

SELECTIVE CLEARING, TRANSPLANTING, PROTECTION AND MAINTENANCE OF EXISTING TREES AND PLANTS TO REMAIN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Selected removal trees and plants not selected to remain.
 - 2. Protection and pruning of existing trees and plants that are affected or adjacent to the Work, whether temporary or permanent construction.
 - 3. Selected trees to be transplanted to on site locations.
 - a. Selected trees as shown on the drawings shall be field dug and transplanted on campus property to locations determined by the Owner's Representative and Landscape Architect.
 - 4. Maintenance of existing trees to remain as shown on the drawings.
 - 5. Warranties and Replacements.
- B. Related Sections:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls" for temporary site fencing.
 - 2. Division 31 Sections related to demolition for removing and/or protecting existing structures and other materials as required for construction.
 - 3. Section 329300 – Trees, Shrubs and Groundcover Planting
 - 4. Section 329350 – Landscape Establishment for 90 Days

1.3 UNIT PRICES AND PAYMENT SCHEDULE

- A. Work of this Section is affected by unit prices specified in Division 1 Section "Unit Prices."
 - 1. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.
- B. Payment for this work will be Lump Sum and shall be accounted for under Landscape / Irrigation (Softscape) bid items or other item(s) as established by the Owner and General Contractor.
 - 1. Work and payments for the work shall be inclusive of all requirements of this section, the drawings and other specifications related to this section. The work shall be one lump sum unit, measured as completed in place and maintained tree protection for the duration of the construction activity for all trees and plants to remain.

2. Payment shall be based on a percentage of completed work. Billing amounts may be included during progress billings as approved by the Owner's representative and Landscape Architect

1.4 REFERENCES:

A. Definitions

1. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at 6 inches above the ground for trees up to, and including, 4-inch size, and 12 inches above the ground for trees larger than 4-inch size.
2. Drip Line of Trees: Shall be a general line projecting from the approximate furthest extending edges of the outer foliage or leaf line (canopy) of the tree or plant downward to the ground and continuous along the ground for the extent of the canopy.
3. Protection: Providing all barricades as required to prevent all damage to existing plant materials to remain, including but not limited to protection from mechanical damage, soil compaction, pollution from all sources, and disruption of environmental support which would result in the loss of vigor of said plantings.
4. Root Protection Area: The measurement of the diameter of the tree trunk in inches times a multiplier of 12. Root Protection Line may not coincide with drip line. An independent Arborist or the Arborist from the University may determine the Root Protection Area is larger or different for certain trees, specimen trees and trees with extreme exposure to construction etc.
5. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
6. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by a circle concentric with each tree with a radius not less than the diameter of the drip line unless otherwise indicated in the drawings.
7. Root-Ball Depth: Measured from bottom of trunk flare to the bottom of root ball.
8. Root-Ball Width: Measured horizontally across the root ball with an approximately circular form or the least dimension for non-round root balls, not necessarily centered on the tree trunk, but within tolerance according to ANSI Z60.1.
9. Root Flare: Also called "trunk flare." The area at the base of the tree's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
10. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

B. Applicable Standards: Apply standards as described in the following:

1. "American Standard for Nursery Stock", 1980 Edition, American National Standards Institute, Incorporated, (A.N.S.I. Z60-1-1980).
 - a. Reference standards for tree balling practices for balling and transplanting selected existing trees to be relocated and for quality and standards of any replacement warranty materials.
2. "Standardized Plant Names", 1942 Edition, American Joint Committee on Horticultural Nomenclature.
3. ANSI - A300 Standards for Tree Care Operations

4. ANSI - A300 (Part 6) and in ANSI Z60.1 pertaining to transplanting field-grown trees.
 5. Approved arboricultural recommendations which are based on the onsite tree inspection and project reports prepared by the arborist and complying with the on the above documents.
 6. Tree Pruning Standards: Comply with the National Arborist Association's "Pruning Standards for Shade Trees" except where more stringent requirements are indicated.
 7. Additional tree work, care and horticultural information included in these specifications
- C. Regulations and Codes:
1. Work Standards and Requirements: All work shall comply with the rules and regulations of the Department of Occupational Safety and Health Administration (OSHA); The Environmental Protection Agency (EPA), State Pesticide Applicators regulations and all other local and State agencies having jurisdiction. Nothing contained herein shall be construed as permitting work that is contrary to such rules, regulations, and codes.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of the following:
 1. Organic Mulch: 1 Quart volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
 2. Protection-Zone Fencing: Fencing Assembly including product information and data on all system components.
- C. Qualification Data: For qualified arborist and tree service firm.
- D. Final Certification: Provided by independent arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired if damaged.
- E. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- F. Existing Conditions: Documentation of existing trees and plantings indicated to remain or be transplanted, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 1. Use sufficiently detailed photographs or videotape. Color shall accurately depict hue condition of foliage and bark.
 2. Include drawings and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.6 QUALITY ASSURANCE

- A. Arborist Qualifications: An arborist certified by the International Society of Arboriculture or Registered Consulting Arborist as designated by ASCA.

- B. Tree Service Qualifications: Engage an experienced tree service firm that has successfully completed tree protection extended maintenance and trimming work similar to that required for this Project and that employs an experienced, certified Arborist continuously on staff meeting Arborist Qualifications and whom actively participates in the work.
- C. Tree-Transplanting Program: Prepare a written plan by arborist for transplanting trees for the whole Project, including each phase or process, tree maintenance, and protection of surrounding materials during operations. Describe in detail the materials, methods, and equipment to be used for each phase of the transplanting work.
 - 1. Include a transplanting schedule for each species to be transplanted, coordinated with the Project schedule.
 - 2. Show details of temporary protective barriers where needed.
 - 3. Include care and maintenance provisions.
- D. Pre-installation Conference: Conduct conference at Project Site
 - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
 - b. Enforcing requirements for protection zones.
 - c. Arborist's responsibilities.
 - d. Field quality control.
 - e. Plant material to be transplanted and verify site locations for the transplants.

1.7 PROJECT CONDITIONS

- A. Verification of Existing Conditions:
 - 1. Contractor shall visit the site to determine existing conditions, including access to the site, the nature and extent of existing trees and other factors that may affect the required work.
 - 2. Utilities in the areas are to be confirmed through preliminary utility excavation in the areas of tree work by excavating and pot holing is required.
- B. Compensation for damaged trees:
 - 1. The Owner shall be compensated by the Contractor for damage to existing trees designated to remain by Contractor. Unless Owner grants prior written approval, plant materials damaged or destroyed by Contractor shall be replaced by Contractor at no expense to the Owner on a caliper inch to caliper inch basis with owner's and landscape architects option, choice and approval of replacement material.
 - 2. Requests for additional compensation to the Contractor resulting from the alleged ignorance of local conditions, and their effect upon the cost of the work will not be approved.
- C. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.

4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
 - a. Should excavation be necessary, reference the requirements for tree and root care outlined in these specifications
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

D. Do not direct vehicle or equipment exhaust toward protection zones.

E. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Adhere to the requirements in Section 329300 – Trees, Shrubs, and Groundcover Planting.

1.9 PRELIMINARY SITE REVIEW:

A. The Contractor shall arrange a site meeting between the Owner's project manager and their affected department personnel and the Landscape Architect to confirm construction plans and to positively identify all trees and to be preserved and protected and materials to be removed.

B. Pre-installation Conferences:

1. For tree removal and trimming: Before commencing tree protection and trimming, meet with representatives of authorities having jurisdiction, Owner's Representatives, Landscape Architect, consultants, and other concerned entities to reconfirm tree protection program. Review tree protection and trimming procedures and responsibilities. Notify participants at least 3 working days prior to convening conference.
2. Record discussions and agreements and furnish a copy to each participant and pertinent parties concerned with the work if not in attendance.

1.10 GENERAL PROVISIONS:

A. All trees within the construction areas are to be identified in the field by survey ribbon tied to tree trunks in different colors for different action requirements. Flagging to be placed on the trunks of trees at chest height.

B. If any trees are found within work limits or with protection zones immediately adjacent to work which have not been indicated on the drawings or tagged, those trees shall remain until review and written instructions from the Owner or Landscape Architect for the disposition of those trees.

1. Unmarked trees shall be brought to the attention of the Owner and Landscape Architect during the preliminary site review meeting.

- C. Trees to be removed are noted on the drawings. Contractor shall mark trees to be removed using flagging. Review of marked trees shall be approved by the Owner and Landscape Architect prior to demolition.
- D. Provision for access to the site for heavy equipment will be as approved by Owner. Equipment shall use prescribed roadways and shall not be allowed in areas other than designated construction areas and designated roadways. Open grass areas which are altered or disturbed by equipment during the work shall be returned by pre-existing conditions at no additional cost to Owner.
- E. Debris shall become property of Contractor and shall be disposed of in accordance with local ordinances. Cost of disposal to be paid by Contractor.
- F. Contractor shall protect root areas and crowns of trees not designated for work under this contract from damage from operations and equipment. The Contractor shall repair such damage at no cost to Owner. Provide fences or other barricade where necessary for such protection.

1.11 INDEPENDENT ARBORIST REVIEWS:

- A. General Contractor to contact and hire project arborist at the commencement of the demolition and tree preservation work. Arborist shall be approved by the Landscape Architect, Owner and Landscape Contractor.
- B. Arborist shall perform initial site review and assess the health and vigor of trees designated to remain and be protected, particularly in areas near construction activities.
- C. Additional contract for the arborist shall include one site visit every two months for project reviews beginning one month after tree protection is in place and continuing until the date of substantial completion or as determined by the Owner's representative and Landscape Architect.
- D. General Contractor to supply copies of the arborist's reports to Landscape Architect and to the Owner.

1.12 WARRANTY:

- A. General: During the Warranty Period for new plantings, similarity warrant all existing plant materials against decline resulting from damage during construction. See Section 329300 – Tree, Shrub and Groundcover Planting.
- B. Transplants:
 - 1. Warrant transplanting the owner's trees that are transplanted to the effect that workmanship is warranted. The material that fails shall be replaced on a cost plus basis including supplying replacement trees that fail at contractors cost for the material and transportation plus added 15 percent profit and at no labor or equipment charge for the work to remove failed material and replace with the replacement material. Owner shall determine failed materials / lack of vigor etc.

based on Section 329300 descriptions of failed plant material. Warranty for transplants shall have 1 year durations.

- a. The Owner's representative and the Landscape Architect will review and approve suitable material for replacement. Contractor shall provide direct actual material cost including delivery tickets and freight cost for each plant submitted for replacement.
- b. Transplant Maintenance: Contractor shall monitor the transplanted trees and report on conditions of materials as a part of the 90 day Establishment Period contract as if the materials were new except that SMU will be responsible for irrigation and the contractor will monitor the moisture conditions at the trees.

- C. Exclusions: Damage due to vandalism, Acts of God, failed maintenance or neglect by Owner.

1.13 REPLACEMENTS:

- A. General: Existing planting to remain which exhibits conditions which are determined as unacceptable due to inadequate protection during construction shall be replaced by Contractor at no expense to Owner as outlined above.
- B. Quality: Match replacements to damaged, destroyed or removed material of the same species unless otherwise approved by Landscape Architect. Submit replacement material through photographs to be approval by Landscape Architect.
- C. Planting and Warranty of Replanted Materials: See Section 329300 - Planting.

1.14 MAINTENANCE AND FINAL ACCEPTANCE:

- A. Reference Section 329350 - Landscape Establishment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil: Reference Division 2 Sections 312220 (Landscape Finish Grading) and 329113 (Soil Preparation) regarding suitable landscape soil.
- B. Organic Mulch: Reference Section 329300 Planting.
- C. Protection-Zone / Tree Protection Fencing: Fencing fixed in position and meeting the following requirements.
 1. Safety: Provide all reflective signage and/or flashers as required by all codes and ordinances affecting barricaded plantings to remain.
 2. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi;

- a. 48" Tensar Safety Fence or approved equal.
 - 1) Height: 4 feet.
 - 2) Color: High-visibility orange, nonfading.
- 3. Provide tubular or T-shape galvanized-steel posts (Paint Pittsburgh Weimer Gray as approved) and spaced not more than 8 feet apart.
- 4. Provide 12 gauge galvanized wire stringer continuous at top and bottom of safety fence running along fence area.
- 5. Provide with plastic bands or galvanized-steel or stainless-steel wire ties at posts and along fencing.

2.2 EQUIPMENT AND TOOLS:

- A. Use only equipment that will perform the work efficiently and not cause damage to those materials designated to remain, either shown on the drawings or implied herein.
 - 1. Air Spade: Air operated trenching and excavation tool connected to suitable high output air compressor. The air spade is suitable and is required for root mass and root crown investigation and for excavation for foundations and utilities or other improvements that must cross specimen tree root protection zones.
 - 2. Pruning Tools: Shall be of good quality and working condition, sharp, and of the approved type for arboricultural work.

2.3 SHARP SAND:

- A. ASTM C-33 for fine aggregate.

2.4 TREE PAINT:

- A. Not used unless required by the arborist for special conditions.

2.5 ANTISEPTIC:

- A. Antiseptic shall consist of a mixture of bleach and water as recommended by the arborist.
 - 1. Disinfect pruning equipment between trees with a mixture of 1 part bleach with 5 parts water mixture, wipe tools dry before moving to next pruning area with clean towels or cloths.

2.6 INSECTICIDE:

- A. Material as suitable for the insect or pest being controlled and approved by the USDA/EPA.
- B. Refer to Arborist report and recommendations for insecticides:
 - 1. Materials deemed necessary and for rate of application.
 - 2. Recommendations for treatment of other pests and disease

2.7 FERTILIZER:

- A. Refer to Arborist Report for recommendation of application.
- B. Refer to Section 329113 and 329350 for other fertilization materials and requirements.

2.8 WATER:

- A. Clean fresh water, potable at the source, suitable for irrigation. Furnish, transport and apply as required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not pond or erode protection zones. Provide grading and erosion control as approved to correct such conditions.
- B. Locate and verify existing utilities, irrigation and other items to remain, investigate record drawings and other Owner available records. Pothole excavations to verify locations before equipment commences.
- C. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain, to be removed or to be transplanted. Tie an identifying surveyors ribbon around each tree using a different color or sets of colors. Tie ribbons to each tree trunk at approximately 54 inches above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations. Areas surrounding trees should slope to drain water away or out of the root protection zone.

3.3 TREE PROTECTION:

- A. All trees to be preserved on the property shall be protected against damage during construction operations by fencing as shown; subject to the approval of the Owner. The tree protection shall be placed before any excavating or grading is begun and maintained in repair for the duration of the construction work unless otherwise directed. No material shall be stored or construction operation shall be carried on within a distance as shown of any tree to be saved or within the tree protection fencing. Tree protection shall remain until all work is completed.
- B. Any damage to existing tree crowns or root systems shall be repaired immediately by an approved tree surgeon at the Owner's direction. Roots exposed and/or damaged during demolition and/or grading operations shall be cut off cleanly inside the exposed or damaged area with the topsoil and mulch placed over the exposed root area

immediately. The Owner shall have his representative present on the site to observe these operations.

- C. Provide fencing, barricades, or other suitable guards located outside the drip line (outer perimeter of branches) to protect remaining trees and other plants from damage. Provide barriers at the drip line of all trees designated to remain. Grouping of trees may be enclosed by a single protective fence.
 - 1. Follow same requirement for trees to be transplanted except barriers may be removed as trees are relocated to new positions.
- D. Protect tree root systems from damage due to noxious materials caused by run-off or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.
- E. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line, and prevent soil compaction over root systems.
- F. Parking for construction workers shall not be permitted within tree protection zones and shall be strictly enforced.

3.4 TREE- AND PLANT-PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by established maintenance gates within the fencing. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
 - 1. Location of fencing shall be staked in the field prior to construction of fencing and approved by the Owner and the Landscape Architect.
 - 2. In general, fences and barricades are intended to alert those working on the project that equipment and machinery are not to be stored or operated in the feeder root zone. Where not shown, the fences and barricades shall be placed not closer than nine (9x) times the caliper of the tree to the tree, or at the drip line. The exact location of fences or barricades shall be determined by the Landscape Architect.
 - 3. Posts shall be installed plumb and rails level, and as approved.
 - 4. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
 - 5. Access Gates: Install in panels. Purpose is for temporary access, inspection and maintenance.
- B. Maintain protection zones free of weeds and trash.
- C. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

- D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
 - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
 - 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.5 MULCH COVERING:

- A. Tree-Protection Zones: Mulch areas inside tree-protection zones which are not covered with permanent turf grass. A portion of the area may be mulch and grass mixture. If turf remains, contractor shall maintain as turf.
 - 1. Apply 3 inch average thickness of organic mulch. Do not place mulch within 24 inches of tree trunks.

3.6 SELECTIVE CLEARING IN GENERAL AREAS:

- A. Remove only those trees and plants designated on the plans or as identified during the preliminary site review meeting.
- B. Vegetation and Tree Removal: Remove and legally dispose of:
 - 1. 12 inch caliper and smaller trees: All above ground portions the tree including branches and foliage and the below grade stump / root system for a dimension approximately 1 ½ times the diameter of the trunk/
 - 2. 12 1/2 inch caliper and larger trees: Same as 12 inch except where root system does not conflict with project improvements, the root system and stump may be ground with the top of the root remaining at a minimum of 15 inches below grade and all associated grinding matter to be removed. Contractor has the option to also remove the root system as outlined above.
 - 3. Shrubs: Same as 12" caliper trees.
 - 4. Groundcover, Lawn and similar low vegetation: Strip vegetation from the ground plus not less than 1 inch of surface soil to be removed. In areas of construction, additional removal will be a requirement of other construction and demolition or may be included in Civil specifications or scoped as work by others.

3.7 EXCAVATING AND MINOR REGRADING:

- A. Do not excavate within tree drip line, unless otherwise indicated.
- B. Cut: Do not permit machine excavation within the drip line of existing trees to remain. All such work shall be by Air Spade and hand labor. Do not permit more than two (2) inches of existing soil to be removed within the drip line except as authorized in writing by the Independent Arborist and Landscape Architect.
- C. Fill: Do not permit stockpiling of soil within the drip line of all existing trees. Do not permit more than three (3) inches of fill to be placed within the drip line during grading operations without written acceptance of the Independent Arborist and the Landscape Architect.

1. If approved, temporary or permanent fill shall be limited to an allowable encroachment zone at a maximum of 25 percent onto the exterior side of the root protection zone.
- D. Where excavation for new construction is required within tree drip lines, hand excavate to minimize damage to root systems. Use an Air Spade and narrow-tine spading forks and remove and comb soil to expose roots.
1. Relocate roots in backfill areas wherever possible. If encountering large, main lateral roots, expose beyond excavation limits as required bending and relocating without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3 inches back from new construction as described in Root Pruning article.
 2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition and temporarily support and protect roots from damage until they are permanently relocated and covered with earth.

3.8 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
1. Cut roots manually by digging a trench with the Air Spade and selectively cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 2. Cut Ends: Do not paint cut root ends]
 3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 4. Cover exposed roots with burlap and water regularly.
 5. Backfill as soon as possible according to requirements in Division 31 Sections for Landscape Finish Grading and Civil Engineers "Earthwork."
- B. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
- C. Treat cut roots after cutting according to arborist recommendations. Disinfect pruning equipment between trees with antiseptic mixture and wipe tools dry with clean towels or cloths before moving to next pruning area.
- D. Fill excavations to existing finished grade with approved loamy soil, compact according to Division 2 requirements in lifts, watering each lift thoroughly

3.9 PRUNING: (N.A.A. STANDARDS)

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.

2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
 3. Cut branches with sharp pruning instruments; do not break or chop.
 4. Do not apply pruning paint to wounds.
- B. Chip removed branches and dispose of off-site.
- C. All cuts shall be made sufficiently close to the trunk or parent limb, without cutting into the branch collar or leaving a protruding stub, so that closure can readily start under normal conditions.
- D. It is necessary to precut branches too heavy to handle to prevent splitting or peeling the bark. Where necessary, to prevent tree or property damage, branches shall be lowered to the ground by proper ropes or equipment. Remove the weaker or least desirable or crossed or rubbing branches. Such removal should not leave large holes in the general outline of the tree.
- E. Treatment of cuts and wounds, with tree wound dressing is optional except where open wounds in certain trees may attract insects that carry disease or allow fungus invasion. If such treatment is made, materials non-toxic to the cambium layer must be used, and care taken to treat only the exposed wood with a thin coat of dressing.
- F. Old injuries are to be inspected. Those not closing properly and where the callus growth is not already completely established should be traced where appropriate. If desired, for cosmetic purposes, the wound may be treated with a thin coat of wound dressing.
- G. In reducing overall size, attention is to be given to the symmetrical appearance. Top is to be higher and sides reduced in order to maintain a tree-like form. All effort should be made to cut back to a lateral, one-third of the diameter of the cut being made.
- H. When cutting back trees, just enough limbs shall be removed to get the effect wanted without admitting too much sunlight to the trunk of the tree or the top of large branches. Care should be taken with maples, oaks, and other thin barked trees susceptible to sunscald. Damage may be minimized by doing work on susceptible species during the dormant season.
- I. In lifting the lower bottom branches of trees for clearance, care should be given to symmetrical appearance, and cuts should not be made so large that they will prevent normal sap flow and they should allow water to drain.
- J. Prune as required and as directed by the Arborist. Pruning shall take no more than one-quarter of root and crown system except by special direction of Arborist and as confirmed by the Owner's Representative and the Landscape Architect.
- K. Use clean, sharp tools, disinfect where necessary to prevent spread of disease.
- L. Limbs and debris from this work shall be transported and not dragged over the site. Wood and debris shall become property of Contractor and shall be removed from site and legally disposed of in accordance with local ordinances. Cost of disposal to be paid by Contractor.

3.10 TRANSPLANTING

1. Dig exploratory pits or trench by hand around perimeter of tree at indicated root-ball width to determine locations of main lateral roots.
2. Dig trench around perimeter of tree at indicated root-ball width to the depth of the root system. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
3. Root-Ball Width: Minimum 10 inches of root-ball diameter, or least dimension for non-round root balls, for each 1 inch of tree caliper being transplanted.
4. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking.
5. Verify proper moisture content of soil, if material is too wet or dry the soil could crack or fail during balling.
6. Cut exposed roots manually with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
7. Do not paint or apply sealants on cut root ends.
8. While tree is in the hole, wrap the sides of the tree tightly with burlap and pin the material using #6 or similar size box nails to suitably tighten the burlap and hold soil securely in the balled form.
9. When the ball is secured, tilt the partially balled tree and cut bottom roots to create a flat bottom ball. Complete balling with burlap and secure the bottom and sides together with burlap.
 - a. If necessary provide temporary wire reinforcement if necessary or tie with 3/16 diameter manila rope ties.
10. Carefully load the ball for transport according to Section 329300 and transport to designated location, follow with planting according to Section 329300.

3.11 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beginning beyond the protection zone. Maintain existing grades within the protection zone.
 1. Root Pruning: Prune tree roots exposed during grade lowering. Do not cut main lateral roots or tap roots; cut only smaller roots. Cut roots with sharp pruning instruments; do not break or chop.
- B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

3.12 REMOVAL OF TREE INFECTED BY HYPOXYLON CANCKER:

- A. Arborist Report shall identify any trees infected.
 1. Contractor to remove designated trees from site and dispose in accordance with local ordinances.

3.13 TREE PRUNING WORKMANSHIP:

- A. Pruning work shall be performed by personnel trained and experienced in this work and shall be done under the direction of a qualified forester or arborist on Contractor's staff.
- B. Pruning work shall be performed in conformance with recognized horticultural and arboricultural practices. Where job requirements require deviation from normal practice, obtain approval.

3.14 BORER PROTECTION:

- A. At the direction of the project arborist and with the approval from the Owner apply specified insecticide at the rate prescribed by the project arborist.

3.15 APPLICATION OF TREE FERTILIZER:

- A. Shall be done at the direction of arborist with approval by the Owner and the Landscape Architect.

3.16 MAINTENANCE OF EXISTING TREES AND PLANTING:

- A. General: During the Construction Period maintain all existing plantings to remain. See Section 329350 - Landscape Establishment.
- B. Trees and planting near buildings, roads, paths, in view corridors and other prominent locations shall receive added maintenance to include watering, disease and pest control, fertilization, and regular washing for dust control. Dust shall not be allowed to accumulate more than weekly on any trees.
- C. Watering Maintenance: Shall include supplemental watering by hand or otherwise. Material shall be watered on whatever frequency is required to maintain adequate moisture in the root zone with approval of from the project arborist.
- D. Fertilizers: Do not use complete fertilizers on existing plant materials unless soils test indicates specific nutrient deficiencies. Use only with approval from the project arborist.
- E. Dust accumulation: During excessively dry or dusty conditions, tree foliage shall be rinsed to remove excess dust on an as needed basis.

3.17 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.18 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed root cutting and tree and shrub repairs.
2. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
3. Perform repairs within 24 hours.
4. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION