

Alaska Department of Natural Resources • Division of Forestry
Community Forestry Program
Developing Tree Purchasing and Planting Specifications

The following is a template for developing specifications for purchasing and planting landscape trees to be used by government agencies and nonprofit organizations. It is designed with the tree's best interest as its guiding principle. It reflects current research-based standards recommended by the Alaska Department of Natural Resources' Community Forestry Program with input from agencies, arborists, and landscape architects. This template is not a boilerplate where you simply fill in your name but is designed to be adjusted to fit individual needs and circumstances.

How to Use the Specification Template

Most of the template is recommended for all specifications, however, there are a number of situations that require a decision on the part of the purchaser. Options selected may depend on the preference of the purchaser, the planting site, the purchaser's resources, or the availability and capability of local bidders.

Where information specific to the purchaser is needed, the template shows a blank line with the needed information in parentheses. Where decisions are required, the template offers options to choose from, which include an explanation of desired or expected results. Optional wording, shown in normal text, should be included in the specification. Wording in *italics* is the explanation of the option and should not be included in the final specification.

Remember that this is a recommended, not a required, specification. Each jurisdiction has its own wording and requirements for specifications. For example, a contract surety bond may be advisable or required. Have your attorney review the final specification and be sure to comply with local regulations and policies.

Selection of a Bidder

Some of the specified or optional practices in this template may be more stringent than common practices in the industry. However, the specifications are designed with the tree's best interest as its guiding principle, not ease or speed of installation. Reputable bidders will carefully read the specification and bid accordingly. Less reputable bidders may simply bid according to their common practice and, as a result, come in with a lower bid. The resulting job performance may be sub-standard or of poor quality. When possible, have a pre-opening meeting to answer questions and weed out potentially disappointing bidders. If trees are planted by a subcontractor, meet with the subcontractor before the landscaping phase begins.

It is also wise to get to know the nurseries you expect to use. Visit them, if practical, or talk to the owners or managers. Share your needs so they will know your expectations. They can tell you the best time to submit orders to get the best selection. Nurseries, unlike other businesses, cannot meet demand by simply making more of their product – plants. Demand must be anticipated years in advance.

Caution

Specifications are only as good as their enforcement. It is important to have a trained inspector to monitor the job as it progresses. If it is known that there will be no inspection, disreputable bidders may underbid a job and cut corners to make up the difference. Do not wait until the job is completed to do inspections. If sub-standard nursery stock is planted, it is often impossible to find replacements until the following year and it may be difficult and damaging to the trees to correct improper planting after the fact.

References

The following references explain much of the science and reasoning behind the specifications. They are available from the International Society of Arboriculture at (217) 355-9411.

Watson, Gary W. and E.B. Himelick. *Principles and Practice of Planting Trees and Shrubs*. International Society of Arboriculture, Champaign, IL. 1997. 199 pp.

Harris, Richard; Clark, James; Matheny, Nelda. *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*. Prentice Hall, Upper Saddle River, NJ. 3rd Edition. 1999. 687 pp.

Tree Purchasing and Planting Specifications

Pre-Qualification of Bidders

All bidders, prior to award of the contract, must present satisfactory evidence that they have been regularly engaged in this type of work. Bidders must have the necessary labor, materials and equipment to execute work to the satisfaction of the Purchaser.

_____ (Specify required evidence). *Note: Evidence may include a reference list with name, address, telephone number and description and dates of completed projects within the last five years. It may include a payroll list, equipment inventory, nursery stock inventory, or other evidence that these resources are available to the bidder.*

Proposal

All proposals shall be made on the forms provided. Bidders must submit prices for the bid in both words and figures. In case of discrepancy, the written word shall prevail.

Award of Contract or Contracts

The contract will be awarded to the lowest responsible, qualified bidder whose proposal complies with all the requirements. The Purchaser reserves the right to reject any and all proposals and to accept the bid that is most advantageous to the Purchaser.

Examination of Plans, Specifications, and Sites

Bidders may examine all plans, specifications, and sites. No deviation from specifications will be allowed after award of the contract without written consent from _____ (Purchaser's representative). Failure to fully examine project sites and work requirements will not relieve bidder from performing work as per plan and specifications.

Insurance and Worker's Compensation

The Contractor shall furnish evidence of Worker's Compensation, public liability and property damage insurance. Limits of insurance shall be as follows: Minimum amounts of \$1 million bodily injury and \$500,000 property damage including both injury and property damage caused by vehicles and machinery. A certificate of insurance shall be filed with _____ (Purchaser's representative and address).

Inspection and Payment

The Purchaser will inspect work periodically to insure that all specifications are adhered to. In no case will the final payment be made until the Contractor has complied with all requirements set forth and the Purchaser is satisfied that the work is properly and satisfactorily complete per plans and specifications.

Work Schedule and Project Completion

The Contractor shall submit a schedule indicating when each stage of the work described will be completed. Contractor shall update the schedule as needed and allow for adequate notice for inspections. All work shall be completed by _____ (date) unless otherwise approved as noted in project specifications.

Guarantee

All work and materials shall be guaranteed in writing as specified in section 15.

Questions

All questions regarding these specifications shall be directed to _____ (name), _____ (title) at _____ (address) _____ (telephone).

1. Scope of Work

- A. These specifications, including drawings and plant lists, apply to those items necessary for and incidental to the execution and completion of planting and maintenance as specified.
- B. The Contractor shall provide for all labor, supervision, equipment, materials, and supplies necessary for the execution of the work at no additional cost to the Purchaser.
- C. A maintenance period shall begin when the initial planting operation has been accepted by the Purchaser and extend (two / three – *select one*) full growing seasons following installation. For plants installed after August 15, the first growing season shall begin the following year.
- D. Reasonable care shall be exercised during excavation, planting, filling, grading, and clean-up to protect from damage existing trees, shrubs, other specified vegetation, and other site features, improvements, structures and utilities.

Removal or destruction of existing plants is prohibited unless specifically authorized by the Purchaser. The grade shall not be changed nor shall soil be added over the roots of existing plants marked for protection.

Note: In situations where existing trees or other features need specific protection, the following language is recommended. To save money, the Purchaser may develop and implement the tree protection plan. The Division of Forestry can provide information on protecting trees during construction.

Option: The Contractor must provide a site protection plan approved by the Purchaser. The plan must include a site map showing equipment traffic routes, material storage areas, and the location of tree and feature protection methods such as fencing, bridging, mulching, etc.

2. Applicable Standards

- A. *American Standard for Nursery Stock. ANSI Z60.1.* current edition. American Association of Nurserymen, Inc., 1250 I St. NW, Suite 500, Washington, DC 20005.
- B. *The American National Standard for Tree Care Operations, ANSI A300.* current edition. International Society of Arboriculture, PO Box 3129, Champaign, IL 61826-3129

3. Planting Season

- A. Planting shall be done when temperatures are above freezing, the ground is frost free, and the soil is in a workable condition. Unless otherwise specified in writing by the Purchaser, planting of containerized and balled in burlap trees shall be done: (*select one of the following*)
 - Option 1: May 20 - September 15 (Interior Alaska)
 - Option 2: May 1 - September 15 (Southcentral Alaska)
 - Option 3: April 15 - October 15 (Southeast Alaska)
- B. All bare root plants shall be planted in the spring while dormant, before buds or leaves open.

4. Materials

- A. Topsoil: Shall be loamy, friable soil containing four to ten percent by dry weight organic matter. The pH shall be between 5.5 and 7.0. Topsoil shall be free of stones larger than one inch in any dimension, refuse, roots, weeds, noxious seed, or other material harmful to plant growth. It shall not contain straw, manure, sawdust, or other fillers. Muddy topsoil shall not be used for planting.

Contractor shall submit a copy of certified test report for topsoil, which includes nitrogen, phosphorus, potassium, soil pH, particle size, and organic content by dry weight.

Note: It is recommended that plants be selected that are suited to pH on site as it is difficult to change and maintain a different pH level.

- B. Water: Shall be provided by the Contractor and shall be suitable for irrigation and free from substances harmful to plants.

- C. Mulch: Shall consist of wood chips, shredded wood, shredded bark, or other material specified by the Purchaser. Material shall be uniform in size, color, quality, and overall appearance. Mulch shall be free of material injurious to plant growth. Wood chips shall have an area of not less than one square inch and not more than three square inches.

Contractor shall submit two pounds (1 kg) of proposed mulch for inspection by Purchaser.

- D. Fertilizer: Shall be a slow-release fertilizer with a ratio of 3:1:1 or 3:1:2 with a salt index of less than 50. Contractor shall submit manufacturer literature and application rate for approval.
- E. Stakes and ties: Stakes shall be 6' to 8' fence stakes, or 2" x 2" wooden stakes pointed at one end. Ground anchors shall be metal or wooden stakes, buried deadmen, or other supports approved by Purchaser. Ties shall be of three-quarter inch or wider bands of polypropylene, elasticized or webbed strapping, or horticultural tape. Ties shall have a smooth surface and be flexible to allow some movement of the trunk without damaging the bark.
- F. Trunk protectors: Shall be perforated drainage tubing or similar material approved by the Purchaser, large enough in diameter to prevent abrasion of the trunk and to allow air circulation between the tubing and the trunk.

5. Plant Materials

- A. A complete list of plants, including quantities, sizes, and other requirements is included. In the event that discrepancies occur between quantities of plants indicated in the plant list and on the drawings, the quantities indicated on the drawings shall govern.
- B. The Contractor shall furnish a written list of proposed sources of nursery stock. This list may not be altered without consent of the Purchaser.
- C. Substitutions of plants must be authorized in writing by the Purchaser. If proof is submitted in writing that a plant specified is not obtainable, consideration will be given to the nearest available size or similar variety, with a corresponding adjustment of the contract price.

Note: Specify if you will accept field-dug or only nursery grown stock. If field-dug trees are specified, it is recommended that Purchaser inspect trees in the field before they are dug and that the Contractor be required to provide written proof of ownership or permission of owner to dig trees. Field dug trees will not have the consistent form of nursery grown stock but should meet same requirements for health and condition.

- D. All plants shall conform to *American Standard for Nursery Stock*. Plants shall be true to species and variety specified and (nursery grown / field dug – *select one*) in accordance with good horticultural practices. They shall have been dug during the most recent favorable harvest season.

Plants shall be so trained in development and appearance as to be unquestionably superior in form, compactness, and symmetry. They shall be sound, healthy, vigorous, well-branched, and densely foliated when in leaf. Plants shall be free of disease and insect adults, eggs, pupae, or larvae. They shall have healthy, well-developed root systems and shall be free from physical damage or other conditions that would prevent thriving growth.

Tree trunks shall be straight and well-tapered. Trees with multiple leaders, unless specified, will be rejected. Damaged, cut, or crooked leaders; included bark, bark abrasions, sunscald, disfiguring knots, mold, and prematurely opened buds, or cuts of limbs over 3/4 inch (2 cm) diameter that are not completely callused are cause for rejection. Needled evergreens shall not have been sheared.

Balled-in-burlap plants shall have firm, natural earth balls of a diameter not less than that recommended in *American Standard for Nursery Stock*, and of sufficient depth to include fibrous and feeding roots. Balls shall be securely wrapped with burlap and tightly bound with rope or twine. Or trees may be in wire baskets lined with burlap and tightly bound with rope or twine. The trunk flare shall be within the top two inches of the soil ball. Balled-in-burlap plants with manufactured balls or balls that are dry, cracked, or broken before or during the planting operation will be rejected.

Bare root plants shall have healthy, well-branched root systems characteristic of the species and with adequate spread.

Containerized plants shall be well established in the container with a root system sufficiently developed to hold together when removed from the container. Plants shall not be pot bound nor have kinked, circling, or bent roots. The root ball periphery shall be free of circling roots larger than 1/4 inch in diameter.

Plants shall conform to the measurements specified except that plants larger than those specified may be used if approved by the Purchaser. Use of larger plants shall not increase the contract price nor allow the Contractor to use smaller than specified material on other plants. If larger plants are approved, the root ball, root spread, or container shall be increased in proportion to the size of the plant.

Caliper measurements shall be taken six inches (15 cm) above the trunk flare for trees up to four inches (10 cm) in caliper, and 12 inches (30 cm) above the trunk flare for trees over four inches (10 cm) in caliper. Plants shall be measured when branches are in their normal position. If a range of size is given, no plant shall be less than the minimum size, and no less than 50 percent of the plants shall be as large as the maximum size specified.

Plants shall have a standard balance between height, crown spread, diameter, and root ball size according to the *American Standard for Nursery Stock*.

6. Certification

- A. All plants shall comply with state and federal laws governing the shipping, selling, and handling of plant stock and inspection for plant diseases and pest infestations. Inspection certificates required by law shall accompany each shipment of plants and shall be filed with the Purchaser before acceptance. The certificate shall bear the name and address of the source of the stock.

7. Transportation and Storage of Plant Materials

- A. The Contractor shall take care to prevent injury and drying out of plants during transportation. Should the roots dry out, large branches be broken, earth balls break or be loosened, or bark be torn, _____ (*Purchaser's representative*) may reject the injured tree(s) and have them replaced at no additional cost to the Purchaser.
- B. Roots of each load of bare root stock shall be adequately covered with wet soil, sawdust, wood chips, or other acceptable moisture-holding medium until planted. Loads shall be covered with an open-mesh tarpaulin, canvas, or other material to ensure that trees do not become overheated or damaged by wind during transport. Loads not protected in this manner may be rejected.
- C. Plants must be protected at all times from sun or drying winds. Those that cannot be planted immediately upon delivery shall be kept in the shade and watered well. Plants shall not remain unplanted longer than three days after delivery without permission from the Purchaser.
- D. Plants shall be lifted and handled with suitable support of the soil ball and shall not be lifted by the trunk or branches.

8. Plant Delivery and Inspection

- A. The Contractor shall give the Purchaser notice of delivery time seven to ten days prior to delivery.
- B. Each bundle or each plant shall have a durable and legible label with plant size and name (genus, species, variety, cultivar) securely attached when delivered and in place until after acceptance. Labels shall not girdle or damage plants.
- C. Plants shall be inspected by the Purchaser upon delivery. A Contractor's representative shall be present at all inspections. Installation shall not begin until after all plants are inspected and accepted by the Purchaser.
- D. The Purchaser reserves the right to reject any plants that do not meet the standards or that have been damaged. Such approval shall not impair the right of inspection and rejection during progress of the work. The Purchaser shall be the sole judge of acceptability of stock at any time during the course of this contract.

9. Layout and Coordination

- A. The (Purchaser / Contractor – *select one*) will mark all planting areas with stakes or paint. The Purchaser shall approve the layout before planting begins.
- B. The Contractor shall obtain a utility locate and ensure that utility marking is complete before any excavation begins. The Contractor shall locate any subsurface improvements such as sprinkling systems or conduits. The Contractor shall be responsible for all damage resulting from neglect or failure to comply with this requirement.

Trees shall not be planted closer than _____ (*specify distance*) from water service connections, sewer laterals, or gas lines, unless so directed by the Purchaser’s representative. The Contractor shall be responsible for moving trees if planted closer than the specified distance.

No plant that grows more than 20 feet tall shall be planted under aerial utility lines.

- C. The Contractor shall notify the Purchaser in writing of any soil conditions or other obstructions the Contractor considers detrimental to tree growth. Proper water drainage must be assured.

Where soil conditions or below ground obstructions that cannot be remedied are encountered, the Purchaser shall designate alternate planting locations. The Purchaser shall bear any costs associated with such relocation.

10. Excavation of Planting Areas

- A. The Contractor shall excavate planting areas as shown on the drawings. Excavation may be done by shovel, backhoe, or stump grinder but a soil auger may not be used.

The planting holes shall be saucer-shaped and the surfaces shall be roughened prior to backfilling.

Note: Digging holes with a stump grinder produces the most friable soil and minimizes glazing of the sides of the hole. Soil augers glaze the sides of planting holes, particularly in heavy clay soils, preventing penetration by the roots into the surrounding soil. Augers may be acceptable in sandy soils if any glazing is broken up and surrounding soil is tilled.

- B. *The following options are for containerized and balled-in-burlap trees. Research has shown that a wider planting hole greatly improves establishment of a tree, particularly in heavy soils. The best option for the tree is a hole at least three times the diameter of the root ball. Common practice in the industry is 1.5 to two times the ball diameter. Loosening the soil with a rotary tiller beyond the hole to a depth of 6 to 12 inches is nearly as effective as a wide hole and may be cheaper. If the planting site is restricted and you are not able to dig a round hole, dig the equivalent rectangular area. See Table 1 for conversion examples.*

Option 1 should be selected in particularly heavy or compacted soils or when the best conditions are desired for the tree. Option 2 may be used in light, uncompacted soils or where topsoil is added to the entire planting site at the same depth as the root balls.

Option 1. The planting hole shall be at least three times the diameter of the soil ball and the soil shall be loosened 12 inches beyond the edge of the planting hole to a depth of 6 to 12 inches. OR base planting hole width on caliper of tree as follows:

Caliper	Planting hole width
1/2 to 1 inch	4 feet
1 1/2 to 2 1/2 inches	7 feet
3 to 4 inches	10 feet

Option 2. The planting hole shall be at least two times the diameter of the root ball and the soil shall be loosened 12 inches beyond the hole to a depth of 6 to 12 inches. OR base planting hole width on caliper of tree as follows:

Caliper	Planting hole width
1/2 to 1 inch	3 feet
1 1/2 to 2 1/2 inches	4 feet
3 to 4 inches	6 feet

Note: On very wet sites or in areas with heavy rainfall, the following option may be included.

Option: The planting area shall be raised or mounded, to provide adequate drainage.

- C. The planting holes for bare root plants shall be two feet wider than the spread of the roots.
- D. The root ball shall be placed on undisturbed soil. The depth of the hole shall be equal to the distance from the bottom of the soil ball to the trunk flare, or slightly less.

The trunk flare is the area where the roots join the trunk. With bare root trees the trunk flare's location is obvious. The trunk flare of balled in burlap and containerized stock may be a few inches below the surface of the soil ball. Remove excess soil from the top of the ball, using hands, not tools, to accurately measure the depth of the root ball.

- E. Excavated planting holes that will be left open when work is not in progress or that pose an immediate and considerable hazard to pedestrians or vehicles shall be adequately barricaded with appropriate warning devices.

11. Handling and Planting Procedures

- A. Plants must be protected from excessive vibrations. Plants shall not be thrown or bounced off a truck or loader to the ground. Plants shall not be dragged, lifted, or pulled by the trunk or branches in a manner that will damage the branches or loosen the roots in the ball.

- B. Trees shall be gently removed from containers before planting. Trees shall not be pulled from the container by the trunk.

Plants shall be set with the top of the trunk flare at or slightly above finished grade. Any soil above the trunk flare must be carefully removed.

Plants shall be set on firm soil (undisturbed or compacted) so that plant will be at the same depth one year after planting. Any repositioning of trees shall be done by supporting and moving the root ball, not lifting by the trunk.

Roots that are circling the bottom, sides or surface of the root ball shall be gently separated and directed away from the trunk. (See specification 5 D).

- C. Roots of bare root plants shall be spread into a natural position, over a pedestal of firm soil if necessary, free of bunching, kinking, or circling. Soil shall be worked firmly into and around the roots so that there are no air pockets. All broken or damaged roots shall be cut back to the point where they are clean and free of rot. No other root pruning shall be done.
- D. After the plant has been set, remove burlap, wire baskets, and other wrappings from at least the top half of the ball. Wraps may be left intact around the lower part of the ball if necessary to support the ball. However, all waterproof or water repellent wrappings shall be removed completely. Care must be taken to not crack or break the root ball.
- E. Planting holes shall be backfilled with _____ (excavated soil / topsoil / mix of topsoil and excavated - *select one*). When holes are approximately two-thirds full, soil shall be thoroughly watered to eliminate air pockets. After this initial watering, soil shall be installed to the top of the hole and again thoroughly watered. Backfill shall not be tamped or compacted.

Note: If topsoil is used, it should be well mixed with existing soil or spread over entire planting area to a depth equal to the depth of the root ball. Filling holes with topsoil, especially when the surrounding soil is compacted, encourages roots to remain within the hole rather than spread.

- F. Fertilizer shall not be applied during the planting operation.
- G. Planting areas shall be finish-graded to conform to drawings after full settlement occurs. Avoid all compaction in planting area after watering.
- H. All plants shall be mulched with a two- to four-inch layer of specified mulch after grading. Mulch shall be placed over the entire planting bed or cover at least a three-foot radius around each tree. Mulch shall be pulled back no less than three inches and no more than six inches from the trunk.

- I. All twine, rope, transit guards, plant labels, and wrappings around the trunk or branches shall be removed after planting.

Use the following language if planting on a slope or in other conditions where a berm is needed to ensure tree receives adequate water. Berms must be removed before winter so the tree does not stand in water or ice and so soil and sand do not fill in the bermed area around the trunk.

Option: A temporary berm, three to four inches high, shall be constructed around the planted area or just outside root ball. It shall be removed at the end of the first growing season.

12. Guying, Staking, Trunk Protection, and Pruning

Note: Research has shown that typical paper or cloth tree wrap provides no benefit to the tree. However trunk protection is recommended when needed to prevent damage from moose, rabbits, voles, or other animals. Staking is not recommended as a routine practice. Exceptions include very windy sites, areas where vandalism is expected, or when planting large bare root trees in light soil. Roots must remain stationary but the trunk needs to be able to sway in the wind to develop trunk taper and strength.

- A. Only trees so designated by the Purchaser shall have trunk protection installed. The trunk protection shall be secured in a manner that does not damage the bark (see specification 4 F) The _____ (Purchaser / Contractor – *select one*) shall remove trunk protection the spring following installation.
- B. Only trees so designated by the Purchaser shall be staked and guyed. Ties made of approved material shall be attached directly to the stakes or attached to the stakes by wire. In no case shall the wire extend around the tree trunk, even if covered by a hose.

Ties shall be attached loosely enough to allow the trunk to sway in the wind without allowing movement of the roots. Ties shall be secured at the lowest point on the trunk at which the root ball remains stationary, approximately one-third up the tree. Stakes shall be driven outside the root ball and 18 inches into solid ground. Tops of stakes shall be cut off above ties so they do not damage branches.

For trees larger than three inches in caliper, ties shall be attached to three guy wires and ground anchors or stakes as detailed in drawing. Anchors or stakes shall be driven at a 45-degree angle to the ground and placed at 120-degree intervals around the trunk. Staking and guying shall further conform to the drawings.

The _____ (Purchaser / Contractor – *select one*) shall remove all stakes, ties, and guy wires one year after installation. The stakes, ties, and wires will _____ (become / remain – *select one*) the property of the _____ (Purchaser / Contractor – *select one*) and should be figured into the bid.

- C. The only pruning allowed at planting shall be removal of double leaders and dead, damaged, or broken branches. Pruning shall conform to *American National Standard for Tree Care Operations, ANSI A300*. No pruning paint or other wound dressing shall be used.

13. Clean-up

- A. Soil, branches, rejected plants, wrapping material, and other debris resulting from installation shall be promptly cleaned up and removed. The work area shall be kept safe and neat at all times. Under no condition shall accumulation of soil, branches, or other debris become a public hazard.

14. Acceptance of Initial Planting Operation

- A. The Purchaser shall perform an inspection with the Contractor after the initial planting operation. Initial planting operation ends when:
 - a) All plants are installed, mulched, and watered as specified;
 - b) Stakes and guys, if specified, are in place;
 - c) All construction material and excess excavated material is removed and clean-up is completed.

- B. Upon completion and reinspection of all repairs or renewals required by the Purchaser, the Purchaser shall certify in writing that the work has been accepted. Work accepted will be paid within 30 days at the contract bid price, unless previously negotiated otherwise.

15. Guarantee Period and Replacement

- A. The Contractor shall guarantee all plants to be healthy and in flourishing condition for (two / three – *select one*) full growing seasons after installation. The guarantee includes replacement for damage caused by vandals, storms, animals, insects, or mechanical damage.
- B. The Contractor shall remove and replace, without cost to Purchaser, all plants not in a healthy and flourishing condition, as determined by the Purchaser, any time during the guarantee period. Replacements shall be made as soon as conditions permit and subject to all requirements stated in this specification.

The guarantee of replacement plants shall extend for a period of one year from the date of replacement. In the event that a replacement plant is not acceptable during or at the end of the guarantee period, the Purchaser may elect subsequent replacement or credit for that item.

16. Maintenance Period

- A. The maintenance period begins when installation has been accepted and extends for (two / three – *select one*) full growing seasons. When trees are installed after August 15, the first growing season shall begin the following year.

The Contractor shall routinely inspect the site during the growing season, May 1 to September 30, and inspect the site monthly during the remainder of the year. (*Use dates appropriate for your location.*)

The Contractor shall furnish all labor, materials, and equipment required to protect and maintain plants in a healthy and flourishing condition, and to repair any damage to the site as specified during the maintenance period.

- B. The Contractor shall deep water all trees and shrubs at least once a week, or as needed to maintain adequate soil moisture. Deep watering is the slow penetration of water throughout the entire root zone of each plant, a depth of approximately 24 inches. The watering schedule must respond to varying seasonal and soil conditions to maintain adequate, but not excessive moisture. If the soil does not adequately absorb water, the Contractor shall take actions that correct this condition without additional cost to the Purchaser.

Watering shall cease at the first hard frost and shall resume when the ground thaws in the spring.

- C. Pruning shall conform to *American National Standard for Tree Care Operations, ANSI A300* and shall be done by a certified arborist or other person trained to meet these standards. Dead, broken, or damaged branches may be pruned at any time. Pruning for form shall begin the year after installation. No tree shall be topped. Any tree damaged by improper pruning shall be replaced by the Contractor.
- D. Fertilizer shall be applied in late summer or early autumn during leaf fall. It is most effective at encouraging growth the following season when applied after growth ends but while soil is warm enough to take up and store the nutrients.

A slow-release fertilizer shall be applied at a rate of three pounds of actual nitrogen per 1000 feet² per application and shall not exceed six pounds of actual nitrogen per 1000 feet² annually. A fertilizer ratio of 3:1:1 or 3:1:2 with a salt index of less than 50 shall be used. These ratios may be adjusted based on age and/or condition of the plant or soil and environmental conditions, when specified by the Purchaser.

Fertilizer shall be uniformly distributed throughout the planting bed or root zone (an area with a diameter equal to the height of the tree). Fertilizer shall be thoroughly watered in.

- E. Mulch shall be raked and smoothed to retain its functional and aesthetic purposes and replaced as needed to maintain a depth of two to four inches at all times. An area of three to six inches in diameter around each tree trunk shall be kept clear of mulch.

- F. The Contractor shall keep the planted area free of litter and weeds. Any tree or shrub damaged by a lawnmower, weed whip, or other equipment shall be replaced.
- G. If trees are staked, the ties shall be inspected and adjusted as necessary to prevent rubbing, girdling, or looseness. Damaged or missing stakes shall be replaced.

The Contractor shall remove all ties no later than one year after plant installation unless directed otherwise by the Purchaser.
- H. If trunk protection is specified, it shall be installed in the fall and removed in the spring.
- I. The Contractor shall secure the permission of the Purchaser before applying any herbicide, fungicide, or insecticide. The applicator shall possess a "Permit for Application" of materials used from the Alaska Department of Environmental Conservation. The Contractor shall apply all materials in complete accordance with state, federal, and local regulations. Contractor shall notify Purchaser and tenants prior to application per state requirements.

17. Inspection

- A. At the beginning and end of each maintenance season, the Contractor shall request a site visit with the Purchaser to review the plant material and document any changes in maintenance tasks.
- B. The Purchaser will make periodic inspections of the planting sites. Any deficiencies in maintenance operations noted shall be corrected within five calendar days after written notice at no additional cost to the Purchaser. All delays beyond the five-day period shall result in an equal number of days added to the maintenance period.

18. Final Inspection and Acceptance

- A. At the end of the maintenance and guarantee period and upon written request of the Contractor, the Purchaser shall inspect all guaranteed work for final acceptance. The request shall be received by the Purchaser at least 14 days before the anticipated date for final inspection. Upon completion and reinspection of all repairs or replacements necessary in the judgment of the Purchaser, the Purchaser shall certify, in writing, that the project has received final acceptance.

19. Payment

- A. *Note: A variety of payment schedules are possible. The following is a possibility. In any schedule, it is wise to hold back a significant amount until the maintenance and guarantee period ends.*

Option: Payment shall be made to the Contractor as follows:

40 percent of the contract sum upon acceptance of the initial planting operation

40 percent of the contract sum at the end of the first growing season after the replanting of replacement material if required

20 percent of the contract sum after final acceptance at the end of the maintenance period

Converting a Circular Hole to a Rectangular Planting Space

Tree Caliper	Ball Diameter	Hole Diameter	Hole Area	3' Wide Terrace	4' Wide Terrace	5' Wide Terrace	6' Wide Terrace
1"	16"	48"	12 Ft. ²	3'x4'	N/A	N/A	N/A
1.5"	20"	60"	20 Ft. ²	3'x7'	4'x5'	N/A	N/A
2"	24"	72"	28 Ft. ²	3'x9'	4'x7'	5'x5.5'	N/A
2.5"	28"	84"	39 Ft. ²	3'x13'	4'x10'	5'x8'	6'x6.5'
3"	32"	96"	50 Ft. ²	N/R	4'x12.5'	5'x10'	6'x8'

N/R - Not Recommended

N/A - Not Applicable (circular hole fits in given space)

Table from Wisconsin Dept. of Natural Resources "Tree Purchase and Planting Specifications"