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PART 1 - GENERAL

<u>1.1 Work Included</u>	.1	This section specifies requirements for planting of trees, shrubs and groundcover. Work includes:	
	.1	Developing and managing planting plans, weekly schedules, and digital planting inventories;	
	.2	Supply and installation of planting soil mix or soil amendments;	
	.3	Supply and planting of trees, shrubs and groundcover complete with all related components and accessories.	
<u>1.2 Related Sections</u>	.1	Environmental Protection	Section 01 57 00
	.2	Clearing and Grubbing	Section 31 10 00
	.3	Earthwork	Section 31 20 00
	.4	Protection of Existing Trees	Section 32 91 10
	.5	Topsoiling and Finish Grading	Section 32 91 19
	.6	Seeding and Sodding	Section 32 92 00
<u>1.3 Reference</u>	.1	Canadian Nursery Landscape Association (CNLA), Standards Canadian Standards for Nursery Stock.	
<u>1.4 Quality Control</u>	.1	Obtain approval of plant material prior to planting.	
	.2	Supply necessary permits and import licenses in compliance with federal and provincial regulations for imported plant material.	
	.3	HRM Urban Forestry may review all plants subject to approval of size, health, quality, character, etc. Review or approval of any plant during the process of selection, delivery, installation and establishment period shall not prevent that plant from later rejection in the event that the plant quality changes or previously existing defects become apparent that were not observed.	
	.4	HRM Urban Forestry reserves the right to select and observe all plants prior to planting and to reject plants that do not meet specifications.	
	.5	The contractor will be responsible for maintaining a digital file (MS Excel format) of planting locations, and species planted.	

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| | .6 | All plants that are rejected shall be immediately removed from the site and acceptable replacement plants provided at no additional cost. |
| 1.5 Delivery, Storage and Protection | .1 | Protect plant material from damage during transportation. Use enclosed vehicle or other approved method. |
| | .2 | Immediately store and protect plant material which will not be installed within 1 hour after arrival at site in approved storage location. |
| | .3 | Protect plant material from frost, excessive heat, wind and sun during and after delivery as follows: |
| | .1 | For pots and containers, maintain moisture level in containers. |
| | .2 | For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain adequate moisture level in root zones. |
| | .3 | For bare root plant material, preserve moisture around roots by heeling-in or burying roots in approved moisture-retaining medium and watering to full depth of root zone. |
| 1.6 Samples | .1 | Submit samples in accordance with Section 01 10 00 for items listed in Supplementary Specifications. |
| 1.7 Warranty | .1 | Notwithstanding GC 12.3 - WARRANTY, warrant that plant material provided will be maintained to remain healthy and free of defects for one full growing season from final acceptance date or as specified in Project Documents, subject to sub-section 3.9. |
| | .2 | Extend warranty period an additional one (1) year for plant materials if leaf development and growth is not sufficient at the end of the original warranty period to ensure future survival as determined by the Engineer or designated consultant. |
| 1.8 Definitions | .1 | Defective Plant: Any plant that fails to meet the plant quality requirement of this specification. |

PART 2 - PRODUCTS

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| 2.1 Plant Materials | .1 | Type of root preparation, sizing, grading and quality: comply with Canadian Nursery Landscape Association (CNLA) Standards. All trees to be Canada #1 Nursery Grown. |
| | .2 | Plant material: free of disease, insects, pests, defects or injuries and structurally sound with strong fibrous root system, be of excellent vigour and condition, root pruned regularly. |

- .3 Trees: with straight trunks, well and characteristically branched for species except where specified otherwise, straight stem, full crown and main leader.
- .4 Bare root stock: nursery grown, in dormant stage, not balled and burlapped or container grown.
- .5 Collected native stock not acceptable unless otherwise approved.
- .6 No substitutions shall be permitted without the written approval of the Engineer and HRM Urban Forestry.
- .7 The Contractor shall provide plants of quality, size, genus, species, and variety or cultivars as shown and scheduled in the Project Documents.
- .8 Unless otherwise stipulated all conifer shall be 150 cm W.B. stock balled and burlapped and all other trees shall be 60 mm caliper balled and burlapped.
- .9 All trees shall be true to name as ordered or shown on planting plans and shall be labeled individually or in groups by genus, species, variety and cultivar.
- .10 Tags bearing species and genus information shall be retained on individual trees.
- .11 All balled and burlapped plants shall be field grown, and the root ball packaged in a burlap and twine and /or burlap and wire basket package.
- .12 Trees are to have been harvested with a tree spade in this calendar year.
- .13 The tree trunk shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks (fungal fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions (mechanical injury).
- .14 Shoot growth (length and diameter) throughout the crown should be appropriate for the age and size of the species or cultivar.
- .15 Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.
- .16 All graft unions, where applicable, shall be completely closed without visible sign of graft rejection. All grafts shall be visible above the soil line. The root collar shall be within the upper 5 (five) cm of the substrate/soil.

<u>2.2 Water</u>	.1	Free of impurities that would inhibit plant growth.
<u>2.3 Tree Support</u>	.1	Stakes: wood, regular or treated, 25 x 40 x 2400 mm long, or as detailed in Project Documents.
	.2	Turnbuckle: galvanized steel, 9 mm diameter with 250 mm open length. Painted fluorescent orange.
	.3	Guying wire: galvanized steel, 3 mm wire or 3 mm diameter multi-wire steel cable.
	.4	Anchors:
	.1	Wood: 50 mm x 50 mm x 600 mm.
	.2	Steel: T-bar, 600 mm.
	.5	Guying collar: tube, plastic 13 mm diameter nylon reinforced, rubber hose or approved commercial equivalent or as detailed in Project Documents.
<u>2.4 Mulch</u>	.1	Organic:
	.1	Bark Mulch: Aged, shredded, bark and wood from coniferous trees or approved commercial bark nugget. Maximum length of any individual component to be 50 mm and a minimum of 75% of the mulch will pass through a 25 mm screen. Mulch to be free of growth or germination-inhibiting ingredients. Mulch to have characteristics of retaining moisture, forming a mat not susceptible to spreading by wind or rain, and providing a good growth medium for plants. Shredded bark may contain up to 50% shredded wood material. Wood chips are not acceptable. Bark mulch containing shredded wood to be aged for one (1) year minimum prior to installation.
	.2	Inorganic:
	.1	Washed River Rock: To be 25 mm to 76 mm washed river rock, uniform in size. All fines shall be screened from the aggregate within a 6mm tolerance. Rock mulch to be composed of round stones or pebbles that may be varied in colour. The material must be free of organic and inorganic debris and litter.
<u>2.5 Fertilizer</u>	.1	Slow release commercial type, inorganic super phosphate ratio as determined by soil test.
<u>2.6 Anti-Desiccant</u>	.1	Wax-like emulsion.
<u>2.7 Flagging Tape</u>	.1	Fluorescent, colour choice optional.

PART 3 - EXECUTION3.1 General

- .1 Qualifications
 - .1 Employ at least one (1) person who is a member in good standing of Landscape Nova Scotia.
 - .2 The Contractor shall have at least two years of successful experience of a scope similar to that required for the work, including the handling and planting of large specimen trees in urban areas.
 - .3 When any planting work is in progress, the Contractor shall maintain, on site, a full-time supervisor.
 - .4 The Contractor's field supervisor shall have a minimum of five years' experience as a field supervisor installing plants and trees of the quality and scale of the proposed project.
 - .5 For tree planting work, the Contractor's planting crew shall have a minimum of two years' experience in the handling and planting of large specimen trees in urban areas.
- .2 Planting Season
 - .1 Planting shall only be performed when weather and soil conditions are suitable for planting the materials specified in accordance with locally accepted practice.
 - .2 Install plants during the planting time as described above unless otherwise approved in writing by HRM Urban Forestry.
 - .3 In the event that the Contractor requests planting outside the dates of the planting season, approval of the request does not change the requirements of the warranty.
- .3 Site Examination
 - .1 Examine the surface grades and soil conditions.
 - .2 Notify HRM Urban Forestry in writing of any unsatisfactory conditions.
 - .3 It is the responsibility of the Contractor to visit the planting sites and assess all requirements.
- .4 Delivery, Storage and Handling
 - .1 Protect materials from deterioration during delivery and storage. Adequately protect plants from drying out, exposure of roots to sun, wind or extremes of hot and cold temperatures.
 - .2 If planting is delayed more than 24 hours after delivery, set plants in a location protected from sun and wind.
 - .3 Provide adequate water to the root ball package during the shipping and storage period.
 - .4 Do not deliver more plants to the site that there is space with adequate storage conditions. Provide a suitable remote staging area for plants and other supplies.
 - .5 Provide protective covering over all plants during transporting.

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| | .6 | Provide protective covering on equipment that will cause bark damage during transportation, such as tailgate padding, etc. |
| | .7 | Trees are to be handled, transported and planted in a manner that does not cause damage or injury to trunk/crown or root ball. |
| | .8 | Trees shall be lifted by the root ball and not by the trunk when being moved or set into the planting hole. |
| | .9 | Root systems of balled specimens shall be handled with sufficient care so that root balls shall not be broken. Broken balls or balls consisting of loose soil will not be accepted and shall be replaced. |
| | .10 | Plants and trees are to be planted the day they arrive on site. |
| 3.2 Pre-planting
<u>Operations</u> | .1 | Prune and remove damaged roots and branches from plant material using proper pruning cuts. |
| | .2 | Apply anti-desiccant to conifers and deciduous trees in accordance with manufacturer's directions. Apply anti-desiccant when material is dug out of recommended season for protection, during extreme temperatures and such other conditions deemed necessary by the Engineer or designated consultant. |
| 3.3 Preparation
of Planting Beds
<u>and Pits</u> | .1 | Obtain approval of plant materials prior to use. |
| | .2 | Excavate to depth and width as indicated. |
| | .3 | Remove damaged roots and branches from plant material. |
| 3.4 Planting | .1 | For bare root stock, place 50 mm planting mixture in bottom of pit. Plant trees and shrubs with roots placed straight in pit. |
| | .2 | For jute or biodegradable burlapped root balls, untie and fold back top one third to one half of wrapping and remove the top layer of the wire basket and fold down remaining protruding wire sections without damaging root ball. Do not pull burlap or rope from under root ball. The wire basket should not be removed entirely as there is a likelihood of destroying the integrity of the root ball particularly if the tree was dug in sandy or dry soil. |
| | .3 | For container stock or root balls in non- degradable wrapping, water plants then remove entire container or wrapping without damaging root ball. Under no circumstances should non-biodegradable burlap or cloth material be allowed to remain around the soil ball after planting. |
| | .4 | Plant plumb in locations indicated. Orient plant material to give best appearance in relation to structure, roads and walks. |
| | .5 | The root system of each plant, regardless of root ball package type, shall be observed by the Contractor, at the time of planting to confirm that the roots meet the requirements for plant root quality. The Contractor shall |

undertake at the time of planting, all modifications to the root system required by HRM Urban Forestry to meet these quality standards.

- .6 For trees and shrubs:
 - .1 Backfill planting mixture in 150 mm lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into planting mixture, backfill to finish grade. Confirm that the final grade of the soil ball and the tree trunk portion or root collar of the tree is at least 50 mm higher to allow for settlement. For trees that have been budded or grafted, the visible joint area of the collar is to be 50 mm above the finished granular bed level.
 - .2 Trees are not to be planted below the nursery soil mark.
 - .3 Form watering saucer as required.
- .7 For groundcovers, backfill soil evenly to finish grade and tamp to eliminate air pockets.
- .8 Water plant material thoroughly after planting operations are complete.
- .9 After soil settlement has occurred, fill with soil to finish grade.
- .10 Dispose of burlap, wire and container material off site.

3.5 Tree Supports

- .1 Install tree supports unless indicated otherwise.
- .2 For deciduous trees 50 mm and over:
 - .1 Use double tree support.
 - .2 Place one (1) stake on the prevailing wind side of tree and second opposite or as directed by Engineer or designated consultant. Both stakes are to be 800 mm minimum for trunk and should be placed on either side of root ball. Where trees are planted next to driveways or walkways, place one (1) stake between tree trunk and driveway or walkway.
 - .3 Drive stakes minimum 300 mm into undisturbed soil beneath root ball. Confirm stakes are secure, vertical and un-split.
 - .4 Install two (2) guying collars above lowest branch crotch a minimum 500 mm above grade.
 - .5 Thread guying wire through collar tube. Twist wire to form collar and secure firmly to stake. Cut off excess wire. Confirm collar is minimum 25mm diameter larger than tree.
 - .6 For trees larger than 100 mm in caliper, support trees with three-way guy wires and stakes positioned in the ground equidistant around the perimeter of the tree. Some larger trees will require additional guy wires for added support. The use of turnbuckles to maintain taut support on the support wires is recommended.

- .3 For evergreens, use three (3) guy wires:
 - .1 Install guying collars above branch to prevent slipping at approximately 2/3 height for evergreens. Collar mounting height not to exceed 1000 mm above grade.
 - .2 Guying collars to be of sufficient length to encircle tree plus 500 mm space for trunk clearance. Thread guy wire through collar encircling tree trunk and secure to lead wire by clamp or multi-wraps; cut wire ends close to wrap. Spread lead wires equally proportioned about trunk at 120 degrees.
 - .3 Install anchors at equal intervals about tree and away from trunk so that guy wire will form 45-degree angle with ground. Install anchor at angle to achieve maximum resistance for guy wire.
 - .4 Attach guy wire to anchors. Tension wire and secure by multi-wraps.
 - .5 Install wire tightener such that guys are secure and leave room for slight movements of tree.
 - .6 Saw tops off anchors, which extend in excess of 100mm above grade or as directed.
- .4 After tree supports have been installed, prune and remove broken branches with clean, sharp tools.

3.6 Mulching

- .1 Correct soil settlement prior to mulching.
- .2 Water plant material thoroughly prior to spreading mulch as indicated.
- .3 After installation of tree, shrub and groundcover plantings has been approved by the Engineer, place mulch around plants and spread to a depth of 75 mm for bark mulch and 115 mm for washed river rock mulch. Use weed-free fabrics below mulch only upon approval by Engineer.

3.7 Maintenance During Establishment Period

- .1 Perform following maintenance operations from time of planting to acceptance:
 - .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
 - .2 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
 - .3 Remove weeds monthly.
 - .4 Replace or re-spread damaged, missing or disturbed mulch.
 - .5 Apply pesticides in accordance with federal, provincial and municipal regulations as and when required to control insects, fungus and disease.
 - .6 Prune and remove dead or broken branches from plant material using proper pruning techniques.
 - .7 Keep stakes and guy wires in proper repair and adjustment.

	.8	Apply fertilizer in early spring at manufacturer's suggested rate and as required by planting material.
	.9	Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
	.10	Where Municipal or Provincial Regulations prohibit the use of Federally and/or Provincially approved pesticides, and the available (alternative) non-pesticide controls are not acceptable to the Contractor; the application of pesticides to control insects, fungus and disease shall be deemed to be removed from this Section.
<u>3.8 Acceptance</u>	.1	Plant material will be accepted after planting operation is completed provided that plant material exhibits healthy growing conditions and is free from disease, insects and fungal organisms.
	.2	Plant material installed in fall will be accepted in following spring, one month after start of growing season, provided acceptance conditions outlined in 3.9 below are fulfilled. The acceptance date, for material planted in the fall and accepted in the spring, will be deemed to be the date of the completion of fall planting operations.
<u>3.9 Maintenance During Warranty Period</u>	.1	This maintenance will be the sole source of maintenance of the work during this period and is wholly the Contractor's responsibility. Should maintenance of the Work be removed from the Contract; warranty will cease following final acceptance at project completion.
	.2	From time of acceptance to end of warranty period, perform following maintenance operations:
	.1	Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
	.2	For evergreen plant material: water thoroughly in late fall prior to freeze-up to saturate soil around root system.
	.3	Re-form damaged watering saucers.
	.4	Remove weeds monthly.
	.5	For non-mulched areas, cultivate monthly to keep top layer of soil friable.
	.6	Apply pesticides where permitted in accordance with federal, provincial and municipal regulations as and when required to control insects, fungus and disease.
	.7	Apply fertilizer in early spring at manufacturer's suggested rate and as required by plant material.
	.8	Remove dead, broken or hazardous branches from plant material.
	.9	Keep stakes and guy wires in proper repair and adjustment.
	.10	Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

- .11 Notify Engineer or designated consultant when warranty period is completed to arrange inspection and transfer of maintenance responsibility to Owner.
- .12 Remove tree supports at end of warranty period if requested by the Engineer or designated consultant.

3.10 Clean Up

- .1 Remove surplus materials at no additional cost to the contract.

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