SECTION 32 93 00

PLANTS

PART 1 - DESIGN DIRECTIVES

1.1 SUMMARY

A. The information contained in this section is based on industry standards but, more importantly, reflects techniques that have proven effective on the Dartmouth Campus. It is the intent of Dartmouth College that the consultant incorporates the requirements contained herein with the consultant's specifications to produce a document that is a cohesive, coordinated, non-conflicting project specific specification. Deviations from these standards shall be discussed with the appropriate FO&M representative.

1.2 DESIGN CRITERIA

A. Plant material specified for use on the Dartmouth Campus shall be hardy to a minimum of USDA Hardiness Zones 4b (-20° to -25°).

B. Refer to the list of Recommended Plants in the Basic Landscape Section for assistance in selecting plant material for use on the Dartmouth Campus. Plants listed on the Restricted List shall be specified for use on the Dartmouth campus.

C. Snow Removal & Storage:

1. Consider snow removal when siting shrubs near walkways, parking lots, and other paved surfaces.
2. To allow for adequate snow storage, place plants so that the mature plant is a minimum of 4′ from the edge of the paved surface. Allow for greater distances where the plant is adjacent to a primary snow storage area.
3. Do not plant woody shrubs and trees within 15' of multi-storied (3 or more stories) buildings having sloped roofs. (except at gable ends).

D. Deciduous Trees:

1. Trees with shallow root systems such as maples and beeches should be used with restraint in lawns and in areas adjacent to walkways, plazas, and other paved surfaces.
2. Trees adjacent to walkways, plazas and parking lots shall not be weak wooded, attract stinging insects or drop litter that would compromise the safety of pedestrians.

E. Evergreen Trees:

1. Evergreen trees should be planted judiciously throughout the Dartmouth Campus. Avoid planting conifers on the south edge of walkways, plazas, and campus streets where the shade cast by the tree will delay snow and ice melt in the winter.
2. Evergreen trees specified for use on the Dartmouth Campus should be disease resistant and not prone to insect attack.
3. Evergreens used for screening and/or windbreaks should be planted in combination with deciduous trees and shrub masses to create more effective breaks and to improve the general aesthetics of the planting.

F. Shrubs and Hedges

1. Barbed plants or plants that attract stinging insects should be used judiciously on campus, especially near walkways, parking lots and other gathering areas.
2. When specifying hedges consider the growing habits of designated plants. Avoid using fast growing plants that require frequent pruning.
3. Informal hedging is preferred to formal hedges but where the character of the design dictates a formal hedge consult with the Dartmouth Grounds Supervisor regarding the selection of appropriate plant material.
4. Linear hedges shall be planted in a continuous trench. Augment the soil with generous amounts of compost and other amendments to ensure a robust and uniform growth of the hedge.
5. When specifying hedges avoid double or staggered rows of plants.

G. Groundcovers and Vines

1. When designating groundcovers ensure that plant beds are adequately prepared, the plants are properly spaced to ensure uniform and complete coverage so as to facilitate a rapid establishment.
2. Groundcovers should be considered for use on slopes greater than 3:1.Groundcovers should also be considered as a lawn substitute in small areas that would require hand mowing or where maintaining lawn would be problematic such as under shallow rooted trees casting deep shade.
3. Groundcovers are a practical and effective alternative to foundation planting especially in areas where snow cascading off rooftops makes shrub and tree planting impractical.
4. Climbing vines should be used judiciously on buildings but pose minimum problems on structures such as garden walls, pergolas, or arbors.

H. Perennial Beds

1. Perennial beds should be used with restraint within the historic central core of the campus so as not to compromise the traditional character and identity of the campus.
2. Preference shall be given to perennial beds that are components of comprehensive landscape plans. Perennial beds are particularly effective when used as focal points, to define edges, or soften the effect of retaining walls and transitions in slopes.
3. Avoid the proliferation of isolated beds planted indiscriminately planted within open lawns as these may compromise the effectiveness of lawns as a unifying element in the overall organization of campus open spaces.
4. The Grounds Supervisor shall carefully review maintenance requirements of proposed perennial beds. Consultants may be required to provide a Maintenance Plan and annual maintenance budget prior to the installation of the perennial beds.

1.3 QUALITY ASSURANCE

A. The Dartmouth Grounds Supervisor and/or the Campus Arborist shall inspect trees and shrubs either at place of growth before shipping or at site before planting.

1. Plants shall comply with requirements for genus, species, variety, size and quantity as shown on the Landscape Planting Plan.
2. Dartmouth College retains the right to observe trees and shrubs for size and condition of root balls and root systems, presence of insects, evidence of injuries, and latent defects.

3. The College may reject unsatisfactory or defective material at any time during the progress of the work.
4. All rejected plant materials must be immediately removed from the Project site.

1.4 DELIVERY, STORAGE AND HANDLING

A. The Dartmouth Grounds Supervisor and/or the Campus Arborist shall be notified of all plant deliveries a minimum of seventy-two hours prior to delivery. The Dartmouth Grounds Supervisor and/or Campus Arborist shall inspect all plant material upon arrival.

B. Deliver freshly dug trees and shrubs.

C. Deliver trees and shrubs after preparations for planting have been completed and installation is imminent.

D. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist. Plants shall be installed within a reasonable time-period following delivery. No unplanted materials shall be stored on site for more than 72 hours.

E. Heel-in bare-root stock. Soak roots in water for 2 hours if dried out.

1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
2. Do not remove container-grown stock from containers before time of planting.
3. Water root systems of trees and shrubs stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.5 COORDINATION AND SCHEDULING

A. Coordinate a preconstruction conference at project site between Landscape Contractor, his/her project supervisor, and the Dartmouth Campus Arborist. Review all drawings and project specifications.

B. Sixty days prior to installation, the Landscape Contractor shall confirm in writing that all plant material specified for the project has been located and reserved.

C. Refer to the Dartmouth Planting Schedule to coordinate all plantings.

1. Spring Planting Schedule:

   a. Trees (conifers & deciduous): April 15th – June 15th
   b. Shrubs (evergreens & deciduous): April 15th – June 15th
   c. Groundcovers: April 15th – June 15th
   d. Turf (seeded/sodded): April 15th – June 1st

2. Fall Planting Schedule

   a. Trees (deciduous): Oct. 15 – Nov. 15
   b. Trees (conifers): Sept. 1 – Nov. 15
   c. Shrubs: Sept. 15 – Nov. 15
   d. Groundcovers: Sept. 1 – Oct. 15
   e. Turf (seeded): Aug. 15 – Nov. 1
   f. Turf (sodded): Sept. 1 – Nov. 1

D. Coordination with Lawns: Plant trees and shrubs after finish grades are established and before planting lawns, unless otherwise directed by the Dartmouth Grounds Supervisor and/or the Campus Arborist.

1.6 WARRANTY

A. Warrant living trees and shrubs for a period of eighteen months after Date of Acceptance.

B. Remove and replace dead trees and shrubs immediately, unless it is more prudent to plant in the succeeding planting season.

C. Immediately replace trees and shrubs that are more than 25 percent dead or in an unhealthy or unsightly condition at any point during the warranty period.

D. A limit of one replacement of each tree and shrub will be required, except for losses or replacements due to failure to comply with Dartmouth guidelines or Project specifications.

1.7 MAINTENANCE

A. Prior to the date of Substantial Completion and for (18) eighteen months following, maintain trees and shrubs as follows:

1. Water once each week from June 15 to Sept. 15. Add sufficient water to thoroughly wet roots but not less than 5 gals. per shrub; and 10 gals. per tree.
2. Remove weeds within mulched area around each tree and in each shrub area every two weeks during growing season. Do not allow weeds to attain more than 6" of growth before removal.
3. Control insects, fungus, and other diseases by spraying with approved pesticides and other means necessary.
4. Prune plants, adjust and repair guying and staking, and replace mulch as required.
5. Replant dead, dying, unhealthy, or unsightly plants.

1.8 CODE CONFORMANCE

A. Install all materials cited in this section in conformance with the most recent applicable codes. Codes include but are not limited to:

1. American Standard For Nursery Stock – ANSI Z60.1
2. American Society for Testing Materials – Standards: A 641; C 602; D 5268; D1140

PART 2 - PRODUCTS

2.1 TREES AND SHRUBS

A. Furnish nursery-grown trees and shrubs with healthy root systems developed by transplanting or root pruning.

1. Provide well-shaped, fully branched, healthy, vigorous stock; free of disease, insects, eggs, larvae, and defects such as knots, sunscald, injuries, abrasions, and disfigurement.
2. Label at least 1 tree and 1 shrub of each variety and caliper with a securely attached, waterproof tag bearing legible designation of botanical and common name.
3. Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread, and number label to assure symmetry in planting.

4. Provide either container-grown or balled and burlapped deciduous shrubs.

2.2 SHADE AND FLOWERING TREES

A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated.

1. Branching Height: 1/3 to 1/2 of tree height.

B. Small Trees: Small upright or spreading type, branched or pruned naturally according to species and type, and with relationship of caliper, height, and branching and stem form as follows:

1. Form: Single stem
2. Form: Multi-stem, clump, with 2 or more main stems.

2.3 DECIDUOUS SHRUBS

A. Form and Size: Normal-quality, well-balanced, deciduous shrubs of appropriate type, height, spread, and shape.

2.4 CONIFEROUS EVERGREENS

A. Provide normal-quality, well-balanced, coniferous evergreens, of appropriate type, height, spread, and shape.

B. Specimen-quality: Provide exceptionally heavy, tightly knit, symmetrically shaped coniferous evergreens.

1. Provide Heavy Grade: "XX." – Unsheared plant.

2.5 BROADLEAF EVERGREENS

A. Provide Normal-quality well-balanced, broadleaf evergreens, of type, height, spread, and shape.

2.6 BALLED AND BURLAPPED STOCK

A. Provide trees and shrubs dug with firm, natural ball of earth in which they are grown.

2.7 CONTAINER-GROWN STOCK

A. Established container stock is defined as a tree or shrub transplanted into container or grown in a container long enough to develop new fibrous roots, so that root mass will retain its shape and hold together when removed from container.

B. Use rigid containers that will hold ball shape and protect root mass during shipping.

2.8 STAKES AND GUYS

A. Upright and Guy Stakes: Provide rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches (50 by 50 mm) by length indicated, pointed at one end.

B. Guy and Tie Wire: Galvanized-steel wire, 2-strand, twisted, 0.106 inch (2.7 mm) in diameter.

C. Guy Cable: 5-strand, 3/16-inch (4.8-mm) diameter, galvanized-steel cable, with zinc-coated turnbuckles, 3-inch- (75-mm-) long minimum, with two 3/8-inch (10-mm) galvanized eyebolts.

D. Hose Chafing Guard: Reinforced rubber or plastic hose at least 1/2 inch (13 mm) in diameter, black, cut to lengths required to protect tree trunks from damage.

E. Flags: Standard surveyor's plastic flagging tape, red, 6 inches (150 mm) long.

2.9 MISCELLANEOUS MATERIALS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's instructions.

B. Trunk-Wrap Tape: Two layers of crinkled paper cemented together with bituminous material, 4-inch- (100-mm-) wide minimum, with stretch factor of 33 percent.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive trees and shrubs for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake individual tree and shrub locations and outline planting beds and areas.

B. Obtain Landscape Architect or The Dartmouth Grounds Supervisor acceptance of layout before planting.

3.3 PLANTING SOIL PREPARATION

A. Before mixing, clean topsoil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

B. Mix soil amendments and fertilizers with topsoil at rates recommended in soil reports. Delay mixing fertilizer if planting does not follow placing of topsoil within a few days.

C. For tree pit and trench backfill, mix topsoil before backfilling. Stockpile on site if necessary.

3.4 EXCAVATION

A. Pits and Trenches: Excavate with vertical sides and with bottom of excavation slightly raised at center to assist drainage. Loosen hard subsoil in bottom of excavation.

1. Balled and Burlapped Trees and Shrubs: Excavate approximately 1-1/2 times as wide as ball diameter and equal to ball depth, plus the following setting layer depth; allow 6 inches (75 mm) of planting soil.
2. Container-Grown Trees and Shrubs: Excavate to container width and depth, plus the following setting-layer depth; allow 6 inches (75 mm) of planting soil.

3. Where drain tile is shown or required under planted areas, excavate to top of porous backfill over tile.

B. Dispose of subsoil removed from landscape excavations. Do not mix with planting soil or use as backfill.

C. Obstructions: Notify the Dartmouth Grounds Supervisor and/or Campus Arborist if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

D. When encountering a hardpan layer, drill 6-inch- (150-mm-) diameter holes into free-draining strata or to a depth of 10 feet (3 m), whichever is less, and backfill with free-draining material.

E. Notify the Dartmouth Grounds Supervisor and/or Campus Arborist if subsoil conditions evidence unexpected water seepage or retention of water in tree or shrub pits.

F. Fill excavations with water and allow percolating out before placing setting layer and positioning trees and shrubs.

3.5 PLANTING TREES AND SHRUBS

A. Set balled and burlapped stock plumb and in center of pit or trench with top of ball above adjacent finish grades as indicated in Standard Planting Details in the Planting Details Section.

1. Place stock on setting layer of compacted planting soil.
2. Burlap, rope and wire should be removed entirely unless doing so will cause the root ball to crack or fail. If this is the case, burlap and/or wire may be folded down to below the top half of the root ball.
3. Do not use planting stock if ball is cracked or broken before or during planting operation.
4. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

B. Set container-grown stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated.

1. Carefully remove containers so as not to damage root balls.
2. Correct circling or girdling root conditions as necessary.
3. Place stock on setting layer of compacted planting soil.
4. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

C. Dish and tamp top of backfill to form a 3-inch- (75-mm-) high mound around the rim of the pit. Do not cover top of root ball with backfill.

D. Remove protective trunk wrap prior to guying and staking.

3.6 PRUNING

A. Prune, thin, and shape trees and shrubs as directed by the Dartmouth Campus Arborist.

B. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by the Dartmouth Grounds Supervisor, do not cut tree leaders; remove only injured or dead branches from flowering trees.

C. Prune shrubs to retain natural character. Shrub sizes indicated are size after pruning.

3.7 GUYING AND STAKING

A. Stake only those trees designated by the Dartmouth Campus Arborist.

1. For trees up to 12 feet (3.6 m) high and 2-1/2 inches (63 mm) or less in caliper use a minimum of two stakes. For trees greater than that use a minimum of three stakes.
2. Space stakes equally around trees. Stakes should penetrate at least 18 inches (450 mm) below bottom of backfilled excavation and extend at least 72 inches (1800 mm) above grade.
3. Set vertical stakes and space to avoid penetrating balls or root masses. Support trees with 2 strands of tie wire encased in hose sections at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Guy only those trees designated by the Dartmouth Campus Arborist.

1. Securely attach no fewer than 3 guys to stakes 30 inches (760 mm) long, driven to grade.
2. For trees over 6-inch (150-mm) caliper, anchor guys to pressure-preservative-treated deadmen 8 inches (200 mm) in diameter and 48 inches (1200 mm) long buried at least 36 inches (900 mm) below grade.
3. Provide turn buckles for each guy wire and tighten securely. Paint turn buckles with luminescent-white paint.
4. Attach flags to each guy wire, 30 inches (760 mm) above finish grade.

3.8 MULCHING

A. Use only organic mulch approved by the Dartmouth Grounds Supervisor and/or Campus Arborist.

B. Mulch backfilled surfaces of pits, trenches, and other areas as indicated on the Drawings.

C. Apply 4 inches (100 mm) of mulch and finish level with adjacent finish grades. Do not place mulch against trunks or stems.

3.9 INSTALLATION OF MISCELLANEOUS MATERIALS

A. Apply antidesiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage.

1. When deciduous trees or shrubs are moved in full-leaf, spray with antidesiccant at nursery before moving and again 2 weeks after planting.

END OF SECTION 32 93 00