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329300 - Plants

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SECTION 32 9300 - PLANTS

1.1 SUMMARY

A. Section Includes:

1. Plants.
2. Planting soils.

1.2 LANDSCAPING, GENERAL

- A. Every effort should be made to select plants native to the region and require minimal or no irrigation and do not require active maintenance or chemical input such as fertilizers.
- B. This Section is intended to assist in the design and construction of campus exterior spaces. Compliance with this Section is not intended to take the place of the involvement of the UNH Grounds and Events Department in the early stages of the planning process. The University seeks to use indigenous plants or appropriate diversity to accomplish landscaping objectives.
- C. Perform a site review before any design work is started for construction or renovation that will affect exterior spaces of the campus. Involve the UNH Manager of Grounds and Events in the review to determine the value of plant material in the area and what steps shall be taken to protect or move them.
- D. Plans for exterior spaces shall be designed for low maintenance. Areas shall be planned so that maintenance is performed with power equipment vs. labor intensive hand work, especially for emergency response functions such as snow removal.
- E. Plant selection and placement decisions shall be made in consideration with the mature size of the species and cultivar. Plantings which require repeated annual prunings, such as sheared hedges and shrubs that grow too large for the spaces they are placed, shall not be accepted. The correct selections make it possible to keep the shrubs at the desired size and shape through "natural" pruning techniques.
- F. Diversity of plant species is necessary in order to reduce maintenance costs and ensure healthy plant growth. Monoculture has been proven to be devastating from an aesthetic, monetary and environmental perspective. In order to increase bio-diversity on campus it is required that no more than 5% of the plants selected for a Project are one species and no more than 10% be from one genus. Plant selections shall be site specific. Plants that are adaptable to a site will thrive, be healthier, more attractive and cost less to maintain over the years.
- G. The most recent version of the following named standard shall be used: ANSI Z60.1,
 1. American Standard for Nursery Stock
1250 I Street, N.W., Suite 500

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- C. Finish Grade: Elevation of finished surface of planting soil.
- D. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- F. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- G. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- H. Root Flare: Also called "trunk flare." The area at the base of the plant'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.
- I. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- J. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- K. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 PROJECT CONDITIONS

- A. Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Spring Planting: Between April 1 and June 15.

2. Fall Planting: Between September 1 and October 15.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of exterior plants.
 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
- C. Substitutions shall be approved by UNH Manager of Grounds and Events or his appointee. Submit proof of non-availability.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.
 1. Provide tree wrap to protect tree trunks during shipping and handling.
- B. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- C. Handle planting stock by root ball.
- D. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F (16 to 18 deg C) until planting.
- E. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1.7 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.
 1. Maintenance Period for Trees and Shrubs: Three months from date of Substantial Completion.

2. Maintenance Period for Ground Cover and Other Plants: Three months from date of planting completion.

1.8 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 1. All plants shall be healthy, freshly dug, and nursery grown under climatic conditions similar to that of the Project site and shall conform to the varieties and sizes specified.
 2. Plants shall conform to the botanical names and standards of size, culture and quality for the highest grades and standards as complying with requirements of "American Standard for Nursery Stock," ANSI Z60.1 – latest edition, and shall exceed these standards where specimens are called for.
 3. Healthy, vigorous stock shall be provided, grown in recognized nursery in accordance with good horticultural practice and, free from weeds, disease, insects or their eggs, and defects such as abrasions or improper pruning cuts to limbs or roots.
 4. Trees and shrubs shall be of good form and free from defects such as weak crotches and girdling roots. The trunk flare of all woody ornamentals shall be exposed prior to planting and the depth of the hole shall correspond to the height of the ball after any excess soil has been removed.
- B. Deciduous Trees shall be provided balled and burlapped and shall not have been previously grown in containers. Trees shall be of height and caliper scheduled or shown with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem, single leader trees except where special forms are shown or listed.
- C. Deciduous Shrubs shall be provided balled and burlapped and of height shown or listed and with not less than the minimum number of canes required by ANSI Z60.1 for type and height of shrub required. Balled and burlapped (B & B) stock previously grown in containers and showing circling roots will be rejected. Container grown stock may be accepted in lieu of B & B material provided no evidence of circling roots can be found.
- D. Coniferous and broadleafed evergreens shall be balled and burlapped and at the sizes shown or listed. Dimensions indicate minimum spread for spreading and semi-spreading type evergreens and height for other types, such as globe, dwarf, cone, pyramidal, broad upright, and columnar. Provide normal quality evergreens with well balanced form complying with requirements for other size relationships to the primary dimensions shown. B & B stock previously grown in containers and showing evidence of circling roots will be rejected. Container grown stock may be accepted in lieu of B & B material provided no evidence of circling roots can be found.

- E. Ground Cover and Vines shall be provided established and well rotted in removable containers or integral peat pots with not less than minimum number and length of runners required by ANSI Z60.1 for the pot size shown or listed.
- F. Bulbs and Perennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.
- G. Label at least one plant of each variety with a securely attached waterproof tag with legible designation of botanical and common names. Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread.
- H. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

1.9 TOPSOIL/LOAM

- A. Topsoil that shall be brought in or reused from the site shall be tested at the UNH Analytical Services Lab at contractor's expense. Provide a copy of test results and recommendations to the UNH Manager of Grounds and Events. No topsoil shall be used until test results have been approved and all required amendments for intended crop have been made.
- B. Existing topsoil from on-site shall be stock-piled and may be reused as long as it meets the specifications for all topsoil, unless approved by UNH Facilities.
- C. All topsoil shall be friable, loam containing a minimum of 25% organic matter after composting. The soil shall be free from toxic substances and particles of subsoil, roots, and rocks over 1/2-inch in size with a pH range of 5.5 to 7. The soil shall be free from roots and vegetative parts of weeds and noxious weeds seeds. The pH of soil for use with ornamentals shall be adjusted to meet the requirements of the different species to be planted.

1.10 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch (19-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings.
 - 1. Analysis and certification of compliance shall be submitted for approval before use.
- B. Organic biostimulant shall be a concentrated organic biostimulant that promotes root and shoot growth, increases stress resistance and reduces fertilizer requirements. Apply according to manufacturer's written instructions.

1. Product: "ROOTS," as manufactured by Roots, Inc.

1.11 FERTILIZERS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

1.12 MULCHES

- A. Organic Mulch: Decomposed shredded bark from pine or spruce trees, from sawdust, wood chips or contaminants.

1.13 WEED-CONTROL BARRIERS

- A. Landscape Fabric or Weed Control Fabric: NOT allowed.

1.14 PESTICIDES

- A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction. Pesticides should conform with Green Product labeling.

1.15 TREE STABILIZATION MATERIALS

- A. Stakes and Guys:
 1. Upright and Guy Stakes: Rough sawn, new cedar, free of knots, holes, cross grain, and other defects, 3-inches in diameter by 5 foot length, pointed at one end.
 2. Tree-Tie Webbing: Broad bands of soft cloth, such as a webbing material, placed loosely around trunk of tree. Rope shall be used to tie webbing to the stakes by folding webbing and making a hole through double layer of material.
 3. Guys shall be removed by the contractor at the close of the staking period set for the in the contract documents.

1.16 MISCELLANEOUS PRODUCTS

- 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 written instructions. Use only when absolutely necessary, such as when evergreens are fall planted.
- B. Burlap: Non-synthetic, biodegradable.
- C. Tree Wraps and Wound Dressings: Not allowed.

1.17 PREPARATION

- A. Preparation for planting trees and shrubs in beds differs from planting individual specimens or rows of plants.
 - 1. Amend soils when installing beds to meet requirements of the plants to be used as long as the entire root area is treated.

1.18 PLANTING AREA ESTABLISHMENT

- A. Loosen subgrade of planting areas to a minimum depth of 6 inches (150 mm); 12 inches (300 mm) for trees and shrubs. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off University's property.
 - 1. Apply fertilizer directly to subgrade before loosening.
 - 2. Thoroughly blend planting soil off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
 - 3. Spread planting soil to a depth of 12 inches (300 mm) but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

1.19 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 1. Excavate approximately three times as wide as ball diameter.

2. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

B. Subsoil and topsoil removed from excavations may not be used as planting soil.

1.20 TREE AND SHRUB PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1.

1. Look for the trunk flare (the point where the trunk widens and the roots begin). If the trunk flare is not visible, gently remove the soil from the top of the ball until the flare and the beginning of the horizontal lateral roots can be seen. Care shall be taken to avoid damaging roots. The flare is where the soil line should have been had the plant been grown and dug properly. The depth of the hole shall be the same as the distance from the bottom of the root ball to the trunk flare.
2. The soil shall be loosened far beyond the drip line of the plant and when digging the sides of the hole will slope up gradually away from the center. Any glazed areas in the soil created by the digging process shall be loosened or scored in order to allow roots and water to penetrate. Do not disturb the area below the plant or if it has already been disturbed ensure it is compacted to prevent settling of plant material. If the ball is wrapped only in burlap the top half of the burlap shall be removed after the plant has been placed in the hole. Any synthetic materials (plastic) used to cover root ball shall be removed entirely. Wire cages shall be cut while the tree is next to the hole, and the tree shall be rolled off the cage and into the hole. If the ball is loose or likely to fall apart, the bottom of the cage can be removed and the tree can be placed in the hole and the sides of the cage cut and removed.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set stock plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grades.

1. Use planting soil for backfill.
2. Balled and Burlapped: After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place

- tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil. No nitrogen containing fertilizer shall be added at planting time. Once the plant is set and about one-third of the backfill is in place, saturate the soil with water. Fill the remainder of hole to match existing or final grades but do not cover top of root ball. Apply organic biostimulant according to manufacturer's written instructions and saturate the remainder of the backfill with water. Water out beyond the dripline.
- D. Set container-grown stock plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grade.
1. Use planting soil for backfill.
 2. Carefully remove root ball from container without damaging root ball or plant. The roots shall be cut vertically with a sharp knife or pruners at three evenly spaced places before planting.
 3. Backfill around root ball layers, tamping to settle soil and eliminate voids and air pockets. When planting pit if approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
 5. Continue backfilling process. Water again after placing and tamping final layer of soil. No nitrogen containing fertilizer shall be added at planting time. Once the plant is set and about one-third of the backfill is in place, saturate the soil with water. Fill the remainder of hole to match existing or final grades but do not cover top of root ball. Apply organic biostimulant according to manufacturer's written instructions and saturate the remainder of the backfill with water. Water out beyond the dripline.
- E. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

1.21 TREE AND SHRUB PRUNING

- A. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

1.22 TREE STABILIZATION

- A. Install tree stabilization as follows:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch (50- through 125 – mm) caliper. Stake trees of less than 2-inch (50-mm) caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches (450 mm) below bottom of backfilled excavation and to extend at least 72 inches (1830 mm) above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
 2. Use three stakes for trees less than 14 feet (4.2 m) high and more than 3 inches (75 mm) in caliper. Space stakes equally around trees.
 3. Support trees with bands of cloth webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree. Webbing shall be tied off to stakes with rope threaded through holes in folded webbing.
- B. Staking and Guying: Stake and guy trees more than 14 feet (4.2 m) in height and more than 3 inches (75 mm) in caliper. Securely attach no fewer than three guys to stakes 30 inches (760 mm) long, driven to grade.

1.23 PLANTING AREA MULCHING

- A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 12 inches (300 mm) and secure seams with galvanized pins.
- B. Mulch backfilled surfaces of planting areas and other areas indicated.
1. Trees and Tree-like Shrubs in Turf Areas: Apply organic mulch ring of 2-inch (50-mm) average thickness, with 48-inch (1200-mm) radius around trunks or stems. Do not place mulch within 3 inches (75 mm) of trunks or stems.
 2. Organic Mulch in Planting Areas: Apply 2-inch (50-mm) average thickness of mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches (75 mm) of trunks or stems.

1.24 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
1. Watering shall be performed twice within the first 24 hours after plants have been installed, and at least twice a week **during June-September, or at least once a week during October-November and April-May** until the provisional acceptance by the UNH Grounds and Events Department. Watering shall be performed beyond the root ball in order to encourage root development past the planting hole. The UNH Manager of Grounds and Events shall be notified in writing as to the date the UNH Grounds and Events is expected to begin maintenance of the completed Project.
- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use practices to minimize the use of pesticides and reduce hazards.
- D. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the work. Notify the University before each application is performed.
- E. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

END OF SECTION 32 9300