1.0 GENERAL

1.1 Scope

.1 This guideline addresses the handling, care, installation, materials, warranty and replacement of plant material installed for new landscape and building projects on UBC Campus by Landscape Contractors.

1.2 Related Work

.1 Section 32 93 05 Relocation of Existing Plant Material
.2 Section 32 91 00 Planting Preparation
.3 Section 32 92 00 Turf and Grasses
.4 Section 32 92 23 Sodding
.5 Section 32 01 90 Operation and Maintenance of Planting

2.0 MATERIALS AND DESIGN REQUIREMENTS

2.1 Pertinent Standards and Legislation

.1 All materials and execution to conform to the latest edition of the following standards or as otherwise specified in contract documents:

.1 CLNA, Canadian Standards for Nursery Stock, current addition.
.2 Canadian Landscape Standard, current addition.
.3 ISA / ANSI, ANSI-A300, Standards for Tree Care Operations.

2.2 Planting Layout and Selection

.1 Maintain existing vegetation where possible.

.2 Show all utility lines on a legible but faded back layer on all planting and site plans from design through to record drawings.

.3 Select and arrange plants with careful consideration to strengthening biodiversity, plant communities, space available to grow to mature size and form, shade and sun conditions of site, moisture requirements of plants, climate change, pests, drought tolerance and resiliency in the context of emergency municipal water restrictions, weed control, the safety of gardeners, and the limited capacity of groundskeepers to maintain an expanding and more complex landscape. Apply the following strategies:

.1 Select plants that are tolerant of seasonal moisture conditions, climate change and drought tolerance without additional irrigation. In plant list, provide one column indicating water requirements.

.2 Select plant palettes that reflect the broad range of woody and herbaceous plants that can be grown in our existing and future climate.

.3 Incorporate appropriate native plants to achieve aesthetic, environmental and social objectives.

.4 Factor site sun exposure and shade into plant selection and layout.

.5 Place woody plants no closer to the edge of a sidewalk, lawn area or curb than the maximum spread of the plant when mature (unless it is intended to be maintained as a hedge).

.6 Base siting and spacing decisions on mature height and form of shrubs and trees. Select self-maintaining plants and trees that will grow to the size and form desired, and in the space available, without the requirement to prune.

.7 Plant large growing shrubs as single specimens rather than in masses.

.8 Do not plant large growing shrubs or trees immediately in front of building windows or adjacent to sidewalks. Arrange plants with higher moisture requirements and plants with lower moisture in their own distinct communities.

.9 Do not extend planting or lawns under building overhangs. Drip strips or other no-planted surfacing (other than water features) must be provided to extend away from building face to at least align vertically with outer edge of any building overhangs that are at a height or orientation that would exclude normal rainfall from reaching lawn or planting in question.

.10 Extend groundcover plants under planting plan symbols to account for the actual size of shrubs when installed and to achieve coverage of ground plane until shrubs mature.

.11 Do not use groundcovers on corners or in other places where people may be expected to trample them.

.12 Arrange perennials and groundcovers in a way that does not leave bare patches of earth adjacent to sidewalks or lawn areas if they are dormant in winter and have no structural presence.

.13 As a general principle, arrange plants informally or in communities as you might expect to see them growing in nature. Do not plant trees in lines or rows, except on streets, or any of the Malls where precedent has been established to do so.

.14 Massing of plants, in terms of alignment and dimensions, should be such that plantings are accessible by maintenance staff for weeding, pruning trimming without causing undue damage to plantings.

.15 Hedge plantings requiring regular shearing to maintain height, width or shape must be avoided.

.16 Select plants for their robustness and capacity to endure urban and high pedestrian traffic conditions.

.17 The planting of trees in metal tree grates is to be avoided and will only be supported in exceptional circumstances.

.18 Select vigorous plants for steep slopes to achieve quick coverage, soil stabilizing capacity and limited maintenance requirements. (See Section 31 22 00 Grading regarding slopes)

.19 Do not select plants that contain toxic substances or produce dusts, exudates or odours that cause irritation, chemical burns, poisoning or allergic reactions. See WorkSafe BC, Toxic Plant Warnings.

.20 Select plant species that are known to exhibit a high degree of pest and disease resistance.

.21 Whether lawn, groundcover or shrubs — careful consideration must be given to gradients, adjacent surface materials and slopes, ease of maintenance, and safety of grounds staff.

.22 Avoid plant species that spread into thickets with underground rhizomes. Where variances to this guideline are granted by Landscape Architect, Municipal Services, plants with these characteristics must be contained with a root barrier to prevent their spread.

.23 Always specify the cultivars of species as required. Specify no plants identified by The Greater Vancouver Invasive Plant Council (GVIPC). See www.gvipc.ca/most_wanted.php

.24 Do not plant suckering vines on building walls. Vines may be used when a trellis structure is provided on which vines can cling or twine.

.25 Living wall planting systems are not permitted.

.26 Where there is a transition between aggregate and lawn or planting, or lawn and planting, they must be defined and separated by landscape edging.

2.3 Tree Selection and Placement

.1 In principle, tree species selected for use on UBC Campus should be:
- .1 Low maintenance.
- .2 Tolerant of local conditions.
- .3 Resistant to branch failure and wind-throw.
- .4 Pest and disease resistant.
- .5 Structurally sound requiring no significant compensatory or remedial pruning.
- .6 Free from problem characteristics such as:
  - Heaving root systems.
  - Significantly messy plant parts (i.e. leaves, fruit, seeds etc.)
  - Allergenic or objectionable properties (excessive pollen, dust or malodorous).

.2 Individual trees selected for planting must be:
- .1 Nursery trained with a single leader (exception: multi-stemmed species).
- .2 Free of pests and diseases.
- .3 Free of pernicious weeds in the rootball or container.
- .4 Free of girdling roots.

.3 Tree planted within 60 cm of walkway or paved surface must have a 45 cm deep root barrier installed according to manufacturer's specifications along edge of surfacing prior to addition of topsoil and tree planting.

.4 Do not plant trees immediately in front of building windows.

.5 Trees should be planted in accordance with the minimum setbacks from:
Lamp Standards – 3m
Driveways/Crossings – 1.8 meters
Street Corners – 5m
Fire Hydrants – 1.8 meters
Underground Utilities, Catch Basins/Valve Boxes – 1.5 meters
Stop Signs – 6 meters
Buildings – 3 meters for large spreading shade trees or conifers
Buildings – 2 meters for columnar trees
Buildings – 2 meters for small ornamental trees

.6 Do not plant fruiting trees closer to paved or lawn areas than the maximum spread of the tree canopy.

.7 Select trees that will grow to the size and form desired, and in the space available, without the

requirement to prune.

.8 Trees that are planted in lawn areas should be located in such a way as to allow the passage of mowers 360 degrees around them to prevent the need for line trimmers (e.g. between tree and curb).

.9 Trees should not be placed:
- .1 With branches overhanging buildings, light wells or air-intakes.
- .2 Under overhead signs, canopies, or building overhangs.
- .3 in front of entryways or in places that will obscure walkways, roadways or traffic signage.
- .4 In significant conflict with site lighting structures or lighting dispersal pattern intentions.
- .5 In locations that would subject the tree to excessive soil/root compaction due to pedestrian or vehicular traffic.
- .6 Avoid planting areas with limited soil volume (narrow slivers in converging sidewalks, between roads and walkways, or in narrow roadway medians).
- .7 Plan, budget and design to optimize soil conditions for root systems under pavements by utilizing Structural Soil or Suspended Pavements and Structural Cells.

.10 Adopt 10-20-30 rule to support tree biodiversity. No project is to include more than 10% of any one species, 20% of any one genus or 30% of any family.

2.4 Coordination

.1 Tree and plant selection, and planting design to comply with planting requirements specified in this document and in the Vancouver Campus Plan Design Guidelines.

.2 Review any plant or tree substitutions during design or construction phases with UBC Landscape Architects (Municipal and C+CP). Written approval is required for any substitutions.

2.5 Delivery, Storage and Protection

.1 Contractor to ensure all plant material and growing medium in which they are planted is free of damages, defects, noxious perennial weeds and is true to type as specified on plant list.

.2 The contractor shall be responsible for the storage, protection and installation of all plants and associated material.

.3 Verify existence and location of any on-site utilities. Contact the Project Landscape Architect immediately for directions as to procedure should any piping or utilities be encountered during excavation.

.4 Protect existing equipment, sidewalks, landscaping reference points, monuments and markers. Make good all damage incurred during this work.

.5 Erect temporary continuous barriers, and/or tree protection fencing where necessary to ensure safety of existing plants and trees. Refer to Section 32 01 93.01 Tree and Shrub Preservation.

2.6 Warranty

.1 Warranty must stipulate that plant material will remain free of defects as per contract plant lists and landscape specifications, for one (1) full year from the date of substantial completion of the work.

2.7 Replacements

.1 Replace all plant material found dead, or not in a healthy, satisfactory growing condition or

which, in any other way, do not meet the requirements of the project or contract specifications, during and up to end of the warranty period.

.2 The cost of replacements resulting from theft, accidental damage, vandalism, carelessness on the part of others shall not be borne by UBC.

.3 All required replacements shall be plants of the same size and species as specified on the plant list and shall be supplied and planted in accordance with the drawings, specifications and change orders.

.4 Replace defective or dead plants, trees, lawns or plantings as required during the 1 year maintenance and warranty period to the satisfaction of the Project Landscape Architect and UBC Municipal Services.

2.8 Planting Time

.1 Do not plant during freezing and/or abnormally hot, dry weather.

2.9 Maintenance

.1 Refer to Section 32 01 90 Operation and Maintenance of Planting for complete maintenance guidelines.

.2 Any plants maintained as hedges must be level and not parallel with the ground.

2.10 Area of Plant Supply and Search

.1 Before substitutions of plant material or plant size are considered, provide written documentation that the specified material is not available at nurseries throughout Pacific Northwest (Canada and United States).

.2 **Substitutions**: If it is impossible to obtain the particular plant material listed on the Landscape Drawing, the Contractor may be permitted to suggest substitutions with types and variations possessing the same characteristics. The Contractor must request any substitutions of trees in writing at least three (3) months and shrubs and groundcover at least two (2) months prior to planting. Substitutions must be approved by the Project Landscape Architect in consultation with UBC Landscape Architect (C+CP) and Landscape Architect (Municipal Services).

2.11 Plant Material

.1 Trees, shrubs, groundcovers, perennials, etc. shall be nursery grown of sizes and quantities shown in plant lists on landscape drawings and specification.

.2 Conform to the Canadian Landscape Standard and Canadian Standards for Nursery Stock. In particular:

.1 "Nursery stock shall be true to name, and of the size or grade stated."

.2 "Quality must be typical for the species when grown under proper cultural practices...viable, substantially free from pests and disease, and undamaged."

.3 "Between digging and delivery, roots must not be subject to long exposure to drying winds, sun, or frost, between digging and delivery."

.4 "Root balls and containers must be free from pernicious, perennial weeds."

.5 “All normal quality nursery stock must have an adequate fibrous root system that has

been developed by proper cultivating practices, particularly transplantings or root pruning."

.6 "Plants must be grown in the container for a minimum of three months or have a well established root system reaching the sides of the container to maintain a firm ball."

.3 Trees designated B&B shall be properly dug with firm, natural balls of soil retaining as many fibrous roots as possible, in sizes and shapes as specified in the Canadian Standards for Nursery Stock. Balls shall be firmly wrapped with non-synthetic, rottable burlap and secured with nails and/or heavy, non-synthetic rottable twine. The root collar shall be apparent at surface of ball. Trees with loose, broken, processed or manufactured root balls will not be accepted.

.4 Trees and plants designated as transplants, bareroot or collected plants, must not be dug or installed before dormancy or after bud break.

.5 All plants, typical of their species or variety, must exhibit a normal habit of growth and shall be first quality, sound, healthy, vigorous, well branched, and densely foliated, free of disease, insect pests, eggs or larvae, healthy well furnished root systems free of binding or girdling roots.

.6 Plants must conform to the size specified in the plant list. Measurements specified are minimum size acceptable for each variety. Plants that meet the requirements specified in the plant list, but that do not possess a normal balance between height and spread will not be accepted. Plants for use when symmetry is required, or when planted in formal rows, shall be matched in form and size as nearly as possible. Do not prune prior to delivery.

.7 If the specified size of plants is not available, and alternate species or quantities or compensation are proposed, the Project Landscape Architect must discuss with Landscape Architect, Municipal Services in advance to obtain support for these remedies.

.8 All plants and all tree trunks shall be measured when the branches are in the normal position. Dimensions for height and spread as contained herein refer to the main body of the plant and not from branch-tip to branch-top. The height of tree trunks need not be as specified if the required height can be obtained by pruning the lower branches without leaving unsightly scars or otherwise damaging the trunk**.** Do not prune branches to obtain the required height, before the plants are delivered to the site unless so approved in writing by the Project Landscape Architect.

.9 As per Canadian Standards for Nursery Stock: tree caliper must be the determining measurement when the caliper exceeds 40 mm (1.5 in.). It must be measured no less than 150 mm (6") above the ground level for trees with a caliper up to 100 mm (4"). Trees 100 mm (4in.) and larger caliper are to be measured 300 mm (12 in.) above the ground level.

.10 All trees must have straight trunks with a single leader intact. Trees with multiple leaders, unless specified, shall be rejected. Trees with a damaged of crooked leader, bark abrasions, sunscald, disfiguring knots, insect or disease damage, girdling roots or cuts on limbs over 20mm (3/4") in diameter that are not completely closed must be rejected by Project Landscape Architect.

.11 Take precautions during digging, handling and shipping of plant material to avoid injury to plants and root systems.

2.12 Related Materials:

.1 Tree stakes: dressed 50mm (2") diameter treated fir stakes, lengths as detailed. Number per tree as required to keep tree plumb and true during one (1) year warranty period.

.2 Guywires: Trees up to 65mm (2.5”) calliper - 14 gauge galvanized, multi-strand, twisted wire. Trees 65mm (2.5”) to 75mm (3”) calliper – 12 gauge wire, covered with new black garden hose, 2-ply, reinforced and of at least 13 mm (1/2”) diameter, around leader at branch crotch.

.3 Deadmen: 100x150 mm (4"x6") pressure preservative treated construction grade lumber or approved equivalent. Lengths to be determined on site.

.4 Plastic Strapping: DeepRoot, Arbortie or approved equivalent. Strapping to be to be 19mm (2") wide, flat, woven polypropylene or nylon; 900 lb. break strength.

.5 Mulch: Shall be non-composted bark mulch with 25mm and minus Douglas Fir / Hemlock bark chips, dark brown in colour and free of cedar chips, soil, wood, stones, roots, plastic and other deleterious matter or pre-approved equal. Minimum compacted depth 100mm (4").

.6 Fasteners: All fasteners hot dipped galvanized.

.7 Fertilizers: Agricultural fertilizer of a formula indicted by soil test results of site soils and/or planting media specified for the project. Fertilizers shall be organic, slow-release compositions incorporated into the planting media wherever applicable.

.8 Anti-Desiccants: if specified, are to be applied to plants in full leaf immediately before digging or as required by the Project Landscape Architect. Anti-Desiccants are to be sprayed so that all leaves and branches are covered with a continuous protective film.

.9 Biostimulants: shall contain soil conditioners, VAM, and ectomycorrhizal fungi spores and soil bacteria appropriate for existing soil conditions. Submit manufacturer’s literature for approval.

.10 Edging: Heavy-duty commercial grade aluminum. Minimum 3/16" thick x 8" height c/w 18" long stakes.

2.13 Planting Hole Excavations – Trees, Shrubs and Groundcovers

.1 Trees, shrub, and groundcover beds are to be excavated to the depth and widths indicated on the drawings – neither too high nor too low. If the planting area under any tree is initially dug too deep, the soil added to bring it up to the correct level should be thoroughly tamped. If the planting area has not been sufficiently excavated, the tree must be replanted at correct level exclusive of required mulch.

.2 The sides of the excavation of all planting areas shall be sloped at a 45 degrees. The bottom of all beds shall slope parallel to the proposed grades or toward any subsurface drain lines within the planting bed. The bottom of the planting bed directly under any tree shall be horizontal and tamped such that the tree sits and remains plumb.

.3 Maintain all required angles of repose of the adjacent materials as shown on the drawings. Do not excavate compacted subgrades of adjacent pavement or structures.

.4 Subgrade soils shall be separated from the topsoil, removed from the area, and not used as backfill in any planted or lawn area. Excavations shall not be left uncovered or unprotected overnight.

.5 On steep slopes, the depth of the excavation shall be measured at the center of the hole and the excavation dug as shown on the drawings.

.6 Detrimental soil conditions: The Project Landscape Architect is to be notified, in writing, of soil conditions encountered, including poor drainage that the contractor considers detrimental to the growth of plant material. When detrimental conditions are uncovered, planting shall be

discontinued until instructions to resolve the conditions are received from the Project Landscape Architect.

.7 Obstructions: If rock, underground construction work, utilities, tree roots, or other obstructions are encountered in the excavation of planting areas, alternate locations for any planting shall be determined by the Project Landscape Architect.

2.14 Transplanting

.1 Existing established trees, shrubs, and groundcovers designated to be relocated on site or from off-site locations, must be harvested, handled and transported according to recognized horticultural and arboricultural practices, and where applicable, within the guidelines and specifications applied to nursery stock as per the Canadian Standards for Nursery Stock, Canadian Landscape Standard and ANSI A300. Refer to Section 32 93 05 Relocation of Existing Plant Material, for comprehensive transplanting guidelines.

2.15 Planting Season

.1 Plant only during the season or seasons which are normal for such work determined by weather conditions and as approved by the Project Landscape Architect.

.2 Do not plant during freezing and/or abnormally hot, dry weather.

2.16 Plant and Tree Layout

.1 Plants and trees should be located according to landscape planting plan, and according to locations determined by the Project Landscape Architect.

.2 Location of all major trees should be accurately staked on site. Project Landscape Architect to contact UBC Landscape Architect (Municipal Services) to review staked locations in advance of planting.

2.17 Planting Procedures

.1 All plants to be installed maintaining original grades of bases as they were in the Nursery.

.2 Loosen bottom of planting hole to depth of 150-200mm (6-8") prior to placing growing medium.

.3 Plant bare root trees vertically with roots placed straight out in hole. Orient plant material to give best appearance in relation to structure, roads and walks.

.4 Place plant material to depths equal to the depth they were originally growing in nursery.

.5 With balled and burlapped root balls, loosen burlap and cut away minimum top 1/3 without disturbing root ball. This must be done before acceptance by UBC Municipal Services irrespective of any restrictions from doing so by plant nursery providers. Do not remove burlap or rope from under root ball. Remove any excess soil on top of root ball such that root flare is at or slightly above finished grade.

.6 With container stock, remove entire container without disturbing root ball. Non bio-degradable wrappings must be removed.

.7 Tamp growing medium around root system in layers of 150mm (6”) eliminating air voids. Frozen or saturated growing mediums unacceptable. When 2/3 of growing medium has been placed, fill hole with water. After water has completely penetrated into soil, complete backfilling.

.8 Water thoroughly on the interior of the tree saucer until it is filled even if it is raining. A second watering may be necessary to ensure saturation of the root ball.

.9 Prune out any dead or broken branches.

.10 Remove all tags, labels strings, etc. from plant material.

.11 Newly planted trees need to have any twine encircling their trunks cut at time of planting to prevent the girdling of the trunk.

2.18 Fertilizer Application and Soil Amendments

.1 Make all amendments of lime and fertilizer indicated by soil test results at time of mixing and prior to placement of plant material. All mixing shall take place using appropriate equipment and methodology so as to ensure thorough mixing of all components within the planting media. (Refer to Section 32 91 00 Planting Preparation)

.2 Pursuant to soil test recommendations and/or recommendations of the Project landscape Architect, add composted organic matter amendment as follows: After specified topsoil or planting mix is installed, and prior to fine grading and installation of plantings, spread 100 (4 in.) of composted organic matter over all beds and rototill into the top 100 mm (4 In.) of planting mix or topsoil. (Refer to Section 32 91 00 Planting Preparation).

2.19 Mulching

.1 Mulch all tree, shrub and groundcover planting areas (See **2.15.5** above).

.2 Ensure soil settlement has been corrected prior to mulching.

2.20 Guying and Staking

.1 Guy and stake all trees immediately after planting according to current recommendations of the International Society of Arboriculture (ISA) and the ANSI A300 – Standards for Tree Care Operations. Plant material not guyed or staked immediately must be replaced if damaged.

.2 Stake or guy a tree only when necessary for the specific conditions encountered and as per ISA Tree Staking Details or project drawing details. Staking may be required in unusual circumstances such as sandy soils or in extremely windy conditions, Poor quality trees with cracked, wet, or loose root balls, poorly developed trunk-to-crown ratios, or undersized root balls shall be rejected if they require staking, unless written approval to permit staking or guying as remedial treatment is obtained from the Project Landscape Architect. Trees that settle out of plumb due to inadequate soil compaction either under or adjacent to the root ball shall be excavated and reset. In no case shall trees that have settled out of plumb be pulled upright using guy wires.

.3 Stakes, anchors wires or plastic strapping shall be of sufficient strength to maintain the tree on an upright positions that overcomes the particular circumstances that initiated the need for staking or guying.

.4 Guying: Fasten tree around leader at branch crotch to stake, pin or deadman in the ground, or laterally to upright tree stake with galvanized wire protected by hose where wire wraps around leader and crotch as per manufacture's or drawing detail specifications. Alternate to wire use Deeproot, Arbortie plastic strapping or approved equivalent.

.5 Trees to stand plumb upon completion of this operation.

.6 Stakes and guys shall be removed at end of first growing season. Any tree that is not stable at the end of this period shall be rejected.

2.21 Maintenance Prior to Substantial Performance

.1 Maintain all plant material from date of planting until Substantial Completion of the landscape. Refer to Section 32 01 90 Operation and Maintenance of Planting for maintenance and operation after Substantial Completion.

.2 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.

.3 Supply equipment such as pumps, portable sprinklers systems, tanker trucks, hose and sprinklers required for watering operations.

.4 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

2.22 Reviews and Acceptance

.1 At Substantial Completion, the Project Landscape Architect must schedule a review of the planting with a UBC Municipal Services Head Landscape Technologist to identify any deficiencies. Provide minimum 48 hours notice.

.2 UBC Municipal Services Head Landscape Technologist will accept the planting. Trees, plant material and plantings must exhibit healthy growing conditions and be free from annual/perennial/invasive/noxious weeds, disease, insects and fungal organisms.

.3 At Final Completion, the Project Landscape Architect must schedule a review of the planting with a UBC Municipal Services Head Landscape Technologist to review satisfactory completion of the deficiencies. Provide minimum 48 hours notice.

.4 Acceptance will not be forthcoming if tree plants, plantings and/or soil show any evidence of invasive or perennial weeds such as morning glory, creeping vetch, horsetail or couch grass.

.5 Plant material insufficiently hardened-off prior to onset of frost and freeze may be rejected and require replacement if signs of frost damage, poor root development or winter desiccation are evidenced.

.6 The Properties Trust or Project Services project manager must schedule an end-of-warranty inspection that includes the Project Manager, the Project Landscape Architect, the landscape contractor, the maintenance contractor (if different from landscape contractor) and a representative from Municipal Services (contact Landscape Architect, UBC Municipal Services).

.7 At the end of the Warranty period, the Landscape Contractor (or Maintenance Contractor if different) must have removed the ropes and burlap from the top third of all tree root balls in accordance with the Project Landscape Architect's tree planting detail. Trees, plant material and plantings must exhibit healthy growing conditions and be free from annual/perennial/invasive/noxious weeds, disease, insects and fungal organisms.

2.23 Maintenance During Warranty Period

.1 Refer to Section 32 01 90 Operation and Maintenance of Planting, *Lawn and Meadow Areas.*

END OF SECTION