CITY OF VICTORIA

SUPPLEMENTARY SPECIFICATIONS
for STREET TREES AND IRRIGATION

SCHEDULE C

TO BYLAW NO.

Victoria Subdivision and Development Servicing Bylaw

CITY OF VICTORIA

2012

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C. CITY OF VICTORIA SUPPLEMENTARY SPECIFICATIONS FOR STREET TREES AND IRRIGATION

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1. STANDARDS FOR STREET TREE INSTALLATION

1.1. General

1.1.1. This specification shall govern the design and location of boulevard street trees within the City of Victoria. Boulevard street trees shall be planted in the boulevard on both sides of a highway being created by a subdivision or development, and in the boulevard of an existing highway immediately adjacent to the site being subdivided or developed. Street trees may also be planted on private property in a right-of-way with the Director of Parks, Recreation and Cultures' approval.

1.1.2. Boulevard trees will not be required under the following conditions:

1.1.2.1. Where healthy boulevard street trees are growing at not less than the density or spacing requirements of this Schedule.

1.1.2.2. Where there are rock barriers or soil conditions which will not sustain a healthy tree.

1.1.2.3. Where due to the size of the boulevard area fronting the lot and the presence of driveways or other site services, there is insufficient room to plant a tree.

1.1.3. For strata title developments, the boulevard street is deemed to be the street frontage prior to development. There is no requirement for tree planting along a private strata title roadway.

1.1.4. Prior to any tree planting, the applicant's consultant shall submit planting locations on the civil site service drawing indicating tree species and size for approval by the Director of Parks, Recreation and Culture. The number and placement of trees will vary according to site conditions, as described within this schedule. Tree species will be selected from the City of Victoria Parks List of Recommended Boulevard Street Trees.

1.2. Design Criteria

1.2.1. The applicant's consultant shall provide tree locations on the service drawing that conforms to the City of Victoria Parks Boulevard Street Tree Program. The program includes a list of acceptable trees, including native tree species where intended. An effort must be made to achieve species diversification within the boulevard. Street tree planting schemes on existing frontages are to be continued. Tree species changes are made at road intersections. All tree species subject to the approval of the Director of Parks, Recreation and Culture.

1.2.2. Street trees are to be planted in boulevards that are 1.5m, or greater, in width. Trees planted 1.0m or less from curbs or sidewalks are to have root barriers to protect civil infrastructure.

1.2.3. Street trees shall be spaced according to species and form. Typically, upright, columnar forms are used in commercial and high-density areas. Broader, spreading forms are used in residential, low-density areas.

1.2.4. Typical street tree spacing shall be:

1.2.4.1. Small scale trees minimum 6.0m-8.0m apart

1.2.4.2. Small – medium scale trees minimum 8.0m-10.0m apart

1.2.4.3. Medium – large trees minimum 10.0m -12.0m apart

1.2.4.4. Large trees 12.0m – 14.0m apart

1.2.5. Street tree placement shall be placed in a manner not to pose significant impacts to underground and overhead servicing. Listed below are minimum distances regarding services. Instances where street trees are required and the minimum distances can not be achieved, trees will be planted with mitigation measures to protect said services, subject to the approval of the Director of Engineering and Director of Parks, Recreation and Culture.

Recommended minimum distances for planting street trees:

1.2.5.1. 1.5m from underground BC Hydro, natural gas and communication utilities

1.2.5.2. 5.0m from street lights and BC Hydro poles

1.2.5.3. 3.0m from Telus poles that have no street light

1.2.5.4. 7.0m from an intersection

1.2.5.5. 3.0m from a driveway crossing

1.2.5.6. 2.0m from a fire hydrant, water service lateral, catch basin, Kiosk, vault

1.2.5.7. 3.0m from sanitary sewer or storm drain laterals

1.2.6. Street trees in hardscape are to have a minimum $12m^3$ of structural soil as growing medium. Multiple trees on the same frontage are to have a continuous trench of structural soil. Structural soil is to extend from curb to property line, at minimum depth of 700mm.

1.2.6.1. Alternative solutions to providing necessary soil volumes for tree development, such as ‘soil cells’, are encouraged and subject to the approval of the Director of Engineer and Director of Parks, Recreation and Culture.

1.3. Material

1.3.1. All plant material shall be of good health and vigor with no visible signs of disease, insect pests, damage, or other disfigurements, and shall comply with the latest version of the “BC Landscape Standards” published jointly by the BC

Landscape Architects Society and the British Columbia Nursery and Landscape Association.

1.3.2. Tree species to be used will have one dominant central leader or single straight trunk, 5-8cm diameter, caliper measured 15cm above ground, well balanced crowns with branching starting at 1.8m-2.5m above ground, planted as per Planting of Trees, Shrubs and Ground Covers (32 93 01 MMCD 2009 and City of Victoria Supplemental Drawings SD P3 and SD P4).

1.3.3. Structural Soil specifies a growing medium that combines the structural capacity of the soil with the nutrient and organic compounds necessary for tree root development in environments that do not readily meet the growth needs of a tree.

1.3.3.1. Structural soil composite shall be composed of growing medium and clear crush granular components in accordance with the following recommended base ratio of materials. Ensure sufficient moisture (25% to 75% of field capacity) to provide a homogeneous mixture with consistent properties throughout the composite soil. Peat moss shall not be used in the preparation of structural soil.

Structural Soil

Soil Component	Proportion by Weight
Growing medium	15% to 20% dry weight
Clear Crush (25mm to 75mm clear crush	80% to 85% dry weight
Hydrogel/Stabilizer*	0.01% to 0.02%

*Hydrogel/Stabilizer is applied as a soil tackifier to ensure even distribution and blending of the component materials. Refer to manufacturer specifications for appropriate mixing proportions.

1.3.3.2. Growing medium properties for use as a component in structural soil shall conform to Topsoil and Grading (32 91 21 MMCD 2009 Supplemental).

1.3.3.3. Clear crush gravel properties for use as a component in structural soil shall conform to Aggregates and Granular Materials (31 05 17 MMCD 2009) specifications. Gravel graduation shall consist of 25mm to 75mm clear crush washed rock free of any foreign elements or materials.

1.3.3.4. Structural soil installation shall conform to Excavating, Trenching and Backfilling (31 23 01 MMCD 2009) specifications.

1.4. Inspections

1.4.1. All trees and plantings will require inspection by the Parks Division. Inspections require 24hour notice. Inspections will be according to Table 4-1.

Table 4-1 Tree Planting Inspection Requirements

1st Inspection	Tree pits, structural soil, root barriers
2nd Inspection	Prior to planting trees are inspected for pests, disease and structural defects
3rd Inspection	Completed planting – mulch, staking, tree grates installed

1.4.2. All tree plantings are to be to City standard with all deficiencies corrected prior to substantial completion.

1.4.3. Trees are guaranteed for one year against pest and disease from the date of substantial completion.

1.5. Recommended Street Trees

1.5.1. Trees species will be selected from the City of Victoria Parks List of Recommended Boulevard Street Trees. Substitutions to the recommended tree list will be considered.

1.5.1 Recommended Boulevard Street Trees

Tree Species	Common Name	Variety(s)	Tree Height/ Spread (m)	Spacing (m)	Comments
Acer campestre	Hedge Maple		10/9	10	
Acer griseum	Paperbark Maple		7/6	6-8	Shredding copper bark
Acer platanoides	Norway Maple	Columnar Crimson King	12/6 12/12	6-8 12	Upright Purple leaves
Acer rubrum	Red Maple	Armstrong Bowhall Sentinel Karpick Red Sunset Sun Valley	13/5 12/5 13/9 12/6 13/10 12/10	8-10 8-10 10 8-10 10-12 10	
Acer truncatum	Norweigen Sunset	Keithsform	10/7	8-10	
Aesculus x carnea	Red Horse Chestnut	Briotii	9/10	10-12	Fruitless variety
Aesculus hippocastanum	Horse Chestnut		14/12	12-14	
Amelanchier laevis	Allegheny Service berry		8/7	8-10	Non-aggressive roots
Amelanchier canadensis	Shadblow Serviceberry	Autumn Brilliance	8/7	8-10	
Carpinus betulus	European Hornbeam	Fastigiata Frans Fontaine	10/7 10/4	10-12	Upright growth habit Upright, columnar
Cerdidiphyllum japonica	Katsura Tree		12/12	12	
Cercis Canadensis	Eastern Redbud	Forest Pansy	6/7	6-8	Some horizontal branching in age
Cornus forida	Flowering Dogwood		6/6	8	Needs good drainage
Cornus nuttallii	Pacific Dogwood		7/6	8-10	Native
Crataegus lavellei	Carriere Hawthorne		8/6	8-10	
Fagus sylvatica	European Beech	Dawyckii Riversii	12/4 12/4	8-10 8-10	Leaves purple or copper
Fraxinus americana		Autumn Purple	13/12	12	
Fraxinus ornus	Flowering Ash		12/8	10-12	Seedless
Fraxinus oxycarpa	Claret Ash	Raywood	10/7	10-12	Claret red fall colour
Ginkgo biloba	Maidenhair Tree	(male only)	12/10	10-12	Males trees only
Ginkgo biloba	Maidenhair Tree	Golden Sentry	12/4	8-10	Male trees only
Gleditisia tricanthos	Honeylocust	Skyline Halka	12/8 12/12	10 10	
Halesia monitcola	Mountain Silver Bell		12/8	10-12	Graceful growth habit
Liquidambar styraciflua	Sweet Gum	Worplesdon	12/7	10-12	Bark deeply furrowed

Tree Species	Common Name	Variety(s)	Tree Height/ Spread (m)	Spacing (m)	Comments
Liriodendron tulipifera	Tulip Tree		15/9	12-15	Tulip shaped coloured flowers
Magnolia 'Galaxy'	Galaxy Magnolia		9/5	8-10	
Magnolia kobus	Kobus Magnolia		10/8	10	
Magnolia x soulangiana	Saucer Magnolia		8/6	8-10	Large flower, very showy
Malus floribunda	Japanese Flowering Crabapple	Plena Hope Makamik, Rudolph	6/7	8-10	Buds deep pink
Malus x zumi		Calocarpa	6/7	8-10	
Parrotia persica	Persian Ironwood	Ruby Vase Vanessa	8/5 8/5	8 8	
Platanus acerfolia	London Plane		15/12	12-14	
Prunus cerasifera	Flowering Plum	Thunder Cloud Pissardi nigra	6/7 6/7	8-10 8-10	
Prunus serrulata	Japanese Flowering Cherry	Kwanzan Shirofugen	8/6 8/6	8-10 8-10	Young bronze foliage, irrigation required
Prunus yedonensis	Yoshino Flowering Cherry	Akebono	8/6	8-10	Irrigation required
Pyrus calleryana	Flowering Pear	Chanticleer	9/6	8-10	
Quercus coccinea	Scarlet Oak		15/12	12-14	
Quercus garryana	Garry Oak		15/12	12-14	Roots non-aggressive, deep
Quercus palustris	Pin Oak	Crownright	10/6	8-10	Variety avoids drooping branches
Quercus robur	English Oak	Fastigiata	12/6	10-12	
Quercus rubra	Red Oak		12/10	12-15	
Quercus shumardii	Sumard Oak		15/12	10-12	
Styrax japonica	Snowdrop Tree		7/7	8-10	Roots non-aggressive, unique flower
Tilia cordata	Littleleaf Linden	Greenspire Rancho	10/6 10/6	8-10 8-10	Variety upright, flower fragrant
Tilia euchlora	Crimean Linden		10/6	8-10	Summer flower, fragrant
Zelkova serrata	Japanese Zelkova	Green Vase	10/8	10-12	A substitute for American Elm

2. STANDARDS FOR IRRIGATION INSTALLATION

2.1. General

2.1.1. Where required by the Director of Parks for the maintenance of trees, grass or landscaping located on City right-of-way, an underground automatic irrigation system is required. The system is to be from a separate City source. All costs associated with the source and irrigation system are the responsibility of the Developer.

2.1.2. Where there is a discrepancy between the industry standards as set by the Irrigation Industry Association of British Columbia (IIABC) and the City of Victoria standards, the City of Victoria standards will prevail.

2.1.3. References:

2.1.3.1. Standards for Landscape Irrigation Systems 2008 - Irrigation Industry Association of British Columbia (IIABC)

2.1.3.2. Master Municipal Construction Document Platinum Edition 2009 – Master Municipal Construction Document Association

2.2. Quality Assurance

2.2.1. All irrigation designs and installations shall meet the minimum standards of the Irrigation Industry Association of B.C. (IIABC) for landscape, unless otherwise specified. Refer to published Standards for Landscape Irrigation Systems (IIABC).

2.2.2. All irrigation systems shall be installed in accordance to all applicable plumbing regulations.

2.2.3. It is required that the contractor have trained and competent personnel adequate for the scope of work. It is recommended to utilize personnel certified by the IIABC in such disciplines as Certified Irrigation Technician (Level 1 or 2), Certified Designer (Commercial or Residential), Certified Irrigation Auditor, etc.

2.2.4. A manufacturer's warranty is required for all irrigation equipment outlined in the specifications and on the irrigation drawings.

2.2.5. A one year warranty will apply for materials and workmanship.

2.3. Design Criteria

2.3.1. Design and As-built Submittals

2.3.1.1. Design drawings shall be submitted to the Director of Parks for review, thirty (30) days prior to scheduled installation. Drawings will indicate all

components, models and materials from water supply to irrigation heads. Zones are to be clearly indicated. Precipitation rates are to be indicated.

2.3.1.2. Upon completion, electronic as-built drawings are to be submitted showing all connection points, backflow preventers, sleeves, main lines, lateral lines, valves, controllers and any other component installed. Zones are to be clearly indicated. Precipitation rates are to be indicated. Dimensionally locate all pressurized components from buildings, curb lines or other fixed features.

2.3.2. All irrigation systems shall be isolated from the City water main by an approved gate valve installed downstream, outside of the City water meter box and be accessible to City personnel.

2.3.3. A Watts 007 Double Check Valve assembly or a Watts Pressure Zone Assembly to City Cross Control Connection Standards shall be used, with the Backflow Test Certificate submitted to the Parks Division. The Backflow Preventer Assembly Test Report is to have the City of Victoria as the registered owners with a copy provided to the Capitol Regional District (CRD).

2.3.4. Backflow Prevention devices shall be installed using brass fittings and minimum of 300mm of brass or copper both upstream and downstream of the device.

2.3.5. Install immediately downstream of backflow prevention device a Number 5 Rainbird quick coupler for winterizing.

2.3.6. Mainline shall be installed a minimum of 400mm below grade and laterals a minimum of 300mm below grade. All piping shall have a good bed, 75mm below and 150mm above, of rock free soil and free of unsuitable materials which could damage the pipe and create unusual settling problems. Back fill in lifts of 200mm, to a degree of compaction equal to that of the undisturbed areas. Pit Run Sand (31 05 17 MMCD 2009) and Growing Medium (32 91 21 MMCD 2009) are accepted backfill materials.

2.3.7. All sprinkler zones shall have head to head coverage, spacing 50% of diameter of throw of sprinkler. Sprinklers with different precipitation rates shall be zoned separately. Plant material with different water requirements shall be zoned separately. Lawns shall be watered separate from shrub plantings.

2.3.8. Flow rates through piping shall not exceed 1.5m per second on pop-up zones and 1.2m per second on rotor zones. Flow rates through meters, backflow prevention devices and valves shall not exceed manufacturer specifications.

2.4. Materials

2.4.1. All pressurized lines shall be copper or C.S.A. approved Schedule 40 Polyvinyl-Chloride (PVC). Lateral lines shall be SDR 21 PVC (Class 200). Unless otherwise specified at irrigation system plan review.

2.4.2. Pop-up spray-heads to be Rainbird 1800 Series. Rotors to be enclosed gear driven Rainbird models to fit requirements of installation. Unless otherwise specified at irrigation system plan review.

2.4.3. Solenoid valves are to be Rainbird DVF Series, controlled by Rainbird TBOS 9 volt timers, unless otherwise specified. All valves and timers shall be installed in an approved valve box (see 4.5).

2.4.4. Appropriate primer and glue to be used when gluing pipe as per pipe manufacturer's specifications. Teflon tape is to be used on all threaded joints.

2.4.5. All plastic valve boxes to be Carson Industries or pre-approved equal. All valves shall be installed in a lockable box, or vault of a commercial grade quality that allows sufficient access to effect repairs and maintenance. Boxes shall not be altered as to lose their integrity. Bricks shall be installed under the box to provide firm support, with a minimum of 25mm clearance from bottom of box to top of piping.

2.4.6. If the contractor wishes to deviate from the specified products only pre-approved commercial grade products will be considered at the discretion of the Director of Parks.

2.5. General Installation

2.5.1. All sprinklers shall be installed on swing joints using PVC 90 degree street elbows and PVC Schedule 80 nipples. Turf valves are to be supported by a galvanized stake and fastened by two heavy duty galvanized fasteners. See Standards for Landscape Irrigation by IIABC.

2.5.2. All piping installed shall be flushed prior to installation of solenoid valves, sprinklers or turf valves.

2.5.3. Sprinklers shall be installed a minimum 25mm and maximum of 50mm away from any retaining wall, sidewalk or solid boundary.

2.6. Inspection

2.6.1. All irrigation systems will require inspection by the Director of Parks. Inspections require 24 hour notice. Inspections will be according to Table 6-1.

Table 6-1 Irrigation Inspection Requirements

1st Inspection	Sleeving
2nd Inspection	Open trench Main Line & Pressure Test
3rd Inspection	Open trench Lateral Line
4th Inspection	Irrigation system, Controller, Coverage test, Backflow Preventer Assembly Test Report required, Backflow Assembly is to have inspection tag completed and attached

2.6.2. As-built drawings, Backflow Assembly Test Reports, coverage adjustments and deficiencies corrected prior to irrigation system acceptance.

2.6.3. Provide written guarantee for all workmanship and materials for one year from the date of substantial completion.