

SCHEDULE B

**SUBDIVISION AND DEVELOPMENT
STANDARDS BYLAW, 2003**

STANDARDS FOR SERVICE

Index

- Section G- General**
- Section D- Storm Water**
- Section R- Roads**
- Section S- Sanitary Sewerage**
- Section W- Other Services**
- Section WA- Water**
- Section WT- Walkways and Trails**
- Section T – Street Trees** *(Bylaw No. 160)*

SCHEDULE B

SECTION G - GENERAL

G.1 INTRODUCTION

- 1.1 The purpose of this Section G is to outline the minimum standards and requirements the District will accept in the design and as-built drawing submissions for engineering works. Quality submissions of design and as-built drawings are expected.
- 1.2 Incomplete or substandard submissions will be returned to the consulting engineer without comment on the drawings and with a short letter of explanation as to why the drawings are being returned.
- 1.3 All engineering surveys must be conducted in a safe manner so as to not create a nuisance to traffic or the public at large. The permission of the registered owners is required before entering private property.

G.2 GENERAL

- 2.1 Any information received from the District on existing services must be used as a guide only. Verification of locations and elevations must be checked by actual survey. The District takes no responsibility for the exactness of service information obtained from District files and drawings.
- 2.2 Elevations must be shown in metric geodetic datum. All survey work must be tied into an accepted benchmark using NAD83 (CSRS 2002-CRD) data. The reference benchmark and elevation must be shown on the design drawing.
- 2.3 The elevation of all existing basement floors and minimum basement elevations (MBE's) must be shown where critical.
- 2.4 All existing rights-of-way and their permitted uses must be confirmed through the Land Title Office and be shown lightly shaded on the design drawing.
- 2.5 All proposed rights-of-way for new services must be shown as a dashed line and tied to the iron pin in each lot together with their width, permitted use and the note "acquired" or "proposed." Right-of-way documents must be prepared approved by the District's prior to registration in the Land Title Office.
- 2.6 A north arrow, existing and proposed road names must be shown on the design drawing.

- 2.7 All services must be shown on one plan with curbs, sidewalks, sewers, drains, water, and underground wiring and poles identified as MC or NMC, S/W, S, D, W, and U/G, H or T respectively.
- 2.8 Indicate existing watermains, fire hydrants, sanitary sewer mains, storm drains (including all appurtenances), ditches, pavement, curbs, sidewalks, underground wiring, gas lines, underground ducting, poles, fences, hedges, existing buildings, unusual ground conditions, wells, septic systems, water courses, ponds, lakes, and service connections must in indicated in plan and profile.
- 2.9 Drawings must show all proposals for construction that are not covered or specifically detailed by standards or specifications in this bylaw. It is not always necessary to include details for which those that are in the MMCD or this bylaw a Standard Drawing. Standard Drawing numbers may be quoted.

G.3 DRAWING INFORMATION

- 3.1 All drawings must be prepared in accordance with the following requirements and all other requirements of this Schedule.
- 3.2 All design submissions must have an original dated signature and seal of a Professional Engineer registered in British Columbia. Failure of this will result in the plans being returned without comment. The consulting engineer's seal and original signature with date must infer that all works as proposed are structurally sound, comply with the applicable design criteria of this bylaw, and good engineering practise.
- 3.3 All drawings must be stencilled and must clearly identify the works in sufficient detail. Road cross-sections may be by hand, provided they are of good quality and clarity.
- 3.4 Where applicable, cross-sections will be required. The sections must include centreline, edge of pavement or gutter line, edge of shoulder, ditch invert, top of ditch, trail or pathway, property line, and an existing ground elevation inside property line.
- 3.5 Standard sheet size is A1 metric size 594 mm x 841 mm.
- 3.6 Transparent plan/profile paper, complete with title block in the lower part of the sheet making reference to the District's correspondence file number, must be used.
- 3.7 Dimensioning of drawing must be given from an existing or proposed iron pin or lot line.
- 3.8 All new works must be drafted in bold dashed lines.

- 3.9 Road chainage must be tied to an iron pin from the start of construction.
- 3.10 Plans must show the legal layout of roads and properties, with all legal descriptions (lots and plan numbers) and dimensions (to the nearest 0.01m). Also show existing house numbers and registered statutory rights-of-way.
- 3.11 A cover sheet must be prepared and attached to the front of all drawing sets. The cover sheet must note the consulting engineer's name, the applicant's name, address, telephone number and fax number, the District's file number, the legal description of the lands involved, a site plan at a 1:5000 scale, and a drawing index. The plan must note all proposed roads and the proposed subdivision layout. The cover sheet may be utilized to show the drainage catchment area.

G.4 REQUIREMENTS FOR SUBDIVISION KEY PLAN

- 4.1 A key plan must be provided to scale 1:2500 and must include the following:
- a) a plan of adjacent roads and existing lots with roads named and legal description of adjacent lots given;
 - b) the civic address and the property being subdivided shown shaded;
 - c) a north arrow;
 - d) the contours at 2.0 metres intervals except on very steeply sloping ground where 5 metre intervals will be accepted;
 - e) if the subdivision is to be developed in stages, each proposed stage shown clearly outlined and the order of development indicated; and
 - f) the location of existing survey monuments.

G.5 REQUIREMENTS FOR STORM WATER MANAGEMENT PLAN DRAWINGS

- 5.1 Storm water management plan drawings must be at an acceptable scale and identified as per key plan system if more than one sheet is required. The Storm Water Management Plan must include:
- a) contours as per subsection 4 of this Section G extending a minimum of 200 metres outside the development site;
 - b) indication of any areas of cut or fill with existing property pin elevations uncircled and proposed elevations circled. Fill over 0.5 metres is to be shaded with fill over 1 metre highlighted;

- c) the proposed building envelope for each lot along with the minimum building elevation (MBE);
- d) the minor (1:10 year) storm drainage system with the flows as per Section D of Schedule B;
- e) the major (1:100 year) storm drainage system with the flows noted as per Section D of this Schedule B. Provision must be made for upstream development;
- f) all swales and ditches as well as existing channels required in the Storm Management Plan. Easements required over any lot accepting directed drainage from upstream lots; and
- g) no increase in surface drainage flowing off site over adjacent lands unless provision is made for offsite works to be constructed in compliance with District standards.

G.6 REQUIREMENTS FOR ROAD OR PARKING AREAS DRAWINGS

- 6.1 Show all iron pins adjacent to the works and the existing ground elevation at each pin or proposed pin.
- 6.2 Both plan and profile must be tied to an iron pin, preferably near or at 0+00 chainage. If the chainage exceeds 120 m, a second tie must be shown.
- 6.3 Show the road width, curb, edge of pavement and sidewalk offsets measured from the property line where applicable.
- 6.4 Road profiles must show the gutter of curb and/or centreline of road elevations.
- 6.5 Detail the road construction with a typical cross-sectional view.
- 6.6 The profile must be shown at true centreline length and provided in as close relationship as possible to the plan.
- 6.7 Locate catch basins in accordance with specifications.
- 6.8 Locate barricades.
- 6.9 Locate ditches and centre of pavement in road construction by offsetting to property line.
- 6.10 Existing and proposed critical driveway locations within the subdivision must be shown as well as a profile of each driveway from the road centreline to the end of the driveway within the property.

- 6.11 Chainage of the BC and EC for horizontal curves must be shown together with the centreline radius. Curb radii are not required if the centre line radius and road width are shown, except on curb returns at intersections if other than 8 metres, at the end of cul-de-sacs, and on any curbs where alignment is not directly related to the centreline radius.
- 6.12 The percent grade to two decimal places must be shown on the profile together with the following information on vertical curves:
- a) the station and elevations of BVC, EVC, and VPI;
 - b) the external value;
 - c) the length of vertical curve;
 - d) the elevation and station at 20 metre stations and the low spot of sag curves;
 - e) the % grades of the adjacent vertical alignment; and
 - f) the K value for vertical curves.
- 6.13 On super elevated curves and cul-de-sacs on vertical and horizontal curves, show a profile of each curb or the edge of pavement (no centreline profile).
- 6.14 Road cross-sections must be scaled at 1:100 horizontal and 1:50 vertical and must note the existing ground elevation, the proposed elevations of the road centreline, the curb and gutter (or road edge), the invert and top of any ditches, centreline of trails or walkways, and property lines. Cross-sections are required at 20 metre intervals. Additional sections may be required or requested where excessive cuts or fills are involved. These plans may be by hand, provided they are of good quality and clarity. Side and back slopes are to be shown. Each sheet must have a typical cross section.
- 6.15 Show pavement markings and traffic control signs on all drawings.

G.7 REQUIREMENTS FOR SEWER AND DRAIN DRAWINGS

- 7.1 The following information must be shown on the profile:
- a) size, type and class of pipe, class of bedding;
 - b) percent grades to two decimal places. If critical, mark "CR" after the grade, if not critical, show the minimum grade thus: (1.08% min.);

- c) give invert elevations at both inlet and outlet of manholes;
- d) give rim elevations on all manholes and catch basins;
- e) show existing Sewer and Drain where required.

7.2 The following information must be shown on the plan:

- a) information on horizontal curves as detailed in paragraph 6.11;
- b) pipe offsets from property line; and
- c) the grade of any service connection from the upper end to the drop to the main if other than two percent.

7.3 The following additional information must also be shown on the appropriate part of the drawing:

- a) sanitary sewer manholes and cleanouts must be lettered;
- b) storm drain manholes, cleanouts and silt traps must be numbered;
- c) structural detail of all manholes not covered by MMCD Standard Drawings;
- d) cross sections and plan views of any swales or ditches required for the development;
- e) details regarding any storm water retention or treatment facilities required for the development;
- f) where an open ditch drainage system is proposed, note the size of future driveway culverts required to conform to the design.

7.4 The information requested in Section S of this Schedule B for on-site sanitary sewerage systems must be shown and detailed on a suitably scaled drawing. Information and details regarding soils tests, treatment proposed and sewage disposal system proposed must be adequately and accurately detailed and noted on the drawings or attached submissions.

G.8 REQUIREMENTS FOR UNDERGROUND WIRING AND POLES DRAWINGS

8.1 Dimension the offset from property line and/or iron pins of the existing underground conductors or mains and the location of all appurtenances related to the system including house connections. Refer to the appropriate utility for

- complete details of existing underground installations. Offsets to be verified through the appropriate utility.
- 8.2 Show proposed overhead underground hydro/telephone/cable service schematically.
- 8.3 Dimension the location of all poles, both existing and proposed, from the pole surface face to property line and/or iron pin.

G.9 REQUIREMENTS FOR ROAD LIGHTING DRAWINGS

- 9.1 Location, type and wattage of luminaries complete with ducting information to be shown.
- 9.2 Details of service base and wiring must be shown if not as per standard drawings.

G.10 REQUIREMENTS FOR WATER DRAWINGS

- 10.1 The following information must be shown on the plan and profile drawings:
- a) size, type, and class of pipe;
 - b) class of the pipe bedding;
 - c) elevations and grades of the pipe;
 - d) ground profiles and pipe cover; and
 - e) valves, bends, fire hydrants, other appurtenances, etc. are to be shown and chainages noted; and
 - f) all other requirements of the CRD Water Department.
- 10.2 The full pipe must be shown for the watermain on the profile.
- 10.3 All crossover points with sewers must be noted and where the watermain is below any sewer, or is less than 0.5 metres above any sewer, the watermain must be shown to be protected in accordance with Capital Regional District Water Department requirements.
- 10.4 The design drawings for the Community Water System of sub-section 4 of Section WA of Schedule B for Service Level 2 must be provided. These must indicate all details required for the works on a suitably scaled drawing all to the approval of the Municipal Engineer.

G.11 DESIGN AND DRAWING SUBMISSIONS

11.1 The first complete design submission must consist of:

- a) two complete sets of drawings;
- b) two additional storm water management plans;
- c) nine additional key plans;
- d) two additional streetlighting plans;
- e) four additional sets of water system drawings including a site and key plan with each set, together with a copy of the completed application to the Comptroller of Water Rights or the CRD Water Department, which was submitted for their approval;
- f) two additional sets of sanitary sewerage system drawings including site and key plan with each set, together with a completed application to the CHR or the Ministry of Water, Land, and Air Protection as applicable;
- g) soils report to verify road structure design for all new road construction where required; and
- h) all applicable utility calculations (water, sanitary, storm drainage) and reports requested earlier.

11.2 Subsequent design submissions requiring changes to the previous submission must consist of :

- a) two complete sets of drawings;
- b) any changes made by the consulting engineer that are in addition to “Red Line” changes required by the District must be highlighted in yellow;
- c) all items “Red Lined” by the District must be addressed by the consulting engineer or the submission will be returned.

11.3 The final submission for District acceptance must consist of:

- a) four complete sets of drawings;
- b) two additional storm water management plans;
- c) four additional key plans; and

- d) one additional road lighting plan.

G.12 AS-BUILT DRAWING SUBMISSION

- 12.1 The consulting engineer must submit two complete sets of paper prints except for the road cross-section sheets.
- 12.2 One marked-up set of the as-built drawing paper prints will be returned to the consulting engineer for revision. If there are minor changes, the Mylar may be revised. If amendments are numerous, it is likely that the consulting engineer will be requested to resubmit two sets of revised paper prints for a second review. The District's file number will have been noted on each drawing for identification of the Mylar drawings.
- 12.3 As-built drawings must be presented as follows:
 - a) a new key plan at a 1:1000 scale noting water, sanitary, storm drainage works, streetlights, roadworks, benchmarks and monuments. The plan must show the as-constructed offsets for those works and the locations of all service connections relative to the lot lines;
 - b) detailed plan profile drawings for water, sanitary, storm and roadworks. Elevations, inverts and offsets must show the works as constructed. The profile drawings for the utilities must state the pipe materials used;
 - c) where required in the design submission, the stormwater management plan including any lot grading performed. The plan must note the elevations at all lot corner pins, lawn basin and catch basin rims, culverts and swale inverts. Grades in graded areas must be uniform unless indicated otherwise on the plan (to a tolerance of ± 300 mm). The lot grade must not be less than the minimum;
 - d) street light drawings must show make, model and type of luminaire unit and locations of service bases and photocells except those provided by B.C. Hydro;
 - e) plans of details for which there is no Municipal standard (pump stations, water wells, treatment plants, etc.);
 - f) in all cases, notes with instructions to the Contractor must be removed or amended to indicate the results of construction. Previously existing works that have been deleted as a result of construction, or reconstructed in accordance with design must be removed or amended to show works as constructed. The as-built drawings must show the works as they have been constructed in order to provide accurate and

detailed information when adding to, or maintaining, the works shown on the plans.

12.4 When the District is satisfied with the Record (as-built) Drawings submission, the consulting engineer must submit the following:

- a) One set of 3 ml Mylar drawings identified in bold letters with the words "CERTIFIED RECORD DRAWINGS". Mylars must be uniform in background and foreground colouring with no pieces taped together. Mylars must not be signed or sealed. The District file number must be added to each drawing;
- b) Two sets of paper prints with the following certification:

"I certify this drawing represents the works and services as designed, installed, and inspected."

The signature and seal must be by the engineer who personally performed or personally supervised the required inspections. The District will return one set to the consulting engineer upon acceptance.

- c) One set of drawings, in Autocad DWG or DXF format, identified in bold letters with the words "CERTIFIED RECORD DRAWINGS". The District File Number must be added to each drawing. Drawing files must:
 - i) be opened using an unaltered copy of Autocad (no third party entities, fonts etc.);
 - ii) be constructed entirely in model space;
 - iii) have the colour of entities modifiable by changing layer colours (blocks must be built on layer 0 with colour by layer).
 - iv) be plotted by using extents and a fit scale (or noted scale on the appropriate paper size).
- d) One copy of the "Certificate of Inspection" (Form F-10) signed by the consulting engineer.

12.5 When a development does not require a Servicing Agreement (i.e. site plan review, etc), the consulting engineer must provide 5 sets of as-built drawings. Pertinent information must include service connection sizes and locations, driveway widths, light standard locations, and a stormwater management plan including MBEs.

12.6 The following results and information must be provided as part of the consultant's "as-built" submission:

a) Roads

- i) compaction test results on base and sub-base;
- ii) material test results pertaining to asphaltic materials and concrete;
- iii) geotechnical certification of rock faces and rock fill;
- iv) structural certification of retaining walls.

b) Sewers and Drains

- i) results of air tests;
- ii) video inspection results where required;

c) Water

- i) chlorination and pressure test results on watermains;
- ii) hydraulic flow test results;
- iii) certificate of Public Convenience and Necessity for Service Level 2;
- iv) results of water quality and quantity study of well(s).

d) Electrical

- i) provincial Electrical Inspectors Certificate.
- ii) confirmation of B.C. Hydro connection made and all fees paid.

e) Sewage Treatment and Disposal Systems

- i) CHR and/or Ministry of Water, Land, and Air Protection approvals.
- ii) for strata sewage treatment plants, a copy of the Provincial Electrical Inspectors Certificate and confirmation of B.C. Hydro connection made and all fees paid.

SCHEDULE B

SECTION D - STANDARDS FOR STORM WATER MANAGEMENT

D.1 GENERAL

- 1.1 A storm water management system must be designed and constructed for all subdivisions or developments subject to this bylaw. The system must be designed by a Professional Engineer, taking into account the existing drainage conditions in the entire watershed in which the development is located, so that for all events up to the predicted 1-in-100 year rainfall event, there is no increase in water levels or rates of erosion at any point in the watershed as a result of the subdivision or the development compared to the pre-existing conditions, prior to the removal of any natural vegetation from the site.
- 1.2 The above requirement applies to the temporary conditions on site during construction and to the completed development or subdivision.
- 1.3 The storm water management system, design, and construction must be in accordance with the requirements of this Section D and the drainage system in the subdivision or development must be fully integrated with the systems in adjoining areas.
- 1.4 Service Level 1 requires a drainage system where existing soil or site conditions make a drainage system necessary to protect the established amenities of adjoining properties or roads. Where a drainage system is required a ditch may be permitted which flows to an infiltration system, a watercourse or other ditch acceptable to the Municipal Engineer and the Ministry of Water, Land, and Air Protection. Service Level 2 requires an enclosed storm drain system installed by the owner complete with service connections to serve all parcels and roads being created by subdivision at a depth and of capacity sufficient to serve the upstream catchments area including the proposed subdivision. The system must discharge to an infiltration system, a watercourse, ditch or enclosed drain acceptable to the Municipal Engineer and the Ministry of Water, Land, and Air Protection.
- 1.5 This specification must govern the design of all drainage facilities within the District.
- 1.7 The District reserves the right to make all connections or alterations to existing storm drain systems at the expense of the Applicant where it can be demonstrated that such works are necessary to accommodate the Applicant's development.
- 1.8 All drainage works must be designed with considerations for public safety, regulatory requirements, economic benefits and the natural environment.

- 1.9 The presence of an existing municipal drainage system does not mean, or imply, that the system has adequate capacity to receive the proposed design flows, nor does it indicate that the existing system pattern is acceptable to the District. Existing facilities, which are undersized or inadequate to accept additional drainage, must be upgraded at the Applicant's expense to accommodate the appropriate flows. Alternative drainage proposals may be considered.
- 1.10 All downstream drainage facilities for a distance of 3 km beyond the development must be shown that they are capable of handling any projected increase in runoff created by the proposed development.
- 1.11 Adequate erosion and sediment control is required for all developments or works discharging runoff into the municipal drainage system and/or natural watercourses.
- 1.12 Infiltration trenches and drywells are permitted where the native soils demonstrate high permeability and the groundwater table is well below the invert of the trench. Design must be site specific and possibly include a positive drainage outlet.
- 1.13 Designs and plans must be reviewed and approved by the Municipal Engineer prior to construction.

D.2 STORMWATER MANAGEMENT PRINCIPLES

- 2.1 Storm Water Management is the planning, analysis and control of storm runoff in consideration of the entire watershed. The design of the drainage system must incorporate techniques such as minor-major systems, lot grading, surface infiltration, subsurface disposal, storage, erosion control and other acceptable methods to mitigate the runoff impacts due to changes in land use.
- 2.2 A comprehensive Storm Water Management Plan is required for all developments except in areas where no lots less than 1 hectare in area are permitted. The Municipal Engineer may waive this requirement in writing. The plan must include all drainage facilities, lot grading (showing pre- and post-development ground elevations at lot corners and the building site), major flood path routing, and all other appropriate information pertinent to the design.
- 2.3 Minor systems, being those designed and installed as part of the works and services for the subdivision or development, must be designed for a 1-in-10 year rainfall event, providing the existing overland flow system will not have any increase in flow in a 1-in-100 year rainfall event.
- 2.4 The design must create an overland route within the subdivision or development for the 1-in-100 year rainfall event to allow for the failure of the

minor drainage system. This route must be protected and have a statutory right-of-way in favour of the District.

- 2.5 Where, in the opinion of the Approving Officer, future development or subdivision is probable for the lands adjacent to the development or subdivision, storm drainage must be extended to the property boundary in accordance with this Bylaw. A statutory right-of-way in favour of the District must be provided for this storm sewer on private property for access and maintenance.

D.3 DESIGN CRITERIA: RUNOFF PREDICTION

- 3.1 A Tributary Area Schematic diagram of the Drainage System must be submitted with the following:

- The existing drainage system, if a system exists, indicated in solid blue pencil.
- An outline in red pencil of the proposed storm system from the existing upstream storm system to the downstream end of the subdivision or development. Storm sewer pipe together with any proposed retention or detention structures to be installed must be shown with a solid line and proposed ditching with a broken “squiggly” line. The schematic must show the pipe diameter and grade and ditch grades.
- An outline of the drainage area in a solid green line, indicating the tributary area of all surface water added to the proposed storm system below the last existing storm outfall. When the subdivision or development is at the upper end of the drainage system, the green line must outline the tributary area of all water added to the proposed storm system.
- A broken green line indicating within this drainage area the sub-areas of additional drainage added at each tributary drainage facility.
- The calculated numerical values of major and minor flows Q in litres per second, Tributary A in hectares and Time of Concentration T in minutes at the downstream end of the subdivision. When the subdivision or development is not at the upper end of the drainage system, the same information noted above must be provided at the upstream end of the subdivision or development.

- 3.2 The consulting engineer must summarize drainage computations pertaining to the project and submit this data for approval together with the above diagram.

- 3.3 The intensity-duration curve to be used must be that of Supplementary Detail Drawing SDD#1.
- 3.4 The following minimum values must be used for the inlet time to the upstream end of non- extendable drainage works for the coefficient of runoff (R):
- a) Unimproved areas, parks, playgrounds, etc. - inlet time to be determined using standard engineering practice acceptable to the District and $R = 0.35$.
 - b) Residential areas - low density, single family dwelling neighbourhoods – inlet time = 15 minutes and $R = 0.60$.
 - c) Largely impervious areas – inlet time = 5.0 minutes and $0.90 \leq R \leq 1.0$.

The above standards are minimum values only. Composite values based on percentages of different types of contributory areas may be established from the above figures. Care should be taken to incorporate future land use in the design.

- 3.5 French drains, diversion ditches, catch basins, etc. must be installed as required in areas subject to excessive overland flows.

D.4 DESIGN CRITERIA: PIPE AND DITCH CAPACITY

- 4.1 Pipes must be designed to carry the required design flow when flowing full except for pipes carrying flows less than that required for the minimum pipe size.
- 4.2 Pipe capacity must be determined by the Manning Formula using a roughness co-efficient of $n = 0.013$ except that $n = 0.015$ for C.M.P.
- 4.3 The minimum grade for storm drains must normally be that which produces a velocity of 1.0 metres per second in the pipe when flowing full. Maximum pipe full flow design velocity allowed is 3.5 metres per second.
- 4.4 Service connections for single family dwellings must be 100 mm minimum diameter pipe laid at a grade not less than two percent and connected to the main as shown on MMCD Drawing S8 with monolithic wyes, tees, or hubs of acceptable design and material.
- 4.5 Service connections for other than single-family dwellings must be sized according to the criteria contained in the B.C. Plumbing Code. Manholes must be installed at the junction with the main line of all service connections greater than or equal to 200 mm in size.
- 4.6 Main storm drains must not be less than 200 mm in diameter.

- 4.7 Catch basin leads must be a minimum 150 mm diameter laid at a minimum grade of one percent. Only a single catch basin may be connected to each lead and double catch basins must have separate leads to the main.
- 4.8 Catch basins as detailed in MMCD Drawing S11 must be provided as required to collect from a maximum area of 400 square metres of road at the beginning of curb returns to which water flows and at low points. Rim elevations must be 10 mm below finished pavement grade. Side inlet catch basins must be installed at low points and in locations required by the District.
- 4.9 Open ditches to be constructed in accordance to Supplementary Detail Drawing SDD#2 and must enter an enclosed storm drain system through an inlet as per MMCD Drawing S13. The pipe accepting the flow from the ditch must be a minimum 300 mm diameter.
- 4.10 Sandbag outfall structures must be provided where the storm system discharges into an open channel other than a watercourse. The end of the storm sewer must project 300 mm from the toe of the backfill and be placed on standard sandbags filled with 17 MPa dry concrete mix in accordance with MMCD Drawing S15 (replace concrete blocks with sand-cement bags). The area around and over the storm sewer must be built up with sandbags to a height of two rows of sandbags over the storm sewer pipe. A rock riprap apron or other velocity dissipating structure must be placed immediately downstream.
- 4.11 Driveway culverts must be a minimum 300 mm diameter. Headwalls must be as per MMCD Drawing S15 (replace concrete blocks with sand-cement bags or mortared rock).
- 4.12 Cast in place reinforced concrete outfall structures must be provided at all watercourses. In all cases energy dissipation must be provided to reduce maximum outlet flow velocity to 1.0 m/s.
- 4.13 Where an open channel or pipe system is not feasible for storm water management due to a lack of point of discharge or other reasons, an in-ground storm water disposal system may be considered subject to the following:
 - a) a geotechnical report of the soil condition by a qualified consultant;
 - b) a Professional Engineer designed seepage pit complete with size, location, specified material, an inlet structure and a positive emergency drainage outlet.

D.5 FIELD SUPPORT STRENGTH

- 5.1 The class and type of pipe and fittings, together with required class of bedding and trench widths must be selected so that the pipe will support the anticipated gravity earth and any surface dead and live loads with a safety factor of 1.5. Highway standard H20 loading is a minimum design load.
- 5.2 Notwithstanding the generality of paragraphs 5.1 and 6.1, the following minimum requirements must be met.
- a) Minimum cover for PVC pipe must be 0.75 metres. For installation under areas used for vehicular traffic, minimum cover must be 1.0 metres.
 - b) Minimum cover for rigid pipe, corrugated steel pipe, and high-density polyethylene pipe, must be 0.5 metres. For installation under areas used for vehicular traffic, minimum cover must be 1.0 metres except for catch basin leads.

D.6 ALIGNMENT AND GRADE

- 6.1 Pipe lines must be normally designed to follow a straight alignment and constant grade between manholes.
- 6.2 Whether horizontal or vertical, curves will only be acceptable when a straight alignment and constant grade between manholes is not possible.
- a) The radius of a horizontal curve must not be less than 60 metres, or that radius recommended by the pipe manufacturer, whichever is the greater.
 - b) A vertical curve must not be less than 30 metres in length. The curve must be designed so that the pipe deflection does not exceed the manufacturer's specifications.
 - c) Only one curve, either horizontal or vertical, may be permitted between manholes.

D.7 LOCATION OF SERVICES

- 7.1 Storm drains must be located within the road allowance where possible. Service connections must be installed to each proposed lot, connected to the main, and where feasible in a common trench with other services.

- 7.2 In locating the storm drain, the designer must make provision for the installation of other services such as water main, sewers, curbs, sidewalks, gas, power, and telephone facilities.
- 7.3 Service connections must be extended to the edge of any right-of-way.
- 7.4 Where storm drains can be extended to accommodate future subdivisions upstream, the main must be extended to the limits of the subdivision, and cleanouts or silt traps must be installed at those locations at the applicant's expense.

D.8 MANHOLES AND CLEANOUTS

- 8.1 The maximum distance between storm drain manholes may vary according to the pipe diameters as shown in the table below:

<u>Pipe Size</u>	<u>Maximum Spacing</u>
200 mm up to and including 375 mm	120 metres
400 mm up to and including 1200 mm	180 metres
over 1200 mm	300 metres

- 8.2 Manholes must be provided at the following additional locations:
- At all changes of grade and/or alignment, except as provided in clause 8.1 of this Section D;
 - At all changes of pipe size;
 - At all pipe junctions other than service connections and catch basin leads.
- 8.3 Drop manholes may be allowed only where particular circumstances preclude the use of normal manholes. These must be constructed wherever the change in invert elevations through the manhole is greater than 0.60m. Allowance must be made in the design for the effect of the resulting turbulence on the hydraulic capacity of the system.
- 8.4 The relative elevations entering and leaving a manhole must be such as to ensure that the manhole does not reduce the hydraulic capacity of the system. Allowances for energy losses or changes in velocity must be determined in accordance with sound hydraulic principles. Junctions must require special

- treatment as must all situations involving a pipe flowing into a smaller pipe on a steeper grade.
- 8.5 Manholes are normally constructed in accordance with the details as shown on MMCD Drawings S1, S2, and S3. In cases where these details will not suffice, a detailed design drawing must be submitted to the Municipal Engineer for consideration. All manholes with pipes 450 mm or larger must be individually designed.
- 8.6 Stubs must be placed in manholes to allow for future connections. The length of the stubs must be 0.60 metres maximum from the outside of the manhole unless otherwise requested and the end must be securely capped.
- 8.7 Cleanouts must be installed at the end of all storm drain lines.

SCHEDULE B

SECTION R - STANDARDS FOR ROADS

1. All roads in the District must be designed in accordance with the recommended practise as outlined in the latest edition of the *Manual of Geometric Design Standards for Canadian Roads* as published and amended from time to time by the *Canadian Transportation Association* (TAC) or as stated elsewhere in this Schedule R or as accepted by the Municipal Engineer.
2. Roads must have a minimum right of way width of 20 metres except that small lot urban local roads and country lanes must have a minimum right-of-way width of 14 metres.
3. Cul-de-sac roads must be provided at the closed end with an area designed to permit the turning of motor vehicles.
4. The maximum slope permitted on a cul-de-sac is 8%. The minimum property line radius of turning areas at the end of cul-de-sac roads must be 15 metres. The minimum edge of pavement radius at the end of cul-de-sac roads must be 10 metres.
5. The design of cul-de-sacs is not limited to the above and the designer may propose alternatives provided that good engineering practise is followed. Alternative designs are subject to review by the Municipal Engineer.
6. Intersecting roads boundaries must be rounded to a 6 metre radius curve. The edge of pavement or curb return radius must be 7 metres.
7. Jogs in road alignment at intersections must be permitted, provided the distances between centre lines at the jog is a minimum of 80 metre, unless it is impractical to comply because of the existing road configuration.
8. Intersecting roads must meet substantially at right angles. In no case may roads intersect at an angle of less than 80 degrees. Grades of roads at intersections must be adjusted where topographic or other conditions dictate the use of maximum or near maximum permissible grades. Such adjustments are essential to provide reasonable stopping opportunities during extreme roadway slippery conditions.
9. Roads are to be laid out with due regard to the topography so as to avoid flat or excessive grades. The maximum allowable road grade is 12%. The minimum allowable longitudinal road grade permitted is 0.5%.
10. Standard cross-slopes on roads must be 2.5% with the crown point in the centre of the pavement. Where topography is involved, local roads may be designed

with cross-slopes from 1% to 3% and with one-way cross falls subject to the acceptance of the Municipal Engineer.

11. The design speed for country lanes, small lot local roads and cul-de-sacs is 30kmph, for rural and suburban local roads is 40 kmph and for all others 50 kmph.
12. Typical design cross-sections for each class and location of road are indicated as follows:

Class of Road	Schedule C Drawing
Urban Collector	SDD-R01
Residential Urban Local Roads	SDD-R02
Commercial Urban Local Roads	SDD-R03
Small Lot Urban Local Roads	SDD-R04
Suburban Collector	SDD-R05
Suburban Collector (curb and gutter)	SDD-R05C
Suburban Local	SDD-R06
Suburban Local (curb and gutter)	SDD-R06C
Rural Collector	SDD-R07
Local Rural	SDD-R08
Country Lane (Rural & Suburban)	SDD-R09

Road classification designations are contained in the Official Community Plan or as specified by the Municipal Engineer..

13. Supplemental Construction details to be adhered to for the construction of new roads are provided in Supplementary Detail Drawings SDD-R10 and SDD-R11 in Schedule C.
14. The design of new roads must be based on the results of the analysis of materials from test holes dug on the proposed road site at representative intervals. A qualified soils test company must take test holes and samples and all reports must be signed and sealed by a qualified Geotechnical Engineer where required.
15. Paved pullouts must be provided at all group mailbox locations and must be 3 metres wide, 7 metres long and have 3 metres long tapers on each end.
16. Where applicable, the road design must ensure that the road cross-sections are established to accommodate the 1-to-100 year Flood Path Routing.
17. If cut or fill slopes, including any required for trail or walkway construction on the roadway, extend beyond the road allowance, a right-of-way sufficient to support the slope plus 1 metre must be registered in favour of the District.

18. Where the construction of a Small Lot Urban Local Road is approved, the applicant must design and build within the subdivision additional public vehicle parking in the amount of one stall for every two lots fronting on the Small Lot Urban Local Road.
19. The entire area of all roads must be brought to the designed grades and shapes. All unsuitable material must be removed and replaced within the right-of-way. Where possible existing trees and vegetation must be preserved within the right-of-way. Any disturbed area must be re-vegetated to the satisfaction of the Municipal Engineer.
20. The District, at the Applicant's expense, will install all traffic signage and pavement markings required for each project.
21. Driveway access grades must be designed to permit the appropriate vehicular access for the zone, without "bottoming-out" or "hanging-up". From the edge of pavement to the property line, the driveway must follow proper boulevard slope to avoid flooding the road. For the first 10 metres on private property, the maximum driveway grade must be 15%.
22. Designs and Plans must be submitted to and must receive approval by the Municipal Engineer prior to construction.

SCHEDULE B

SECTION S - STANDARDS FOR SANITARY SEWAGE SYSTEMS

S.1 GENERAL (Amended by Bylaw No. 205 April 11, 2005)

- 1.1 Service Level 1 requires that each fee simple lot is provided with an approved design, as per Section S.2.1, for a conventional onsite in ground sewage disposal system that is site specific for that lot; the system is not required to be installed prior to subdivision approval. Service Level 1 requires that each bare land strata lot be connected to a sanitary sewage collection, treatment, and disposal system all designed and constructed by the owner prior to subdivision approval, to serve all bare land strata lots created by the subdivision or each bare land strata lot must be provided with an approved design for a conventional onsite in ground sewage disposal system, as per Section S.2.1, that is site specific for and on that lot; the conventional onsite system is not required to be installed prior to subdivision approval.
- 1.2 Service Level 2 requires that all lots being created by the subdivision shall be connected to a municipal sanitary sewage collection, treatment and disposal system.
- 1.3 Service Level 1 requires that for all bare land strata subdivisions with common sewage systems either the Ministry of Water, Land and Air Protection must approve the proposal for sewage disposal prior to subdivision approval or the plans and specifications for the common sewage system must be filed with and accepted by the Vancouver Island Health Authority.
- 1.4 For all fee simple subdivisions the Municipal Engineer must approve the design of the sewage disposal system prior to subdivision approval. For all bare land strata subdivisions with common sewage systems the Municipal Engineer and either the Ministry of Water, Land, and Air Protection or the Vancouver Island Health Authority, whichever jurisdiction has the authority, must approve the design, construction and operational agreements of the sewage disposal system prior to subdivision approval.

S.2 ON-SITE SANITARY SEWERAGE SYSTEMS (Amended by Bylaw No. 205 April 11, 2005)

- 2.1 Single lot on-site sewage disposal systems for fee simple lots must be designed by a qualified professional or an “authorized person” (as defined in the provincial sewage system regulations) retained by the owner. This design must comply with the Vancouver Island Health Authority *Subdivision Standards*, May, 2004 and the *Health Act* and:

- a) the design shall be based on septic tank effluent only ;
 - b) the design shall include a 100% reserve sewage absorption field that is based on field testing in the reserve area; and
 - c) the certified design drawings shall also indicate all siting and zoning restrictions, proposed building sites, driveway accesses, drainage facilities, water services, easements and rights-of-way, location of percolation tests, design details of the system, and accurate dimensions locating the proposed sewage works.
- 2.2 On-site sewage disposal systems serving more than one lot shall be designed by, the construction supervised by, and as-built drawings and certification provided by a qualified professional or an “authorized person” (as defined in the provincial sewage system regulations) retained by the owner. This design shall be based on either the Vancouver Island Health Authority *Subdivision Standards*, May, 2004 or the Ministry of Water, Land, and Air Protection requirements, whichever authority has the jurisdiction, except that:
- a) the design shall incorporate common treatment by package treatment plant;
 - b) the design shall be based on domestic sewage from a four(4) bedroom home on each lot;
 - c) the design shall include a 100% reserve sewage absorption field that is based on field testing in the reserve area; and
 - d) the certified design drawings shall also indicate all siting and zoning restrictions, proposed building sites, driveway accesses, drainage facilities, water services, easements and rights-of-way, location of percolation tests, design details of the system, and accurate dimensions locating the proposed sewage works.
- 2.3 On-site sewage disposal systems serving multiple lots shall be owned and maintained by a strata corporation on common property or on a separate lot within the strata plan where the strata lots are located.
- 2.4 On-site sewage disposal systems serving multiple lots shall be served by a sewage collection system which is owned and operated by the strata corporation of the strata lots being serviced. The sewage collection system shall be designed and built according to Sub-section S.3 and S.4.
- 2.5 Multiple lot on-site sewage disposal systems shall be constructed as per the design approved in Sub-section S.2.2 and the requirements of this bylaw. The reserve sewage disposal field is not required to be built prior to subdivision approval.

S.3 SANITARY SEWAGE COLLECTION SYSTEMS-EASEMENTS

- 3.1 Where sewers required to serve the subdivision are not in highways, the applicant subdividing the land must grant to the strata corporation or the municipality easements over land within the subdivision as approved by the Approving Officer.
- 3.2 Where sewers required to serve the subdivision must cross over privately owned land outside the subdivision, the owner must be responsible for obtaining the consent of the owner of such land to grant to the strata corporation or the District easements providing for such services.
- 3.3 Where sewers required to serve the subdivision are in highways, the applicant subdividing the lands must obtain from the District the required highways permit on behalf of the strata corporation to operate the sewage collection system on the highway.

S.4 DESIGN OF SANITARY SEWERS AND SERVICE CONNECTIONS

- 4.1 This specification must govern the design of all sewer pipe and sewer appurtenances within the District
- 4.2 Design must conform to the requirements of the Ministry of Environment, Waste Management Branch *Guidelines for Assessing Sewage Collection Facilities*, 1980 Edition, as amended from time to time, and the requirements noted in this Schedule S.
- 4.3 Pipe must be designed to carry the required quantity when flowing full.
- 4.4 Pipe capacity must be determined by the Manning Formula using a roughness coefficient of $n = 0.013$ for smooth-bore pipe.
- 4.5 The minimum grade of sanitary sewers must be that which produces a minimum velocity of 0.61 metres per second in the pipe. However, a velocity of 0.9 metres per second must be attained in the pipe above the last manhole of a non-extendable system.
- 4.6 Service connections for single family dwellings must be 100 mm minimum diameter pipe laid at a grade not less than two percent connected to the main with monolithic wyes, tees, or hubs of acceptable design and materials as shown on MMCD Drawing Number S7.
- 4.7 Service connections for other than single-family dwellings must be designed according to the criteria contained herein for main lines and connected to the main as shown on MMCD Drawing Number S7

- 4.8 Main sanitary sewers must not be less than 150mm in diameter.
- 4.9 All pipes must be new, free of defects and be of the size and class shown on the design drawings.
- 4.10 The following pipe is permitted for sewers providing it is designated on the design drawing:

SIZE	MATERIAL AND CLASS	USE	CURRENT STANDARDS
100mm & up	Ductile Iron - 1035 kPa	where ground cover is less than 450mm, where ground cover is less than 750mm carrying vehicular traffic or similar loading within 750mm of a foundation wall or footing	AWWA C151-76
100mm & 150mm	PVC Gravity Sewer Pipe rubber gasket with integral bell type PSM Poly (Vinyl Chloride) Dimensional Ration (DR) of 28 with a pipe stiffness not less than 690 kPa	Service connections	CSA B182.1 ASTMD2412-73
200 mm & up	PVC Gravity Sewer Pipe rubber gasket with integral bell type PSM Poly (Vinyl Chloride) Dimensional Ration (DR) of 35 with a pipe stiffness not less than 320 kPa	Sewer mains	ASTM D3034-77C, CSA B182.4, or equivalent

- 4.11 The class and type of pipe and fittings, together with required class of bedding and trench widths must be so selected that the pipe will support the anticipated gravity earth and any surface dead and live loads with a safety factor of 1.5 for rigid and 1.9 for non-rigid pipe.

- 4.12 Notwithstanding the generality of paragraphs 4.11 and 4.13, the following minimum requirements must be met.
- a) minimum cover for PVC pipe must be 0.75 m. For installation under areas used for vehicular traffic, minimum cover must be 1.0 m.
 - b) minimum cover for rigid pipe must be 0.5 m. For installation under areas used for vehicular traffic, minimum cover must be 1.0 m.
- 4.13 Pipelines must be normally designed to follow a straight alignment and constant grade between manholes.
- 4.14 Any curve, whether horizontal or vertical, must be approved by the Municipal Engineer. Curves will only be acceptable under unusual topographical or subsoil conditions. In addition:
- a) The radius of a horizontal curve must be not less than 60 metres, or that radius recommended by the pipe manufacturer, whichever is greater.
 - b) A vertical curve must not be less than 30 metres in length. The curve must be designed so that the pipe deflection does not exceed the manufacturer's specifications.
 - c) Only one curve, either horizontal or vertical, may be permitted between manholes.
- 4.15 The maximum distance between sanitary sewer manholes is 125 metres.
- 4.16 Manholes must be provided at the following additional locations:
- a) at all changes of grade and/or alignment;
 - b) at all changes of pipe size;
 - c) at all pipe junctions other than service connections; and
 - d) where the service connection is the same size as the main.
- 4.17 Drop manholes may be allowed only where particular circumstances preclude the use of normal manholes. These must be constructed wherever the change in invert elevations through the manhole is greater than 0.60 m. Allowance must be made in the design for the effect of the resulting turbulence on the hydraulic capacity of the system.

- 4.18 The relative elevations entering and leaving a manhole are to be such as to ensure that the manhole does not reduce the hydraulic capacity of the system. In addition:
- a) Allowances for energy losses or changes in velocity are to be determined in accordance with sound hydraulic principles.
 - b) Junctions must require special treatment as must all situations involving a pipe flowing into a smaller pipe on a steeper grade.
- 4.19 Manholes are normally constructed in accordance with the details as shown on MMCD Drawing Numbers S1, S2, and S3. In cases where these details will not suffice, a detailed design drawing must be approved by the Municipal Engineer.
- 4.20 Cleanouts must be installed at the end of all sanitary sewer lines.

SCHEDULE B

SECTION W - STANDARDS FOR ELECTRICAL, TELEPHONE, STREET LIGHTING, AND OTHER SERVICES SUPPLIED THROUGH WIRES

W.1 GENERAL

- 1.1 Service Level 1 does not require underground wiring. Service Level 2 requires underground wiring and ornamental street lighting.
- 1.2 Every parcel must be provided with an adequate supply of electrical power, telephone communications, and television communications in accordance with the requirements of the appropriate utility company and the requirements of the regulatory bodies and approving agencies having jurisdiction.
- 1.3 Transformers must be located within the road right-of-way, in a location approved by the Municipal Engineer.
- 1.4 Where required by the Municipal Engineer, streetlights must be fitted with an appropriate baffle or shield to deflect light away from private residences without compromising the effectiveness of the light on roads and walkways.
- 1.5 Designs and plans must be approved by the Municipal Engineer prior to construction.

W.2 STANDARDS FOR ROAD LIGHTING FOR SERVICE LEVEL 1

- 2.1 Street lighting for Service Level 1 must be of the cobra-head style provided by B.C. Hydro and mounted on B.C. Hydro poles. They must be installed at only those locations approved by the Municipal Engineer.

W.3 STANDARDS FOR ROAD LIGHTING FOR SERVICE LEVEL 2

3.1 SCOPE

- 3.1 A system must be designed by a Professional Engineer with road lighting design experience and installed to provide lighting of a type and intensity as hereinafter specified, on all roadways.

3.2 BASIC DESIGN CRITERIA - LIGHTING LEVELS

3.2.1 All facilities must be designed and installed in accordance with good current Engineering Practice, and complying with the current B.C. Electrical Code. Not limiting the foregoing, the following basic design criteria must be used:

	Horizontal Average Luminance	Uniformity Avg./Min.	Average Illum.
a. Collector Road	10	3:1	N/A
Local Road	6	6:1	N/A
Commercial Road	10	3:1	N/A
b. Crosswalks At Intersections:			
Collector Road	45	3:1	11
Local Road	45	3:1	11
Commercial Road	45	3:1	11

3.2.2 The light levels specified are minimum for normal conditions. The consulting engineer must increase levels to suit conditions where visibility is restricted and must take into account trees and other objects that may reduce the effectiveness of the lighting scheme.

3.3 TYPE OF LIGHTING

3.3.1 Non-Ornamental Lighting

For Service Level 2 luminaries may be attached to power poles on roadways designated by the District of Sooke for overhead power lines, provided that davit arms of sufficient length are installed to bring the fixture to the edge of the travelled portion of the roadway.

3.3.2 Ornamental Lighting

Ornamental lighting must be provided on all roadways and walkways in Service Level 2. The type of standards, luminaries, lamps, underground wiring, etc., must be as hereinafter specified.

3.4 ROAD LIGHTING STANDARDS FOR ORNAMENTAL LIGHTING

3.4.1 All standards must be steel and of the type shown in the following table.

Application	Type	Minimum Mounting Height	Maximum Height
Collector	Post top	5.5 m	6.5 m
Local Road	Post top	5.5 m	6.5 m
Commercial	Post top	5.5 m	6.5 m

NOTE: All standards situated within 9 metres of the travelled portion of a roadway must be designed to shear under high impact.

3.4.2 All standards must have heavy dipped galvanized finish.

3.4.3 All standards must be certified for wind loadings suitable to the exposure of the location, but not less than 160 kmph.

3.5 LUMINARIES

3.5.1 Luminaries must be specially designed to accept the type and size of lamp proposed, and with a distribution pattern suited to the road width and location of the fixture. They must be equipped with a closed refractor.

3.5.2 Luminaries and all electrical components must be C.S.A. approved.

3.5.3 Road luminaries must be so placed and of distribution type to avoid excessive light pollution to residences. I.E.S. Type V distribution may only be used where no residences would be adversely affected.

3.5.4 Post top luminaries must be one-piece die cast aluminium with integral pole top adapter containing the ballast and photocell (where required) within the luminaire housing. The prismatic refractors must be polycarbonate. The refractor must be secured to the luminaire to totally seal the luminaire but allow movement if impacted. The luminaire must have captive hinged lid and the lid must be secured to the luminaire by metal rods, and not be supported by the refractor. Pre-approved luminaire is Crouse-Hinds PTA series.

3.5.5 Davit mounted road luminaries must be smooth cast aluminium housing with prismatic polycarbonate refractor and one piece die formed alzak finished aluminium reflector. Luminaire may be natural aluminium finish, and have hinged housing for access to lamp and ballast. The photocell

socket must have adjustable twist lock receptacle and be sealed when not used. The Crouse-Hinds OV series is pre-approved.

3.6 LAMPS

3.6.1 All lamps must be high pressure sodium, having a minimum rated life of 20,000 hours.

3.6.2 The lamp sizes must be 100, 150 or 250 watts and universal mounting.

3.7 BALLASTS

3.7.1 The ballasts must be 120 volt supply and have 55V lamp voltage for 100 and 150 watt size, 100V lamp voltage for 250 watt size.

3.7.2 The ballasts must be auto regulating type, with Class H insulation. The ballasts must have push on connectors to simplify maintenance.

3.8 CONTROLS

3.8.1 Photocell control may be used to operate luminaries without contactors, but the maximum current carried by the photocell contacts must not exceed 50% of the rated capacity.

3.8.2 Controls must be provided on all road lighting. Use service base for davit type installation. For pole top luminaries, the controls may be contained within the pole, except the main disconnect must be mounted externally and to the current Electrical Code.

3.8.3 Wiring from B.C. Hydro Service to main disconnects must be run in raceway internal to the pole. The raceway within the pole must be P.V.C. conduit or liquid tight flexible conduit.

3.8.4 Luminaries must be controlled in groups, with H.O.A. control for inspection installed in poles or service bases at each main service point.

3.8.5 The main disconnects must be secured to the pole with at least two 6.3 mm self-tapping screws. The main disconnects must be able to be locked off using a padlock. The main disconnects must be enclosed in a gasketed weatherproof enclosure (EEMAC4). Any exposed fastening must be the oval head tamperproof type.

3.8.6 Where less than 3 lights are involved in the system; where possible, the luminaries must be connected to an existing adjacent luminaire controlled by an existing controller. If this is not possible then the luminaries must have individual photo-electric controls.

3.9 UNDERGROUND WIRING

3.9.1 All ductwork and wiring must be in accordance with the requirements of the B.C. Electrical Code. Not limiting the foregoing, the following are the District of Sooke's minimum requirements:

- a) All underground wiring must be installed in P.V.C. conduits of a minimum of 25 mm in size.
- b) All wiring must be copper and insulation of RWU type.
- c) Utility warning tape 300 mm over all underground conduit runs.

3.10 CONCRETE BASES

3.10.1 Concrete bases must be provided for all ornamental light standards.

3.10.2 Bases must not protrude more than 150 mm above the finished grade of the adjacent ground, or less than 25 mm.

3.10.3 Bases must exceed the width of the luminaire base plate by a minimum of 25 mm at all points around the base.

3.10.4 Concrete bases and bolt must be adequate to withstand the earlier noted wind loads, being installed in the ground to a minimum depth of 1.5 metres.

SCHEDULE B

SECTION WA - STANDARDS FOR WATER SERVICE AND FIRE PROTECTION

WA.1 GENERAL

- 1.1 Service Level 1 requires that each lot must have an individual well, constructed on the lot, for which the requirements of this Section WA have been met. Service Level 2 requires that prior to subdivision approval, each parcel must be connected to a privately owned water utility, which has been granted a Certificate of Public Convenience and Necessity and met all requirements of the Comptroller of Water Rights and this Section WA. Service Level 3 requires that prior to subdivision approval, each lot must be connected to the Capital Regional District water distribution system.
- 1.2 Water systems serving two, three, or four lots are not permitted.

WA.2 INDIVIDUAL WELLS FOR SERVICE LEVEL 1

- 2.1 Individual groundwater wells are required to meet the following requirements:
 - a) A Professional Engineer or a Geoscientist who is a hydrogeologist experienced in groundwater must be responsible for the location, evaluation, design, and construction of the groundwater well. This professional is required to certify as to whether the groundwater wells constructed for the development or subdivision meet the bylaw requirements.
 - b) The Professional Engineer must prepare, seal and submit a hydro-geological evaluation report , which includes an assessment of the aquafer's vulnerability to contamination, on this groundwater system for providing drinking water for the development or subdivision. This report must include a to scale site plan showing the location of the well sites including any unsuccessful test wells. The report must discuss, as a minimum, the impact of the proposed development on this well and all others in the aquifer, the hydro geological setting of the well, aquifer boundaries, recharge conditions, well water quality now and in the future, and the possibility of well contamination. The report must include the results of all water quality and quantity testing undertaken as part of the testing program and the comments from other authorities reviewing the data.

- c) Wells must be located, constructed, tested and disinfected in accordance with the current provincial Regulations and codes of practise.
- d) The total dependable yield of the well must exceed 2500 litres per day. The groundwater source must be capable of sustaining this rate of flow continuously without utilizing more than 70% of the available draw down below the lowest seasonal static groundwater level. A well test must be carried out after the well is constructed to determine if the well is capable of meeting the design demand of 2500 litres per day per lot served. This test must involve continuous pumping at a constant discharge rate for a minimum of 10 hours and recovery level monitoring until the original groundwater level is achieved. In addition the well must be capable of providing a sustained yield of 9 litres per minute per lot served for a minimum of 2 hours.
- e) At least one sample of the pumped well water must be taken near the end of the well draw down test and sent to a laboratory for chemical analysis. These analyses must include but not be limited to all major ions, iron, manganese, and tests for other metals if suspected of being present in the aquifer. A sample for bacteriological analysis must also be taken after the well has been disinfected and the chlorine residual has been reduced to less than 2ppm. All samples must meet the requirements of the Medical Health Officer for the Vancouver Health Authority, the *Health Act* and the *Guidelines for Canadian Drinking Water Quality*. The laboratory must be accredited by the Standards Council of Canada to carry out the tests performed and reported on.

WA.3 WATER SUPPLY FOR FIREFIGHTING IN SERVICE LEVEL 1

- 3.1 This standard identifies the minimum requirements in Service Level 1 for the provision of a water supply by the applicant for fire fighting purposes.
- 3.2 All designs in this Section WA are to meet, as a minimum, the requirements of NFPA 299, *Protection of Life and Property from Wildfire*, 1991, NFPA 1141, *Fire Protection in Planned Building Groups*, 1990 and NFPA 1231, *Standard on Water Supplies for Suburban and Rural Fire Fighting*, 1993.
- 3.3 Water supply for fire fighting must come from a dry hydrant system, which may use cisterns. The details of this system are contained in Supplemental Detail Drawings FD-1, FD-1A, FD-2, FD-2A, and FD-3.
- 3.4 The location of these water supplies must be such that the average travel time to supply fire-fighting water to buildings located in the proposed development is 5 minutes.

- 3.5 An all weather access road suitable for fire fighting vehicles is to be provided, with any required rights of way, to all dry hydrants and cisterns in the system.
- 3.6 The establishment of a minimum water supply for fire fighting in each development area requires the approval of the Municipal Engineer prior to the design of the water supply system for fire fighting. The Approving Officer may refer any design submission to the Insurance Organization Inc. for their comments.
- 3.7 All designs require the approval of the Municipal Engineer prior to construction.

WA.4 COMMUNITY WATER SYSTEMS IN SERVICE LEVEL 2

- 4.1 Each parcel in a Service Level 2 subdivision or development must be serviced by a private community water system that meets the requirements of this Section WA.
- 4.2 If the source of supply for a Service Level 2 community water system, operated as a water utility, is groundwater, then the supply must meet all the requirements of subsection 2 of this Section WA except that the total developed dependable yield of the well must exceed 4,000 litres per day per parcel to be serviced in the subdivision.
- 4.3 The water system must provide each parcel with a water supply at the property line in sufficient pressure to meet the requirements of the *B.C. Building Code* and must be shown to have sufficient pressure to meet the requirements of the *B.C. Building Code* for water pressure at the faucet at the highest point at which a plumbing fixture could be installed on the parcel having regards to bylaws and covenants applicable to the parcel.
- 4.4 Each parcel in a subdivision which is zoned for commercial, industrial, or institutional use must be within 30 metres of a water main capable of supplying a minimum of 5000 litres per minute of water for four hours with a residual pressure of 138kPa.
- 4.5 The design of the water system must be as per the *Design Guidelines for Rural Residential Community Water Systems* as published by the Ministry of Environment, Lands and Parks in 1998 except that:
 - a) The design maximum day demand per residential parcel must be 5,300 litres;
 - b) All groundwater well sources must be developed in accordance with "Evaluating Long Term Well Capacity for a Certificate of Public Convenience and Necessity" as published by the Ministry of Environment in 1999;

- c) Water system storage capacity must include a minimum of 140,000 litres for fire fighting in addition to storage for emergency and balancing usage;
 - d) Standpipes are not allowed; and
 - e) Fire hydrants must meet the requirements of MMCD Specification 02666-2.6.
- 4.6 All water system design and construction must be provided according to the criteria, standards, specifications and requirements of this Bylaw and its Schedules and the *Master Municipal Construction Documents*. Should any conflict exist between these documents, this Bylaw and its Schedules shall take precedence over the *Master Municipal Construction Documents*.
- 4.7 Construction and operation of a community water system on District property and right of ways require permits and approvals from the District. These approvals must be obtained before any construction of the water system commences.

WA.5 WATER SYSTEM IN SERVICE LEVEL 3

- 5.1 Each parcel in a subdivision in service Level 3 must be serviced by a water supply provided by the Capital Regional District Water Department that meets the requirements of this Section WA.
- 5.2 Each lot in a residential subdivision which is provided with a water supply from the Capital Regional District Water Department must have sufficient pressure in the water supply at the property line to meet the requirements of the *BC Building Code* and must be shown to have sufficient pressure to meet the requirements of the *BC Building Code* for water pressure at the faucet at the highest point at which a plumbing fixture could be installed on the parcel having regard to the restrictions in the District Zoning Bylaw and in any Covenants registered on the property. A Professional Engineer must approve and certify the required pressures. If a residential fire sprinkler is required, the Professional Engineer must certify the fire flows.
- 5.3 The location of the fire-fighting platform for each lot must be within 150 metres, measured along the access route and along the highway to which the access route connects, of a fire hydrant capable of producing 3500 litres per minute of water for two hours with a residual pressure of 138 kiloPascals.
- 5.4 Each lot in a subdivision, which is zoned for commercial, industrial or institutional use must be within 30 metres of a water main capable of supplying a minimum of 5000 litres per minute of water for four hours with a residual pressure of 138 kPa.

- 5.5 Wherever possible and, in the opinion of the Municipal Engineer, practicable pipes supplying water to a subdivision or development must be free of dead ends or must be constructed to the property boundary of the subdivision or development so that future subdivision or development shown in the Official Community Plan for the District can provide for the continuation of these water supply lines to eliminate dead ends.
- 5.6.1 Where a water tower or reservoir is required to provide adequate supply to the subdivision or development, an independent review by an environmental and a geo-technical engineer is required. The location and access routes must be approved by the Municipal Engineer, adjacent municipalities, the Capital Regional District Water Department, the Capital Regional District Parks Department, the Ministry of Water, Lands, and Air Protection, and any other jurisdictions having authority. It must be demonstrated by the applicant that the proposed tower or reservoir will not interfere with the aesthetics of the existing and potential future development of the surrounding area.
- 5.6.2 Fire Hydrants on private property must have a right-of-way in favour of the District for maintenance, and must be installed and mounted by the Capital Regional District Water Department.

SCHEDULE B

SECTION WT - STANDARDS FOR WALKWAYS AND TRAILS

WT.1 GENERAL

- 1.1 Walkways and trails must be provided and constructed where, in the opinion of the Municipal Engineer, they are needed to provide pedestrian access to schools, parks, playgrounds, open spaces, recreational areas, transportation, trail systems, beaches, and other community facilities, or for proper circulation of pedestrian traffic.
- 1.2 Where a walkway or trail is to be constructed in its own right-of-way the minimum width of the right-of-way must be 4 metres .
- 1.3 Walkways must be located adjacent to property lines within the highway right-of-way except as provided in item 1.4 below.
- 1.4 Walkways and trails must meander where possible to avoid trees and natural features.
- 1.5 The grades of walkways and trails may vary where appropriate to provide improved connectivity with other walkways, parks, and trail systems.
- 1.6 Gravel shoulders are not permitted. The natural native landscaping must be reinstated to the edge of the walkway, trail or landscaped area within the right-of-way.
- 1.7 Service Level 2 trails and walkways must be asphalt or concrete surfaced. Service Level 1 walkways and trails must be surfaced as per the direction of the Municipal Engineer.

WT.2 OFF ROAD TRAIL STANDARDS

- 2.1 Off road trails must be constructed by the applicant by way of a statutory right-of-way provided by the applicant to the District.
- 2.2 The entrance to parks or designated trail systems must be identified with the appropriate Trail Marker and signage as approved by the Municipal Engineer.
- 2.3 Off road trails must be constructed to the following requirements:
 - a) travelled trail width must be a minimum of 1.5 metres;

- b) vegetation 0.5 metres on either side of the traveled trail must be cleared of all overhanging limbs, all bush, and all brush to a height of 3.0 metres above the travelled trail;
- c) unless otherwise directed by the Municipal Engineer, the travelled trail surface must be constructed of compacted native soils with clean crushed gravel surfacing in the wet areas;
- d) Hand constructed drainage works must be provided by the applicant along the trail as directed by the Municipal Engineer; and
- e) The maximum sustained trail grade must be 10%. Grades of up to 15% maximum will be permitted in sections less than 100 metres long provided that they constitute in total less than 20% of the trails provided by the applicant.

WT.3 ROADSIDE TRAIL (WALKWAY) STANDARDS

- 3.1 Walkways must be constructed by the applicant in road right-of-ways.
- 3.2 The entrance to parks or designated trail systems must be identified with the appropriate Trail Marker and signage as approved by the Municipal Engineer.
- 3.3 Walkways must be constructed to the following requirements:
 - a) travelled walkway width must be 1.5 metres;
 - b) vegetation 0.5 metres on either side of the traveled walkway must be cleared of all overhanging limbs, all bush, and all brush to a height of 3.0 metres above the travelled walkway;
 - c) unless otherwise directed by the Municipal Engineer, the travelled walkway surface must be constructed of compacted native soils with clean crushed gravel surfacing in the wet areas;
 - d) hand constructed drainage works must be provided by the applicant along the walkway as directed by the Municipal Engineer; and
 - e) the maximum sustained walkway grade must be 8%. Grades of up to 10% maximum may be permitted in sections less than 100 metres long provided that they constitute in total less than 20% of the trails and walkways provided by the applicant.

SCHEDULE B

SECTION T – STANDARDS FOR STREET TREES

(Bylaw No. 160 March 8, 2004)

T.1 GENERAL

- 1.2 Street trees must be planted for all new roads, extensions of an existing road, and in the frontage of any property of an existing road as a condition of subdivision approval or building permit within those areas designated as urban area and suburban area in Schedule A to this Bylaw.

T.2 DESIGN

- 2.1 A landscape plan must be prepared by a landscape professional and submitted to the District of Sooke for approval.

- 2.2 The Tree Planting Plan:

The Tree Planting Plan must be approved by the District of Sooke prior to planting. The tree planting plan must include:

- a) tree species list with botanical and common names;
- b) size, quantity of trees and spacing of trees;
- c) location of trees, utilities and sight-lines;
- d) protection buffer for existing trees; and
- e) staking and guying techniques.

- 2.3 Uniformity:

Each road section separated by intersection streets must be planted with the same species. Wider boulevards may include other species positioned away from main road section plantings.

- 2.4 Type:

The applicant must select street trees in accordance with Appendix 1.

- 2.5 Size:

The minimum tree sizes accepted by the District of Sooke are as follows:

Road Type	Deciduous Calliper Size/Height	Coniferous Trees Calliper Size/Height
Collector Roads	8 cm (4.5 to 5.8 m)	8 cm (4.0 to 4.25 m)
Major Local Roads	7 cm (4.25 to 5.5 m)	7 cm (3.0 to 3.25 m)
Local Roads	5 cm (3.0 to 4.25 m)	5 cm (2.0 to 2.25 m)

2.6 Spacing:

Street trees must be planted no more than 15 m apart on each side of the highway.

T.3 INSTALLATION

3.10 Street trees must be planted for the appropriate planting situation in accordance with detail drawings as follows:

<u>Street Tree</u>	<u>Drawing</u>
Coniferous Species	STPD 1
Deciduous Species	STPD 2
Planting Detail in Structural Soil	STPD 3

T.4 GUARANTEE OF INSTALLATION

4.1 Security in the amount of 10% of the estimated cost of works and services associated with street trees must be held for one year after the works and services related to the street trees in the development have been approved by the District of Sooke to be used for the replacement of trees.

APPENDIX 1 LIST OF SUITABLE STREET TREES						
Species (Deciduous)	Common name	Foliage /Bark	Flower	Fruit	Fall colour	Other Attributes
Small tree species						
Acer davidii	Snake bark maple	B			X	
Cornus kousa	Korean dogwood	F	X			Disease resistant
Crataegus x lavalleyi	Carriere Hawthorn	F		X		Pest resistant
Parrotia persica (standard form)	Ironwood tree	F			X	Good form
Prunus serrulata 'Kwanzan'	Ornamental fl cherry	F	X		X	
Medium tree species						
Betula jacquemontii	Jacquemont Birch	B	catkins		X	Good form
Betula papyrifera	Paperbark birch	B	catkins		X	Good form
Betula nigra 'Cully'	River birch	B	catkins		X	Pest resistant
Carpinus betula *	Hornbeam	F			X	Good form
Cercidiphyllum japonicum	Katsura tree	F			X	Scented leaves in Fall
Gleditsia triacanthos var. inermis *	Thornless honeylocust	F				Good form
Sorbus aucuparia (Cultivars)	Mountain ash	F	X	X	X	
Large tree species						
Acer platanoides *	Norway maple	F			X	Good form
Acer rubrum	Red maple	F			X	Pyramidal form
Fraxinus oxycarpa 'Raywood'	Ash	F				
Liquidamber styraciflua	American sweetgum	F			X	
Liriodendron tulipifera	Tulip tree	F	X		X	Good form
Platanus x acerifolia *	London plane tree	B		X		
Quercus pallustris	Pin oak	F			X	
Tilia x euchlora *	Lime / linden	F			X	Pest resistant
Species (Evergreen Conifers)						
Cryptomeria japonica 'Elegans'	Incense cedar	F			X	Good form
Picea omorika	Serbian spruce	F				Columnar form
Pinus nigra	Austrian Pine	F				Good form
Pseudotsuga menzeisii	Douglas fir	F				Good form
Thuja plicata	Western red cedar	F				Good form
Tsuga heterophylla	Western hemlock	F				Good form

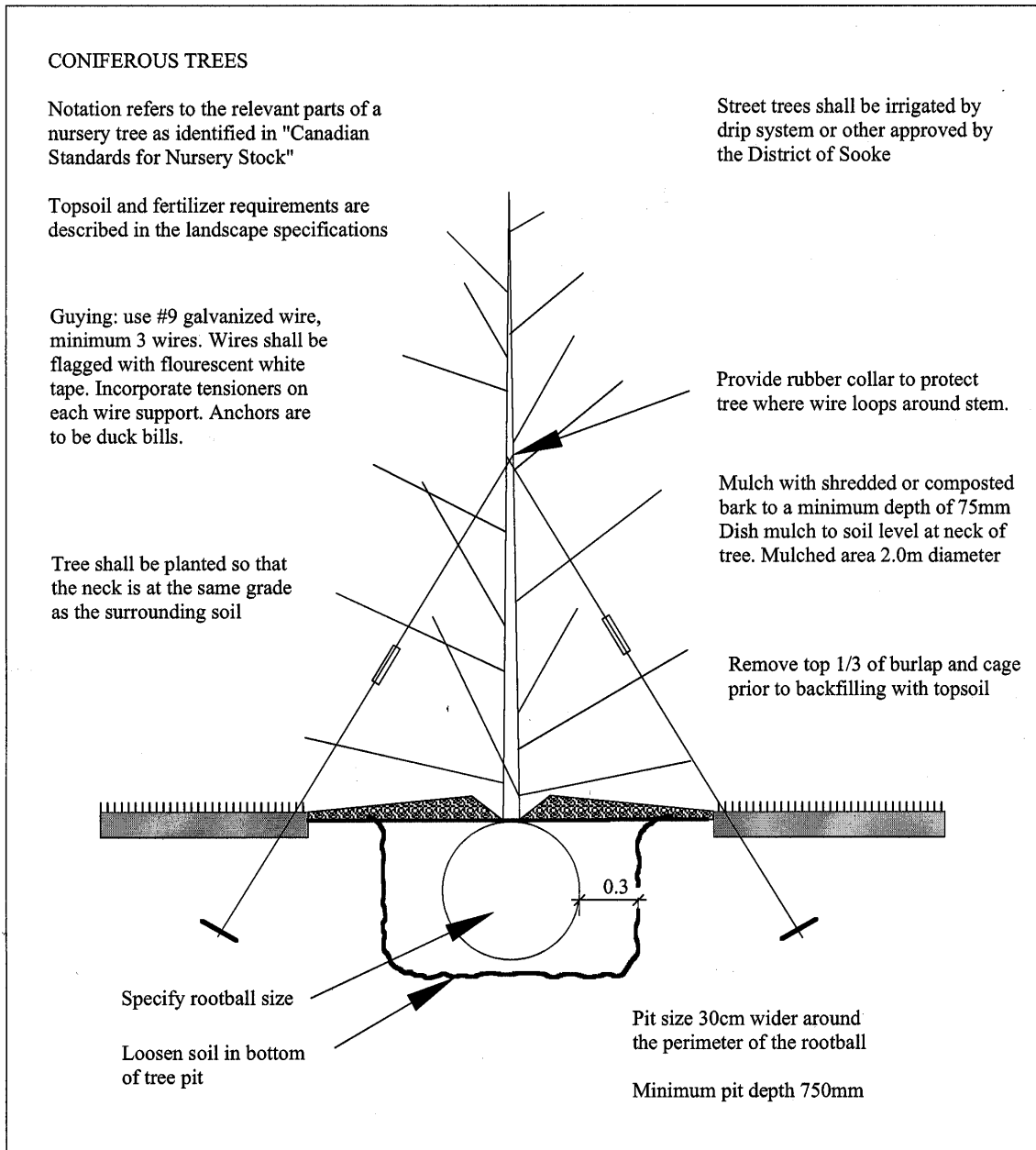
* Suitable for planting into Structural Soil tree pits

LIST OF SUITABLE STREET TREES – Columnar Trees Suitable for Medians and Narrow Streets

Species	Common name	Foliage /Bark	Flower	Fruit	Fall colour	Other Attributes
Acer rubrum 'Bowhall' *	Fastigate red maple	F			X	Good form
Acer platanoides 'Columnar' *	Columnar Norway maple	F			X	Good form
Fagus sylvatica fastigiata ('Dawyek') *	Fastigate beech	F			X	Good form
Quercus robur 'Fastigiata' *	Fastigate oak	F				Good form
Pyrus calleryana 'Chanticleer' *	Columnar pear	F	X		X	Good form

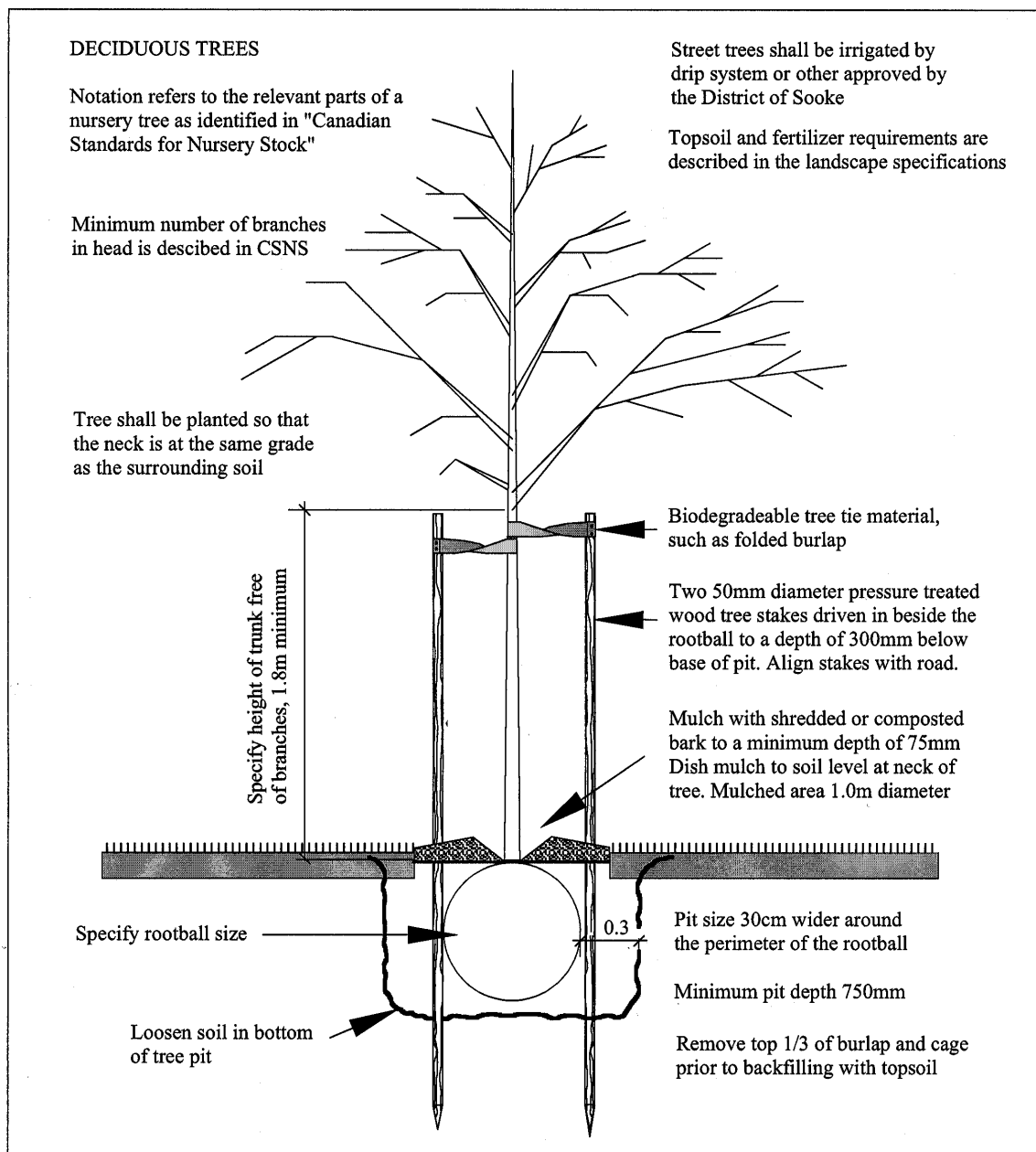
* Suitable for planting into Structural Soil tree pits

DRAWING STPD 1



TITLE: STREET TREE PLANTING DETAIL (coniferous species)	DATE:	DRAWN: AJS	DWG No.
	SCALE: NTS	APPROVED:	

DRAWING STPD 2



TITLE: STREET TREE PLANTING DETAIL (deciduous species)	DATE:	DRAWN: AJS	DWG No.
	SCALE: NTS	APPROVED:	

DRAWING STPD 3

