

SECTION 01 5639

TEMPORARY TREE AND PLANT PROTECTION

PART 1 GENERAL

1.00 RELATED DOCUMENTS

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

1.01 WORK INCLUDED

- A. Protection of existing trees and plants from damage as a result of the Contractor's operations including, but not limited to:
 - 1. Protection of existing natural woodlands.
 - 2. Tree protection fencing and barricades.
 - 3. Root pruning.
- B. Tree trunks and branches shall not be damaged by equipment and/or workers and tree root protection zones shall be protected from soil compaction, damage by trenching or excessive grade changes, and hazardous materials or waste products.

1.02 RELATED REQUIREMENTS

- A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
 - 1. Section 02 41 10, SITE PREPARATION: Clearing and grubbing.
 - 2. Section 31 13 00, SELECTIVE TREE REMOVAL AND TRIMMING; Selective clearing within tree protection areas.
 - 3. Section 31 25 00, EROSION AND SEDIMENT CONTROL: Silt fencing.
 - 4. Section 31 23 00, SITE EXCAVATING, BACKFILLING AND COMPACTING; Establishment of subgrade elevation.
 - 5. Section 32 93 00, TREES, PLANTS, AND GROUND COVERS: New plant material.
- B. Protection of Existing Utilities: Prior to any work being performed the Contractor shall insure that all existing utilities within and surrounding the project site have been clearly marked in accordance with the Pennsylvania Underground Utility Line Protection Act, Act 287 as amended by Act 199

1.03 REFERENCED STANDARDS

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. American National Standards Institute (ANSI):
 - Z133.1 Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees, and for Cutting Brush.

A300

Tree Care Operations - Tree, Shrub And Other
Woody Plant Maintenance - Standard Practices
Part 1 - Pruning

2. International Society of Arboriculture (ISA):

Guide

Guide for Establishing Values of Trees and Other
Plants

3. Tree Care Industry Association, 3537 Stratford Rd., Wantagh, NY 11793 (TCIA):

Ref. 1

Pruning Standards for Shade Trees

1.04 SUBMITTALS

- A. Prior to the start of any construction work the Contractor shall submit a Tree Canopy/Tree Root Zone Protection Plan. Development of this plan shall include input from the University Arborist and Project Manager or Assigned Construction Quality Representative. This plan shall be of the entire site showing accurate trunk locations and drip-line dimensions of all trees on the project site, limits of construction, locations of tree canopy/tree root protection zones, and indicating all appropriate protective measures.
- B. The Contractor shall submit a written guarantee that he/she shall not enter the tree protection zones at any time during construction without first getting approval from the University Representative.
- C. The Contractor shall verify in writing that all tree protection measures have been met as per the Protection Plan. Compliance with this plan shall be field verified by the University Representative.

1.05 LIABILITY / DAMAGE PENALTIES

- A. The Contractor shall be held liable for any damage to protected trees. A dollar value shall be determined by the University Arborist or certified tree appraiser following criteria outlined in the "Guide of Plant Appraisal" (Council of Tree and Landscape Appraisal, Latest Edition).
- B. The Contractor shall be held liable for all remedial measures required to treat broken limbs, or damaged trees and roots, or for the unauthorized removal of existing trees or plant material. All remedial treatments will be accomplished by the University Arborist and/or their designee. The Contractor shall not be liable for any loss or damage which occurs while the Contractor is complying with instructions given by the Owner, Architect, or arborist working on the Project.

1.06 QUALITY ASSURANCE

- A. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of tree protection and trimming.
- B. Selective pruning methods shall conform to the applicable requirements of ANSI Z133.1.

- C. Work of this section shall be completed by a professional ISA Certified Arborist with a minimum five years experience, who has successfully completed an exam and education program equal to the International Society of Arboriculture (ISA) Certification Program, sponsored by the International Society of Arboriculture 2009, P.O. Box 3129, Champaign, IL 61826 (217) 355-9411; Email: isa@isa-arbor.com.
- D. Arborist shall have the following minimum qualifications:
1. Membership in:
 - a. TCIA -- Tree Care Industry Association, Inc.
 - b. ISA -- International Society of Arborists
 2. Meet state requirements for insurance.
 3. Licenses for application and use of pesticides.

PART 2 PRODUCTS

2.01 TREE PROTECTION FENCING

- A. Tree protection fencing shall be the following:
1. Galvanized chain link fencing, 6 ft. high. (OR SNOW FENCE VERIFY WITH OWNER)
 - a. Fabric shall be a good commercial quality of steel wire of 2 in. mesh and 11 gage.
 - b. Fittings shall be malleable iron casting, wrought iron forgings, or pressed steel and provided with pin connections. Equipment shall be designed to carry 100% overload.
 - c. Stakes for fencing shall be galvanized steel pipe, driven a minimum of 2 ft. into the ground. Piping shall be steel conforming to ASTM A 120 except that pipe shall be unthreaded and untested for water pressure. Posts shall be spaced 10 ft. o.c. maximum.
 - d. A 3 feet wide gate shall be provided at each tree protection area to allow maintenance access to the protection zone.
 - e. Movable fence panels may only be used upon approval from the University Representative.
 - f. For fencing within the drip line of trees, surface mounted post anchors may be acceptable. Review with Architect and arborist and obtain written approval prior to installing. Post installation shall not damage tree root systems.
 - g. An 8 1/2" x 11" sign indicating the area as a tree protection zone shall be prominently displayed on each fence panel. Signs may be obtained by contacting the University Representative.
- B. Temporary protection measures shall be strictly enforced at the conclusion of the project, up until final acceptance. These methods may include, but are not limited to the use of signs, post and wire, or other methods approved by the University Representative.

2.02 TREE PROTECTION ACCESSORIES

- B. Mulch: Pine bark mulch
- C. Tree Wound Paint: Bituminous based paint of standard manufacturer specifically formulated for protection of tree wounds from moisture and insect invasion.
- D. Tree Armor:
1. Wood: SPFA utility grade, 2x4.
 2. Wire: Annealed steel wire, 16 gage minimum.

- E. Critical Root Zone Protection: Critical root zones shall be protected with AlturnaMats, 1/2" thick recycled polyethylene mats capable of supporting vehicles and equipment weighing up to 60 tons, manufactured by AlturnaMats, Inc., 701 E. Spring Street, Mailbox #9, Titusville, PA 16354 • Phone: 888.544.6287 • Fax: 866-723-2903 , or approved equal.

2.03 ROOT PRUNING

- A. Mulch materials shall be as specified under Section 329300, TREES PLANTS, AND GROUND COVERS.
- B. Liquid fertilizer to be applied to root pruned and construction pruned trees shall be Peters 20-20-20 General Purpose Soluble Fertilizer, manufactured by The Scotts Company, LLC 14111 Scottslawn Rd. Marysville, OH 43041; RoMax7 Low Salt Liquid Starter Fertilizer, manufactured by Nutra-Flo Company, 1919 Grand Ave, Sioux City, IA 51106-5708; Phone: 712-277-2011; 800-831-4815; Fax: 712-279-1946; Agro- Culture Liquid Fertilizer, mircoLink, manufactured by Agro-Culture Liquid Fertilizers, 3055 W. M-21, P.O. Box 150, St. Johns, Michigan 48879; 1-800-678-9029 , or approved equal. Liquid fertilizer shall be approved by Certified Arborist.
- C. Dormant oil spray shall be a dormant miscible spray equal to Sunspray Scalecide or Volck Oil.
- D. Insecticide shall be Isotox manufactured by Ortho; Tempo, manufactured by Mobay; Orthene, manufactured by Chevron Chemical Co., or approved equal. Insecticide shall be EPA approved for the intended use and the names should be provided to, and approved by the Arborist prior to use.

PART 3 EXECUTION

3.01 SCOPE OF WORK WITHIN OR AROUND TREE CANOPY PROTECTION ZONE

- A. Trees to be removed that have branches extending into the canopy of trees to be preserved shall be removed under the continuous supervision of an arborist certified through the International Society of Arboriculture and not by a demolition or construction contractor. The Arborist shall remove the tree in a manner that causes no damage to the protected trees and landscape to remain after the construction period.
- B. Trees to be removed shall be felled so as to fall away from protection zones and to avoid pulling and breaking of roots or branches of trees indicated on remain on the Tree Canopy/Tree Root Protection Zone Plan.
- C. Any brush clearing required within or around the tree canopy/tree root protection zone shall be accomplished with hand operated equipment.
- D. The Contractor shall be held liable for damages incurred to any tree branches that extend over protective fencing and to any trees or other plant material located on the site and indicated on the plan to remain. The Contractor shall notify the University Representative when any overhanging branches or other plant material interferes with the construction activity or post potential risks to workers or bystanders.
- E. If plans and field situations do not match and work must occur closer to any existing tree (s) than planned, the Contractor shall notify the University Representative to evaluate and to determine future viability of the existing tree (s) located within the area of proposed construction or excavation. Final evaluations shall be coordinated with the University

Landscape Architect and Arborist to determine if the tree (s) should remain, be relocated, or be removed.

3.02 SCOPE OF WORK WITHIN OR AROUND TREE ROOT PROTECTION ZONE

- A. Any grading, construction, demolition, or other work that is expected to encounter tree roots shall be made in consultation with the University Arborist.
 - 1. Any digging that must occur within the Tree Root Protection Zone must be done with the University Arborist present and must utilize alternative excavation methods including, but not limited to air spading, hand excavation, metal plating or other method approved by the University Arborist.
- B. Any roots 2 inches in diameter or less that sustain damage during construction shall be exposed to sound tissue and cleanly pruned close to the tree side of the excavation. Clean cuts shall be made at all times. The cutting of tree roots greater than 2 inches in diameter must be approved and supervised by the University Arborist.
- C. Trees to be removed adjacent to the tree root protection zones shall be cut near ground level and the stump ground out to avoid damaging existing roots by pulling and breaking.
- D. For those construction projects requiring temporary access or haul roads through the protection zone, a roadbed shall be installed using road plates, Altumamat, or a PADOT Class IV Geotextile base covered with 6 inches (minimum) of mulch, wood chips or gravel to protect soil and minimize soil compaction. In those cases approval shall be given by the University Representative prior to the start of any construction activities. The roadbed material shall be maintained as necessary to maintain its original state.
- E. No material shall be stored or piled within the tree root protection zone unless otherwise approved by the University Representative. No gasoline, fuel oil, harmful chemicals or other deleterious materials shall be stored, spilled or deposited on the ground within the tree root protection zone.
- F. There shall be no vehicular traffic or parking permitted within the tree root protection zone.
- G. Foot traffic shall be kept to a minimum within the tree root protection zone. If temporary foot traffic must be directed over the tree root protection zone a pathway shall be installed using Altumamat or a PADOT Class IV Geotextile base covered with 3 inches (minimum) of mulch, wood chips or gravel to protect soil and minimize soil compaction. In those cases approval shall be given by the University Representative prior to the start of any construction activities. The pathway material shall be maintained as necessary to maintain its original state.
- H. Installation of curbs and sidewalks shall be completed in a manner least damaging to trees and tree root systems. PADOT Class IV Geotextile shall be considered a viable alternative to the specified sub-base in sensitive root zones. When unique site conditions not addressed in the contract documents result in the opportunity for an alternative solution or a potential modification to the plan, the Contractor may present a proposal to the University Representative.

3.03 INSTALLATION OF FENCING

- A. Prior to start of demolition work and clearing and grubbing operations, tree protection fencing shall be installed in accordance with the following:
 - 1. Fencing shall be installed at the tree protection areas indicated on the Drawings.

2. Fencing shall be installed a minimum of 15 ft. beyond the drip line of trees to be protected, unless otherwise approved by the Architect.
- B. Post installation must avoid underground utilities. Tree protection fencing located within the drip line shall be installed using surface anchors. No poles or stakes shall be driven into the ground at these locations.
- 3.04 EXCAVATING AROUND TREES
- A. Excavate within the dripline of trees only where required and when absolutely necessary.
1. Any excavation within the RPZ of trees shall be under the direction of the Arborist.
 2. Arborist shall be at site at all times while excavation is occurring within the RPZ.
 3. Air spade all removals within the RPZ.
 4. Refer to ROOT PROTECTION ZONE (RPZ).
- B. When excavating for new construction is required within the RPZ, air spade and hand excavate to minimize damage to root systems.
1. Use narrow tine spading forks and comb soil to expose roots.
 2. Relocate roots back into backfill areas wherever possible.
 3. If large main lateral roots are encountered, expose beyond excavation limits as required to bend and relocate without breaking.
 4. If root relocation is not practical, clean cut roots using sharp ax approximately three (3) inches back from new construction.
- C. Where existing grade is above new finish grade, carefully excavate within the dripline to the new finish grade.
1. Carefully hand excavate an additional six (6) inches below the finish grade.
 2. Use narrow tine spading forks to comb the soil to expose the roots, and prune the exposed root structure as recommended by the Arborist.
 3. Keep the exposed roots damp.
 4. Treat the cut roots as specified and as recommended by the Arborist.
 5. After pruning and treatment of the root structure is complete, backfill to finish grade with eight (8) inches of approved plant mix, or structural soil.
- D. Where noted on plan, use airspade to expose roots for required cutting to accommodate hardscape elements. Architect to verify all cuts prior to proceeding.
- E. Temporarily support and protect roots against damage until permanently relocated and covered with recommended landscape material.
- 3.05 ROOT PRUNING
- A. Where construction will be in close proximity to existing trees designated to remain, [within drip line of existing trees designated to remain] roots shall be pruned in accordance with ANSI A300 prior to trenching and tunneling operations. Root pruning shall be performed as early as possible before trenching or tunneling operations. Proximity shall be as determined in the field by the Architect.
- B. Root pruning is the physical cutting of tree roots to minimize root damage and promote healing. Suitable means for root pruning include hand methods which result in a sharp

clean cut. Any method which tears roots or disturbs the soil beyond the grading limit is unacceptable.

- C. Unless otherwise directed by Architect, tree to be root pruned shall be root pruned to a depth of 24 in.
- D. Backfill root pruning trench with existing soil mixed with peat moss or well-rotted sawdust to a mixture of approximately 75% soil and 25% humus. Tamp lightly to set soil
- E. Apply mulch to a depth of 4 in. to 6 in. at minimum 10 ft. to 15 ft. radius around tree to reduce compaction and increase moisture retention.
- F. Dormant oil spray shall be applied in early spring before buds begin to swell at a rate recommended by the manufacturer.
- G. Insecticide spray shall be applied twice to root pruned trees following application of dormant oil spray. Spray insecticide at rates recommended by spray manufacturer at intervals appropriate for effective insect control.

3.06 GOVERNING STANDARDS - PRUNING

- A. Work procedures will be guided by the current provisions of the American National Standard Institute. Complete detail of the provisions are to be found in the references listed. The two basic objectives of the pruning operation shall include:
 - 1. Hazard Reduction Pruning: Hazard reduction pruning shall be completed to remove visible hazards in a tree. Hazard pruning shall consist of one or more of the maintenance pruning types.
 - 2. Maintenance Pruning: Maintenance pruning shall be completed to maintain and improve tree health and structure and includes hazard reduction pruning.

3.07 MAINTENANCE PRUNING TYPES

- A. Both hazard reduction pruning and maintenance pruning shall consist of one or more of the following pruning types in accordance with ANSI A300:
 - 1. Crown Cleaning: Crown cleaning shall consist of the selective removal of one or more of the following items: dead, dying, or diseased branches, weak branches, water sprouts and stubbed branches.
 - 2. Crown Thinning: Crown thinning shall consist of the selective removal of branches to increase light penetration, air movement, and reduce weight.
 - 3. Crown Raising: Crown raising shall consist of the removal of the lower branches of a tree to provide clearance.
 - 4. Crown Reduction, or Crown Shaping: Crown reduction shall consist of decreasing the height and/or spread of a tree.
 - 5. Vista Pruning: Vista pruning shall consist of selective thinning of framework limbs or specific areas of the crown.
 - 6. Crown Restoration: Crown restoration pruning shall improve the structure, form and appearance of a tree which has been severely headed, vandalized, storm damaged or improperly pruned.

3.08 APPROVAL

- A. No major limbs or structure will be cut or removed without prior approval of the Architect and Owner's Representative.

3.09 STERILIZATION

- A. All tools used will be sterilized with Clorox Bleach, or approved equal, prior to use and between each tree.
- B. Residue from sterilization operation shall be diluted so as not to damage any vegetation.
- C. At trees known to be diseased and where there is danger of transmitting that disease, tools are to be disinfected after each cut.

3.10 PAINT CUTS:

- A. Paint cuts more than 1 inch in diameter with an approved tree wound paint on trees.
 - 1. Paint cuts within 30 minutes after cutting.

3.11 FERTILIZATION OF PRESERVED TREES:

- A. All existing trees to be reserved impacted by construction activities taking place within the dripline, including but not limited to trenching and grading, shall be fertilized.
- B. Feeding of existing trees to be impacted by construction shall be accomplished in accordance with the following specifications:
 - 1. Feeding shall be completed prior to construction of permanent improvements adjacent to all trees including site fill or paving including trenching operations.
 - 2. Liquid tree fertilizer applied with a standard hydrant sprayer at a pressure of 100 to 200 psi shall be injected in slightly slanted holes approximately twelve (12) inches in depth.
 - 3. Concentration of suspension to be forty (40) pounds of fertilizer for trees in each 100 gallons of water. Application rate: six (6) pounds of actual nitrogen per 1,000 square feet of area under drip-line.
 - 4. Holes are to be made in concentric circles and 3' on center around the tree with the last ring located at the dripline of the foliage of the trees.
 - 5. Area beneath the dripline of the trees is to be well watered after the fertilization is placed.

3.12 INSECT SPRAYING OF PRESERVED TREES:

- A. All existing trees to be preserved and impacted by root pruning and construction pruning, and construction activities taking place within the dripline, including but not limited to trenching and grading, shall be treated with liquid fertilizer, dormant oil spray, and insecticide as prescribed by Certified Arborist. Unless otherwise indicated, the minimum shall apply:
 - 1. Liquid fertilizer shall be applied at a rate recommended by the manufacturer and as required by ANSI A300 Part 2 Soil Management standards.
 - 2. Dormant oil spray shall be applied in early spring before buds begin to swell at a rate recommended by the manufacturer.
 - 3. Insecticide spray shall be applied twice to root pruned trees following application of dormant oil spray. Spray insecticide at rates recommended by spray manufacturer at intervals appropriate for effective insect control.

3.13 MULCH:

- A. Mulch base of all existing trees four (4') feet radius with 3 " deep mulch layer.

1. If existing trees are grouped, the entire area is to be mulched in between the trees.
- B. Mulch base of all existing trees impacted by construction activities within RPZ with 3" deep mulch layer.
 1. If existing trees are grouped, the entire area is to be mulched in between the trees.
- 3.14 CLEANUP:
 - A. Wood and debris shall become property of the Contractor and shall be removed from the site. Cost of disposal to be paid by Contractor.
 - B. If acceptable to Owner, wood from tree removal and pruning activities can be double shredded/grinded and used on site as mulch at locations as approved by Architect and Owner.
- 3.15 REMOVAL OF PROTECTION
 - A. All protection shall remain in place throughout the construction period. Temporary protection devices and facilities installed during course of the work shall be removed only after all work which may injure or damage trees and plants is completed, and written permission has been granted by the Architect.
- 3.16 WASTE MANAGEMENT
 - A. Separate and dispose of waste in accordance with the Project's Waste Management Plan

END OF SECTION