniformly into the soil..." to reach optimal conditions for microbial activity.

G-4.6 Root-washed trees may need to be staked or splinted to support the trunk.



P-X TREE STAKING - LODGE POLES (2)



P-X TREE STAKING - LODGE POLES (3)