

SECTION 015639 – TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the protection of trees that interfere with, or are affected in any way by, execution of the Work, whether temporary or new construction.
- B. Related Sections include the following:
 - 1. Division 31 "Earth Moving".
 - 2. Division 31 "Site Clearing".
 - 3. Division 31 "Site Demolition"

1.2 DEFINITIONS

- A. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape at a height 54 inches above the ground line for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground.
- B. Tree-Protection Zone (TPZ): Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings. TPZ's are defined by a circle concentric with each tree with a radius 15" for every 1" of caliper size (DBH). Where overlapping, TPZ's are defined by a shape that extends to the outermost boundaries of each grouping of trees indicated.
- C. Special Excavation Zone:
 - 1. Areas indicated on Tree Protection and Demolition and Protection plans and may require expansion if demolition work reveals critical root zones for existing trees in areas beyond the special excavation zones.
 - 2. Removals work within a Special Excavation Zone requires the submittal of a work plan indicating means, methods, and sequencing proposed to prevent soil compaction and damage to exiting landscape trees and roots, buildings, and existing work to remain.
 - 3. Requires on-site and real-time monitoring of all removals and modifications within each designated area.
- D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 PREINSTALLATION MEETINGS

- A. 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. Tree-service firm's personnel and equipment needed to make progress and avoid delays.
 - b. Arborist's responsibilities.
 - c. Quality-control program.
 - d. Coordination of Work and equipment movement within and around the locations of protection zones.

- e. Trenching by hand or with air spade within and around protection zones.
- f. Field quality control.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Tree Protection Plan, a written report and plan prepared by Contractor and Arborist addressing, at a minimum, the following:
 - 1. Plans, elevations, sections – as required - and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with all protection zones.
 - 2. Detail fabrication and assembly of protection-zone fencing and signage.
 - 3. Indicate extent of trenching by hand or with air spade within protection zones.
 - 4. Report shall review all areas of Special Excavation as shown on plans and shall indicate all proposed measures to protect existing or exposed soil from vehicular use within these areas. Information shall include root pruning, structural and compensatory pruning, soil aeration, and fertilization as required.
 - 5. Coordinate all submittals with existing or proposed construction fence or hoarding and all points of site access. Indicate all areas along site access routes where pruning of overhanging limbs may be required. Include complete schedule as per below.
 - 6. Itemized tree inventory of all trees to be protected on-site. A numerical replacement value shall be provided for each tree and subject to Owner approval.
- C. Samples: 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.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For arborist and tree service firm.
- B. Certification: From 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 when damaged.
- C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 - 1. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
 - a. Tree protection plan to include the following information:
 - 1) Tree protection fencing locations
 - 2) Silt fencing (to be coordinated with sediment and erosion control plans)
 - 3) Root pruning lines
 - 4) Root protection matting zones
 - 5) Mulching zones
 - 6) Tree pruning plan noting:
 - 7) Root pruning areas/trees

- 8) Canopy thinning/reduction areas/trees
- 9) Canopy lifting areas/trees
- 10) Tree/stump removals
- 11) Understory cleaning areas
- 12) Maintenance schedule

b. Construction activities zone plan to include the following information:

- 1) Construction and staging zones
- 2) Construction access points and routes
- 3) Designated materials storage areas
- 4) Concrete and masonry storage and wash-out areas
- 5) Demolition access and dumpster storage areas
- 6) Soil stockpiling
- 7) Equipment staging, storage, and access areas
- 8) Limits of disturbance
- 9) Excavation depths
- 10) Benching
- 11) Tree removals and replacements

E. Quality-control program.

1.6 QUALITY ASSURANCE

- A. Arborist Qualifications: Certified Arborist as certified by ISA – minimum 10 years in-field experience.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
 - a. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborist's and tree-service
- C. Firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.
- D. Tree pruning standards: Comply with ANSI A300, "Trees, Shrubs and Other Woody Plant Maintenance – Standard Practices", and the "Standards of Shade Trees", current edition, as published by National Arborist Association, The Meeting Place Mall, Route 101, PO Box 1494, Amherst, NH 03031-1094.

1.7 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:
 1. Storage of construction materials, debris, or excavated material
 2. Moving or parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digs unless otherwise indicated.

7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
 8. Excessive wetting from runoff or drainage.
 9. Spillage of construction materials hazardous to vegetation.
 10. Felling of trees into tree protected areas.
 11. Trenching operations.
- B. Do not direct vehicle or equipment exhaust toward protection zones
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

1.8 SEQUENCING AND SCHEDULING

- A. After review and approval of Tree Protection Plan submitted by Contractor and Arborist, install tree protection prior to any and all site removals, including tree removals.
- B. Landscape Architect shall review and approve tree protection devices installation prior to start of removals work.
- C. Perform tasks related to the trees at time appropriate to best horticultural and arboricultural practices as established in Tree Protection Plan.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
1. Type: Shredded hardwood bark or wood and bark chips.
 2. Size Range: 3 inches maximum, 1/2 inch minimum
 3. Color: Natural.
- B. Pruning Alcohol
1. Commercial ethyl alcohol or "Ethanol" 70-95
- C. Anti-desiccant: "Wilt-Pruf NCF" anti-desiccant by Wilt-Pruf Products, Inc., "Cloud Cover" by Easy Gardener", or approved equal conforming to the following:
1. 100% organic and biodegradable and not damaged by freezing.
- D. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements:
1. Wood Protection-Zone Fencing: Constructed of two 2-by-4-inch (50-by-100-mm) horizontal rails and vertical posts, spaced not more than 96 inches (2400 mm) apart, and lower rail set halfway between top rail and ground.
 - a. Height: 48 inches minimum or as shown on the drawings.
 2. Wood Snow Fence: Consisting of uniformly spaced hardwood slats woven together with a minimum five two wire strands of galvanized wire; secured to wood frame with UV-stable plastic bands or galvanized-steel or stainless-steel wire ties:
 - a. Height: 48 inches.
 - b. Color: Natural, no staining.

- E. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz. /sq. yd. (101g/sq. m) minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.
- F. Plywood- For use in selected areas within root-zones of specimen trees.
- G. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with non-fading lettering and as follows:
 - 1. Size and Text: 8-1/2 inches by 12 inches minimum. Text to read "Tree Protection Zone" or as directed by Owner's Representative.
 - 2. Lettering: 1-inch-high minimum, black characters on white background.
 - 3. Signage to be provided by Owner.

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 enter or cross protection zones.
- B. 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. Flag each tree trunk at 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.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.
 - 1. Apply 2-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.

3.3 ARBORIST

- A. Supervise the installation and placement of landscape protection fencing.
- B. Oversee the protection of trees throughout the course of the project.
- C. Coordinate with Owner's Arborist throughout project duration. Notify Architect immediately of any damage or root zone conflicts.

3.4 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 and animals from easily entering protected areas except by entrance gates. 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.

- B. Maintenance of Protection-Zone Fencing: The contractor shall be responsible for the repair and replacement of any part of new or existing protective fencing throughout the duration of the project.
- C. Where construction work is required within the branch spread of trees that are to remain, the work shall be performed under the direction of the Arborist.
- D. Geotextiles: Prescribed for designated trees where foot traffic, masonry debris, or surface equipment can impact critical root zone yet access is needed for construction. Triple ply geotextile is tacked on top of mulch buffer beneath and removed upon completion. This method should be used extensively for staging, stockpile, and access within tree protection areas.
- E. Mulching – For select specimen or tree protection zones requiring traffic access install a 12" layer of wood chips overlaid with continuous 3/4" plywood sheets on the existing grade for the entire area of the traffic route to allay rutting and slightly reduce soil compaction.
- F. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 20 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- G. Maintain protection zones free of weeds and trash.
- H. 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 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 3120 00 "Earth Moving" unless otherwise indicated.
- B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.
- D. 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. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.6 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:
 - 1. Cut roots manually by digging a trench and 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: Coat cut ends of roots more than 1-1/2 inches (38 mm) in diameter with a coating formulated for use on damaged plant tissues and that is acceptable to arborist. Cover with wet burlap and maintain moist.
 - 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 Section 312000 "Earth Moving."
- B. Root Pruning at Edge of Protection Zone: Prune tree roots flush with the edge of the protection zone by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
- C. 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.
- D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.8 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.

3.9 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.

3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Owner. Replacement value of trees shall be that which was established based on value in Arborist's report.
 - B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Owner determines are incapable of restoring to normal growth pattern.
 1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 4 inches or smaller in caliper size.
 2. Large Trees: Provide two new tree(s) of 3-inch caliper size for each tree being replaced that measure more than 4 inches in caliper size.
 3. Plant and maintain new trees as specified in Section 329300 "Plants."
 - C. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 2-inch 4-inch Insert dimension uniform thickness to remain
 - D. Soil Aeration: Where directed by Landscape Architect or Owner, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch diameter holes a minimum of 12 inches deep at 24 inches OC. Backfill holes with an equal mix of augured soil and sand.
 - E. Post-Construction – Remove protective fencing, wood chips, debris and all surplus construction materials from site following construction, in a manner that will not damage tree preservation areas as directed by Owner. Re-seed, re-sod, or refurbish all disturbed ground areas as soon as possible to the satisfaction of Owner.
- 3.10 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 015639