

SECTION 02900

BASIC LANDSCAPE REQUIREMENTS

PART 1 DESIGN DIRECTIVES

1.1 SUMMARY

- A. 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 DC-FO&M representative.

1.2 QUALITY ASSURANCE

- A. Engage an experienced Landscape Contractor. Landscape Contractor must maintain an experienced full-time supervisor on the Project site during times that lawn, tree, and shrub planting is in progress.
- B. Pesticide application shall be made by experienced workmen under supervision of a licensed applicator approved by Facilities Operation and Maintenance, Dartmouth College. Coordinate all pesticide application activities with the Dartmouth Grounds Supervisor.
- C. Furnish a soil analysis made by a qualified independent soil-testing agency. Soil analysis must state.
 - 1. Percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, and pH levels
 - 2. Sieve analysis and mineral and plant nutrient content of topsoil.
 - 3. Test for herbicide contamination and provide report certifying that no herbicides are present.
 - 4. State quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce satisfactory topsoil.

1.3 COORDINATION AND SCHEDULING

- A. Prior to initiating the design process, the designer shall identify landscape design objectives and discuss management and maintenance concerns with the Dartmouth Grounds Supervisor.
- B. The College Architect and the Dartmouth Grounds Supervisor shall review design drawings to ensure compliance with campus design guidelines and construction standards.
- C. At the direction of the College Architect or Owner Representative, Safety & Security, the Campus Design Review Board or other parties may further review the drawings.
- D. Consult the Dartmouth Grounds Supervisor for a list of preferred Landscape Contractors for landscape construction projects.
- E. Landscape Contractors are required to attend a Mandatory Pre-Bid Conference to be held at the project site. The College Architect, the Dartmouth Grounds Supervisor, and the designer shall review all drawings and specifications with potential bidders.

- F. The Landscape Contractor shall supply the Dartmouth Grounds Supervisor with the name and address of the nursery(s) supplying plant material for all projects.
- G. The College reserves the right to send a representative of their choosing to the nursery(s) to select and tag specific plant material for use on the project.
- H. Sixty days prior to the scheduled installation date, the Landscape Contractor shall notify the College in writing, that all plant material specified for the project has been located and secured for use on the project.

PART 2 PRODUCTS

2.1 TOPSOIL

- A. Provide fertile, friable, naturally loamy with a pH range of 5.5 to 7.0 and 4 percent organic material minimum.
- B. Topsoil shall be free of stones 1/2 inch (12 mm) or larger in any dimension, and other extraneous materials harmful to plant growth.
- C. Topsoil shall meet the following sieve analysis criteria: 100% by weight will pass _” mesh sieve 97% - 100% will pass _” mesh sieve. In material passing _” mesh sieve there will not be less than 20% or more than 65% passing No. 200 mesh sieve as determined by wash test.
- D. Reuse surface soil stockpiled on the site. Verify suitability of surface soil stockpiled to produce topsoil that meets basic requirements. If stockpiled soil does not meet requirements, amend as necessary.
- E. If required, import topsoil from off-site sources. Clean imported topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
- F. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from bogs or marshes.

2.2 SOIL AMENDMENTS

- A. Lime: Provide dolomitic limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 (2.36 mm) sieve and a minimum 75 percent passing a No. 60 (250 micrometer) sieve.
- B. Aluminum Sulfate: Commercial grade, unadulterated.
- C. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.
- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Peat Humus: Finely divided or granular texture.
 - 1. For acid-sensitive trees and shrubs provide moss peat with a pH range of 6.0 to 7.5, composed of partially decomposed moss peat (other than sphagnum), peat humus, or reed-sedge peat.

2. For acid-tolerant trees and shrubs, provide moss peat with a pH range of 3.2 to 4.5, coarse fibrous texture, medium-divided sphagnum moss peat or reed-sedge peat.

F. Sawdust or Ground-Bark Humus: Decomposed, nitrogen-treated, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

1. Mix sawdust with at least 0.15 lb (2.4 kg) of ammonium nitrate or 0.25 lb (4 kg) of ammonium sulfate per cu. ft. (cu. m) of loose sawdust or ground bark.

G. Manure: Well-rotted, unleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

H. Herbicides: EPA registered and approved, of type by manufacturer.

I. Water: Potable.

2.3 FERTILIZER

A. Bonemeal: Finely ground Commercial grade with a minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: Commercial grade phosphate mixture, soluble with a minimum of 20 percent available phosphoric acid.

C. 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-form, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

D. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.4 MULCHES

A. Provide shredded hardwood bark mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs unless directed otherwise by the Dartmouth Grounds Supervisor.

2.5 SUGGESTED PLANT MATERIALS

A. The Dartmouth Grounds Supervisor shall approve all plants specified for use on the Dartmouth Campus. The following lists of plants can be expected to perform well on campus. Designers are encouraged to select from this list but are not obligated to do so. Plants listed, as Highly Invasive shall not be used on the Dartmouth campus; plants listed as moderately invasive shall be used only with the Dartmouth Grounds Supervisor's written permission.

B. Evergreen Trees

Botanical Name	Common Name
<i>Metasequoia glyptostroboides</i>	Dawn Redwood
<i>Picea abies</i>	Norway Spruce
<i>Picea pungens</i>	Colorado Blue Spruce
<i>Pinus nigra</i>	Austrian Pine
<i>Pinus resinosa</i>	Red Pine
<i>Pinus strobus</i>	White Pine
<i>Pinus sylvestris</i>	Scotch Pine
<i>Thuja occidentalis</i>	American Arborvitae
<i>Tsuga canadensis</i>	Canadian Hemlock

C. Deciduous Trees

Botanical Name	Common Name
<i>Acer rubrum</i>	Red Maple
<i>Acer saccharinum</i>	Silver maple
<i>Acer saccharum</i>	Sugar Maple
<i>Aesculus hippocastanum</i>	Common Horsechestnut
<i>Aesculus x carnea</i>	Red Horsechestnut
<i>Amelanchier arborea</i>	Downy Serviceberry
<i>Amelanchier canadensis</i>	Downy Shadblow
<i>Betula alleghaniensis</i>	Yellow Birch
<i>Betula papyrifera</i>	White Birch
<i>Betula populifolia</i>	Grey Birch
<i>Celtis occidentalis</i>	Common Hackberry
<i>Cercidiphyllum japonicum</i>	Katsura Tree
<i>Cladrastis kentukea</i>	American Yellowwood
<i>Cornus alternifolia</i>	Pagoda Dogwood
<i>Fagus grandifolia</i>	American Beech
<i>Fraxinus americana</i>	White Ash
<i>Fraxinus pennsylvanica</i>	Ash
<i>Ginkgo biloba</i>	Ginkgo
<i>Gleditsia triacanthos var. inermis</i>	Thornless Honeylocust
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree
<i>Juglans cinerea</i>	Butternut
<i>Juglans nigra</i>	Black Walnut
<i>Larix decidua</i>	European Larch
<i>Larix laricina</i>	Tamarack
<i>Nyssa sylvatica</i>	Black Tupelo
<i>Ostrya virginiana</i>	American Hop Hornbeam
<i>Phellodendron amurense</i>	Amur Cork Tree
<i>Platanus x acerifolia</i>	London Planetree
<i>Prunus maackii</i>	Amur Chokecherry
<i>Prunus serotina</i>	Black Cherry
<i>Pyrus calleryana 'Bradfordii'</i>	Bradford Pear

Botanical Name	Common Name
Quercus alba	White Oak
Quercus bicolor	Swamp White Oak
Quercus palustris	Pin Oak
Quercus prinus	Chestnut Oak
Quercus rubra	Red Oak
Robinia pseudoacacia	Black Locust
Salix alba	White Willow
Sophora japonica	Pagoda Tree
Sorbus alnifolia	Korean Mountain Ash
Sorbus aucuparia	European Mtn Ash
Tilia americana	Basswood
Tilia cordata	Littleleaf Linden
Tilia cordata 'Greenspire'	Greenspire Linden
Ulmus americana	American Elm
Zelkova serrata	Japanese Zelkova

D. Small Deciduous Trees

Botanical Name	Common Name
Acer ginnala	Amur Maple
Chionanthus virginiana	Fringe Tree
Cornus kousa	Kousa Dogwood
Cornus mas	Cornelian Cherry
Crataegus x mordensis 'Toba'	Toba Hawthorn
Euonymus europaeus	European Euonymus
Magnolia x loebneri 'Merrill'	Dr. Merrill Magnolia
Magnolia stellata	Star Magnolia
Magnolia x soulangiana	Saucer Magnolia
Malus sp.	Crabapple
Prunus serrulata 'kwanzan'	Kwanzan Cherry
Syringa reticulata	Japanese Tree Lilac

2.6 SUGGESTED SHRUBS

A. Evergreen Shrubs

Botanical Name	Common Name
Juniperus chinensis	Chinese Juniper
Kalmia latifolia	Mountain-laurel
Leucothoe fontanesiana	Drooping Leucothoe
Rhodo. catawbiense	Catawba Rhododendron
Rhodo. maximum	Rosebay Rhododendron
Botanical Name	Common Name
Taxus canadensis	Canadian Yew
Taxus cuspidata	Japanese Yew
Taxus x media	Anglojap Yew

B. Deciduous Shrubs

Botanical Name	Common Name
<i>Aesculus parviflora</i>	Bottlebrush Buckeye
<i>Amelanchier canadensis</i>	Shadblow Serviceberry
<i>Berberis koreana</i>	Korean Barberry
<i>Berberis thunbergii</i>	Japanese Barberry
<i>Calycanthus floridus</i>	Common Sweetshrub
<i>Clethra alnifolia</i>	Summersweet
<i>Comptonia peregrina</i>	Sweetfern
<i>Cornus alba</i>	Tatarian Dogwood
<i>Cornus racemosa</i>	Gray Dogwood
<i>Cornus sericea</i>	Redosier Dogwood
<i>Cotinus coggygria</i>	Common Smoketree
<i>Cotoneaster apiculata</i>	Cranberry Cotoneaster
<i>Deutzia gracilis</i>	Slender Deutzia
<i>Elaeagnus angustifolia</i>	Russian Olive
<i>Enkianthus campanulatus</i>	Redvein Enkianthus
<i>Exocorda racemosa</i>	Common Pearlbush
<i>Hamamelis virginiana</i>	Common Witchhazel
<i>Hydrangea paniculata</i>	Panicle Hydrangea
<i>Ilex glabra</i>	Inkberry
<i>Ilex verticillata</i>	Common Winterberry
<i>Kerria japonica</i>	Japanese Kerria
<i>Ligustrum obtusifolium</i>	Border Privet
<i>Lonicera maackii</i>	Amur Honeysuckle
<i>Lonicera tatarica</i>	Tatarian Honeysuckle
<i>Rhamnus frangula</i>	Glossy Buckthorn
<i>Rhodo. mucronulatum</i>	Korean Rhododendron
<i>Rhodo. schlippenbachii</i>	Royal Azalea
<i>Rhodotypos scandens</i>	Black Jetbead
<i>Rhus copallina</i>	Shining Sumac
<i>Rhus glabra</i>	Smooth Sumac
<i>Rosa rugosa</i>	Rugosa Rose
<i>Sambucus canadensis</i>	Elderberry
<i>Spiraea albiflora</i>	Japanese White Spirea
<i>Spiraea bullata</i>	Crispleaf Spirea
<i>Spiraea x bumalda</i>	Bumalda Spirea
<i>Spiraea japonica</i>	Japanese Spirea
<i>Spiraea nipponica</i>	Snowmound Spirea
<i>Spiraea prunifolia</i>	Briadalwreath Spirea
<i>Spiraea thunbergii</i>	Thunberg Spirea
<i>Spiraea x vanhouttei</i>	Vnahoutte Spirea
<i>Stephanadra incisa</i>	Cutleaf Stephanadra
<i>Syringa microphylla</i>	Littleleaf Lilac
<i>Syringa villosa</i>	Late Lilac
<i>Syringa vulgaris</i>	Common Lilac

Botanical Name	Common Name
Tamarix pentandra	Five-stamen Tamarix
Viburnum acerfolium	Mapleleaf Viburnum
Viburnum carlesii	Koreanspice Viburnum
Viburnum cassinoides	Witherod Viburnum
Viburnum dentatum	Arrowwood Viburnum
Viburnum lantana	Wayfaringtree Viburnum
Viburnum lentago	Nannyberry Viburnum
Viburnum opulus	European Cranberrybush

2.7 SUGGESTED VINES

Botanical Name	Common Name
Actinidia quinata	Fiveleaf Akebia
Aristolochia durior	Dutchman's Pipe
Campsis radicans	Trumpet Creeper
Celastrus scandens	American Bittersweet
Clematis sp.	Clematis
Euonymus fortunei "Vegetus"	Bigleaf Wintercreeper
Hedera helix 'Thorndale'	Thorndale Ivy
Hydrangea anomala petiolaris	Climbing Hydrangea
Lonicera x brownii Dropmore Scarlet	Dropmore Scarlet H.
Lonicera x heckrottii	Goldflame Honeysuckle
Lonicera japonica 'Halliana'	Hall's Honeysuckle
Lonicera sempervirens	Trumpet Honeysuckle
Parthenocissus tricuspidata	Boston Ivy
Parthenocissus quinquefolia	Virginia Creeper
Polygonum aubertii	Silverlace Vine
Wisteria floribunda	Japanese Wisteria

2.8 SUGGESTED PERENNIALS FOR GROUNDCOVERS

Botanical Name	Common Name
Aegopodium podagraria 'variegatum'	Bishop's-weed
Ajuga reptans	Bluebugle
Armeria maritima	Common Thrift
Asarum canadense	Wild Ginger
Bergenia cordifolia	Heartleaf Bergenia
Cerastium tomentosum	Snow-in-Summer
Convallaria majalis	Lily-of-the-valley
Epimedium x rubrum	Red Barrenwort
Gazania x splendens	Gazania
Geranium sanguineum	Cranesbill
Hemerocallis hybrids	Daylilies
Hosta sp.	Hostas
Iberis sempervirens	Perennila Candytuft
Lamium galeobdolon	Yellow Archangel

Botanical Name	Common Name
Lamium maculatum	Spotted Dead Nettle
Polemonium retans	Jacob's-ladder
Pulmonaraia angustifolia	Blue Lungwort
Sedum sp.	Stonecrop

2.9 SUGGESTED SHRUBS FOR GROUNDCOVERS

Botanical Name	Common Name
Arctostaphylos uva-ursi	Bearberry
Calluna vulgaris	Scotch Heather
Cornus canadensis	Bunchberry
Cotoneaster horizontalis	Rock Spray
Euonymus fortunei	Winter Creeper
Juniperus communis	Common Juniper
Juniperus horizontalis	Creeping Juniper
Juniperus sabina "Tamariscifolia"	Savin
Micrbiota decussata	Russian Cypress
Rhus aromatica	Fragrant Sumac
Taxus canadensis	Canadian Yew
Spiraea albiflora	Japanese White Spirea
Spiraea bullata	Crispleaf Spirea
Vinca minor	Periwinkle
Xanthorhiza simplicissima	Yellowroot

2.10 INVASIVE PLANTS

A. Highly Invasive Plants – (prohibited from use on the Dartmouth campus)

1. Trees

Botanical Name	Common Name
Acer platanoides	Norway Maple
Populus alba	White Poplar

2. Shrubs

Botanical Name	Common Name
Berberis thunbergii	Japanese Barberry
Elaeagnus angustifolia	Russian Olive
Elaeagnus umbellata	Autumn Olive
Ligustrum sinense	Chinese Privet
Lonicera maaackii	Amur Honeysuckle
Lonicera morrowii	Morrow Honeysuckle
Lonicera tatarica	Tartarian Honeysuckle
Lonicera x bella	Bella Honeysuckle
Rhamnus cathartica	Common Buckthorn

Botanical Name	Common Name
Rhamnus frangula	Smooth Buckthorn

3. Perennials

Botanical Name	Common Name
Alliaria petiolata	Garlic Mustard
Butomus umbellatus	Flowering Rush
Daucus carota	Queen Anne's Lace
Leucan-themum vulgare	Ox-eye Daisy
Lythrum salicaria	Purple Loosestrife
Verbascum thapsus	Common Mullein

4. Vines

Botanical Name	Common Name
Ampelopsis brevipedunculata	Porcelain-berry
Celastrus orbiculatus	Oriental Bittersweet
Lonicera japonica	Japanese Honeysuckle

B. Moderately Invasive (used only with permission of the Dartmouth Grounds Supervisor)

1. Trees

Botanical Name	Common Name
Juniperus virginiana	Eastern Red Cedar
Populus tremuloides	Quaking Aspen
Robinia pseudo-acacia	Black Locust
Ulmus pumila	Siberian Elm

2. Shrubs

Botanical Name	Common Name
Berberis vulgaris	Common Barberry
Cornus racemosa	Gray Dogwood
Cornus sericea	Red Osier Dogwood
Euonymus alatus	Winged Euonymus
Physocarpus opulifolius	Ninebark
Ligustrum vulgare	European Privet
Rhus glabra	Smooth Sumac
Rosa multiflora	Multiflora Rose
Viburnum opulus	European Cranberry-bush

3. Perennials

Botanical Name	Common Name
Hesperis matronalis	Dame's Rocket
Hydrilla verticillata	Hydrilla
Iris pseudacorus	Yellow Iris
Lysimachia nummularia	Moneywort
Najas minor	Naiad
Nasturtium officinale	Watercress
Nymphoides peltata	Yellow Floating Heart
Valeriana officinalis	Garden Heliotrope

4. Vines

Botanical Name	Common Name
Euonymus fortunei	Wintercreeper
Vinca minor	Periwinkle

PART 3 EXECUTION

3.1 CLEANUP AND PROTECTION

- A. During landscape work, keep pavements clean and work area in an orderly condition.
- B. Protect plants from damage due to landscape operations, operations by other contractors and trades, and trespassers.
- C. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.2 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the College's property.

END OF SECTION 02900