**COWICHAN VALLEY REGIONAL DISTRICT**
**SUBDIVISION BY-LAW No. 1215, 1989, 4072**

**WHEREAS** the *Local Government Act*, hereafter referred to as the "*Act*" empowers the Regional Board to adopt and amend subdivision servicing bylaws;

**AND WHEREAS** Section 506 of the *Act* empowers the Regional Board to establish requirements for the provision of works and services in respect of the subdivision of land;

**AND WHEREAS** the Regional District has adopted a Subdivision Servicing Bylaw for the nine Electoral Areas, that being Subdivision Servicing Bylaw No. 1215;

**AND WHEREAS** the Regional Board voted on and received the required majority vote of those present and eligible to vote at the meeting at which the vote is taken, as required by the *Act*;

**AND WHEREAS** after the close of the public hearing, the Regional Board considers it advisable to amend Subdivision Servicing Bylaw No. 1215;

**NOW THEREFORE** the Board of Directors of the Cowichan Valley Regional District, in open meeting assembled, enacts as follows:

~~WHEREAS, pursuant to Section 989 of the Municipal Act, the Regional Board may adopt by-laws to regulate provision of services for the subdivision of land within the Cowichan Valley Regional District.~~

~~AND WHEREAS, pursuant to Section 817.1 of the Municipal Act, notice was published in the "Citizen" on October 22, 1989, October 25, 1989, and October 29, 1989, setting forth the general terms and intent of the bylaw and the place where and times and dates when copies of the bylaw may be inspected.~~

~~The Regional Board of the Regional District of Cowichan Valley, in open meeting assembled enacts as follows:~~

1.0 TITLE

1.1 This bylaw shall be cited for all purposes as **"CVRD Bylaw No. 4072, Subdivision Servicing Amendment Bylaw (Proof of Water), 2016".**

~~This by-law may be cited as the "Cowichan Valley Regional District Subdivision Bylaw, 1989", and further referred to as "this by-law".~~

2.0 APPLICATION

2.1 This by-law shall apply to all lands within Electoral Area A, B, C, D, E, F, G, H and I of the Cowichan Valley Regional District, being those lands as described in the Supplementary Letters Patent of the C.V.R.D.

3.0 PURPOSE

3.1 The purpose of this by-law is to establish procedures for the approval of subdivisions, and to establish standards for works and services that are required in respect of the subdivision of land.

~~The purpose of this by-law is to assist in assuring the safe, healthful, equitable, efficient, economical, and attractive subdivision of land for the benefit of the community as a whole.~~

4.0 SEVERABILITY ~~INTERPRETATION~~

4.1 Severability- if any section, subsection, clause, or phrase of this by-law is any reason held to be invalid by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this by-law.

5.0 In this by-law, unless the context otherwise requires,

"applicant" means an owner who is applying for subdivision approval under this bylaw, and includes an authorized agent acting on the owner's behalf;

"approval" means approval in writing from authority having jurisdiction;

"Approving Officer" means Approving Officer designated as such pursuant to the Land Title Act;

"community sewer system" means a system of sewerage works or sewage collection, treatment and disposal which is owned, operated and maintained by the Cowichan Valley Regional District, or a municipality incorporated under the *Local Government Act*;

~~"community sewer system" means a system of laterals, collectors, mains, trunks, and appurtenant works, including treatment and disposal facilities approved by the Waste Management Program, Ministry of Environment and the Ministry of Health of the Province of B.C, and provides a connection for each site or parcel of land within the boundaries of the system.~~

"community water system" means a system of waterworks where the water supplied meets or exceeds the standards for potability under the *Drinking Water Protection Act* and which is owned, operated and maintained by:

(a) the Regional District;

(b) a municipality;

(c) a water utility; or

(d) a strata corporation, in the case of a bare land strata subdivision under the Bare Land Strata Regulations, B.C. Reg. 75/78, as amended or replaced from time to time.

~~"community water system" means a system of waterworks which serves five connections or more and which is owner, operated, and maintained by an improvement district under the Water Act of the Municipal Act, or a Regional District, or which is regulated under the Public Utilities Act or Health Act.~~

"cul-de-sac" means a length of local highway made for vehicular use, the end of which is designed to be permanently closed by the pattern of subdivision, or which is terminated by a natural feature such as inaccessible terrain, so that there is no alternative vehicular route to another highway;

~~"developer" means the owner or the authorized agent of the owner;~~

"drainage collection system" means a system of natural and man-made elements used to contain, convey, absorb, and store storm water;

"Electoral Areas" means Electoral Areas A, B, C, D, E, F, G, H and I of the Cowichan Valley Regional District;

"frontage" means that length of parcel boundary with immediately adjoins a highway other than a lane or a walkway;

"highway" includes a street, road, lane, bridge, viaduct, and any other open to the use of the public, but does not include a private right-of-way on private property;

"improvement district" means an improvement district as defined under the *Local Government Act*;

~~"improvement district" means an improvement district in pursuant to the Water Act or the Municipal Act;~~

"lane" means a highway which provides a second access to a parcel and is less than 11.1 metres wide;

~~"Medical Health Officer" means the Medical Health Officer appointed under the Health Act who has jurisdiction over the area in which a subdivision is located;~~

~~"natural boundary" means the visible high-water mark of any lake, river, stream, or other body of water where the presence and action of the water are so common and usual , and so long continued in all ordinary years, as to mark upon the soil of the bed of the lake, river, stream or other body of water a character distinct from that of the banks thereof, in respect to vegetation, as well as in respect to the nature of the soil itself;~~

"owner" means a person registered in the records of the Land Title Office as owner of land;

~~"owner" means a person registered in the books of the Land Titles Office as owner of land.~~

"parcel" means any lot, block, or any other area in which land is held or into which land is subdivided or any remaining portion of the land being subdivided;

"potable water" means water that meets or exceeds the standards of potability for domestic water systems under the *Drinking Water Protection Act* and the regulations made under that Act;

~~"potable water" means water which is approved for drinking purposes in accordance with the Health Act;~~

"professional engineer" means a person who is registered or duly licensed as such under the provisions of the Engineering Profession Act of British Columbia;

"Regional District" means the Cowichan Valley Regional District;

~~"regulations governing sewage disposal means those regulations contained in B.C. Regs 577/75 and amendments thereto~~;

"Registered Well Installer" means a Well Installer listed on the Register of Qualified Well Installers in the Province of British Columbia, pursuant to the *Water Sustainability Act* and *Groundwater Protection Regulation*.

"Registered Well Pump Installer" means Well Pump Installer listed on the Register of Qualified Well Pump Installers in the Province of British Columbia, pursuant to the *Water Sustainability Act* and *Groundwater Protection Regulation*.

~~"serves" means actually services or a commitment by the owner to provide the community water system or the community sewer system in order to serve any parcel and which commitment is a condition of approval;~~

~~"slip" means the downward and outward movement of slope-forming materials composed of natural rock, soils, artificial fills, or combinations of these materials which movement many proceed by any one of three principle types of movement – failing, sliding, or flowing – or by their combinations.~~

"strata corporation" means a corporation established under the *Strata Property Act*;

~~"subdivider" means the owner or the authorized agent of the owner;~~

"subdivision" means the division of land into two or more parcels, whether by plan, strata title, or by metes and bounds description or otherwise, except that the words "subdivision plan" shall also be deemed to include a plan consolidating two or more parcels into a single parcel, or a boundary adjustment between two or more parcels;

"subdivision plan" includes a plan consolidating two or more parcels into a single parcel, or making a boundary adjustment between two or more parcels;

"walkway" means a narrow highway for the use of the walking public only;

"watercourse" is any natural or man-made depression with well-defined banks and a bed of 0.6 metres or more below the surrounding land serving to give direction to a current of water at least six months of the year or having a drainage area of two (2) square kilometers or more, or as required by a designated official of the Ministry of Environment of the Province of British Columbia.

~~"zone" means a zone established under the Zoning Division of the Municipal Act.~~

## 6~~5~~.0 AUTHORITY – APPROVING OFFICER

6.1 Subject to the exceptions under section 91(2) of the *Land Title Act*, no land within the electoral areas may be subdivided until the subdivision has received the approval of the Approving Officer.

~~a) No land within the electoral areas of the Regional District shall be subdivided until the subdivision has received the approval of the Approving Officer;~~

6.2 In addition to complying with the requirements of this bylaw, an applicant for subdivision approval must comply with the application procedures and must meet all other subdivision requirements that are established by the Ministry of Transportation and Infrastructure from time to time.

~~b) The approval procedure and all other subdivision requirements shall be those as enforced by the Ministry of Transportation and Highways, unless otherwise stated in this By-law.~~

## ~~5.1 APPLICATION~~7.0 APPLICATION FOR SUBDIVISION

7.1 Applications for subdivision shall be submitted to the Approving Officer at the appropriate District Office of the Provincial Ministry of Transportation and Infrastructure.

7.2 Following receipt of one copy of the proposed subdivision plan together with all supporting documentation from the Approving Officer, the Regional District shall advise the Approving Officer, in writing, as to any Regional District requirements or regulations that apply to the proposed subdivision.

a) Applications for subdivision shall be submitted to the appropriate District Office of the Provincial Ministry of Transportation and Infrastructure;

b) The Ministry of Transportation and Infrastructure shall forward one copy of the proposed subdivision together with all supporting documentation to the Regional District;

c) The Regional District shall advise the Ministry of Transportation and Infrastructure, in writing, as to any requirements for the subdivision.

d) Where an application for a subdivision has been submitted to the Ministry of Transportation and Infrastructure in a form satisfactory to the Approving Officer and the Regional District adopts a bylaw that would otherwise be applicable to that subdivision, then the bylaw has no effect with respect to the subdivision for a period of 12 months after the bylaw is adopted unless the applicant agrees in writing that it should have effect.

6.0 ~~SEVERABILITY~~

6.1 ~~Severability- if any section, subsection, clause, or phrase of this by-law is any reason held to be invalid by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this by-law~~.

~~8~~7.0 FEE FOR APPLICATION

8.1 Prior to the Regional District deeming subdivision conditions met, the applicant must pay all subdivision fees payable to the Regional District, as prescribed under the Cowichan Valley Regional District Development Application Procedures and Fees Bylaw No. 3275, as amended or replaced from time to time.

~~Each subdivision application shall be accompanied by an application fee, payable to the Regional District, of twenty-fie dollars ($25.00) for the first parcel to be created by the proposed subdivision, in addition to any fees required pursuant to Section 83 of the Land Title Act, to be paid to the Regional District prior to final approval by the Approving Officer.~~

~~8.0 SERVICES – WATER SUPPLY~~

## 9.0 SERVICES – WATER SUPPLY

9.1 An applicant seeking subdivision approval must demonstrate that each new parcel within the proposed subdivision has a supply of potable water in accordance with the requirements of this Bylaw.

9.2 The requirement under section 9.1 does not apply to a subdivision application that is limited to boundary adjustments between two or more parcels, where proof of potable water has already been provided for each parcel, and where an occupied dwelling exists on each affected parcel.

## 10.0 COMMUNITY WATER SYSTEMS

10.1 If an applicant intends to connect the lots to be created by subdivision to an existing community water system, the applicant must provide evidence satisfactory to the Regional District, prior to subdivision approval, that the owner and operator of the community water system accepts the new lots into its service area and has agreed to provide potable water to the lots.

10.2 Where the owner wishes to connect the lots to be created by subdivision to a community water system that is owned and operated by the Regional District, the regulations in sections 10.3 to 10.7 apply.

### 10.3 Design

The design of each portion of the water distribution system within the lands being subdivided, and all works providing a connection to a Regional District water main, must conform to the MMCD Standards applicable to potable water services.

### 10.4 Approval

All plans and specifications for a water distribution system that is to be constructed within the subdivision, and for the works that will connect that water distribution system to a Regional District water main, must be submitted to the Regional District Engineering Services Department for approval, before the applicant:

(a) undertakes any construction or installation of the water distribution system;

(b) establishes any service line connections to any new lot the parcel to be subdivided;

(c) constructs any works for the purpose of establishing a connection to a Regional District water main.

10.5 Surface Water Source

Where a surface supply of water is to be the source of domestic water for a community water service operated by the Regional District, the applicant must transfer its water license to the Regional District prior to the final approval of the subdivision.

10.6 Ground Water Source

Where a ground supply of water is to be the source of domestic water for a community water service, the applicant must provide a 72 hour pump test result from the well to be used for that purpose which indicates that there is a minimum per minute yield of 1.2 US gallons based on tests done between June 1st and November 1st (summer testing) and 2.4 US gallons based on tests done between November 2nd and May 31st (winter testing).

10.7 Water Quality Testing

For any proposed source of water for a community water system, samples of the water shall be tested in a laboratory for all potential contaminants that would otherwise render the water incapable of meeting the standards for potable water under the *Drinking Water Protection Act*. The test results shall be submitted to the Regional District and indicate clearly whether or not the results meet the requirements of the *Drinking Water Protection Act*. In the event that treatment is required to meet this standard, provision of a treatment system to the satisfaction of the CVRD Engineering Services Department shall be a precondition of acceptance of the source of water, and shall be provided prior to subdivision approval.

11.0 PRIVATE WATER SOURCES

11.1 Where a water source other than a community water system is proposed as the source of domestic water to parcels within a subdivision, each parcel must have its own source of potable water in accordance with the regulations in sections 11.2 to 11.5.

11.2 Surface Water Source

All components, including the intake, for a private water system using surface water sources must be located on the same Parcel as the residential Dwelling Unit in respect of which they are required.

11.3 Ground Water Source

Where a ground supply of water is to be the source of domestic water for a parcel or parcels to be subdivided, a well shall be drilled on each parcel by a registered Well Installer or registered Well Pump Installer. Prior to subdivision approval, a Well Construction Report shall be submitted to the Regional District that

indicates that there is a sufficient supply of potable water that has the flow capacity required under section 11.4 for each parcel to be created.

11.4 Required Volume

For each well that has been drilled under section 11.3, the results of the pump test must indicate a minimum per minute yield of 1.2 US gallons based on tests done between June 1st and November 1st (summer testing) and 2.4 US gallons based on tests done between November 2nd and May 31st (winter testing).

11.5 Water Quality Testing

Every separate source of water proposed for a subdivision shall be tested in a laboratory for potential contaminants that would otherwise render the water incapable of meeting the standards of potability that apply to domestic water systems that are regulated under the *Drinking Water Protection Act*. The test results shall be submitted to the Regional District and indicate clearly whether or not the results meet the regulations applying to domestic water systems under the *Drinking Water Protection Act*. In the event that treatment is required to meet this standard, provision of a treatment system shall be a requirement of the subdivision approval. Where a treatment system cannot be installed on a proposed parcel until a building or structure is built, the applicant shall register a covenant on the parcel(s) whose water supply will require treatment, under which occupancy and use of any building constructed will not be permitted until such time as the treatment system has been installed and is in satisfactory operating condition.

12.0 SHARED WATER SOURCES

12.1 Other than a community water system, no parcel proposed to be created by subdivision shall share a source of potable water with another parcel through any kind of

distribution system, whether the source is surface water or ground water.

8.1 The design of any community water system or part thereof provided within the subdivision to service the subdivision or to connect the water distribution system within the subdivision to a Regional District trunk water main shall, if constructed after the enactment of this bylaw be submitted and approved in accordance with the standards and specifications set out in Schedule "A", which is attached to and forms part of this bylaw.

8.2 Where a community water system is to be installed in a subdivision there shall be a supply of potable water, equal to not less than 3650 litres (800 imperial gallons) per day to be created.

8.3 Every proposed subdivision which is not served by a community water system shall establish that each parcel in the proposed subdivision has proven source of potable water and that the water quality consistently meets the conditions of the British Columbia Drinking Water Quality Standards.

For the purpose of satisfying the provisions of this section, proof of water shall mean of the following:

(a) Surface Water Supplies

Where a surface supply of water is to be the source of domestic water for a parcel of land, the subdivider shall provide evidence of a valid domestic water license prior to subdivision approval or written assurance from the comptroller of Water Rights that a domestic water license shall be issued prior to registration of the plan of subdivision.

(b) Groundwater Supplies

Where groundwater is proposed as a source of domestic water within a proposed subdivision, the subdivider shall provide:

i) a well on each new parcel, capable of producing a minimum per minute yield of 4.5 litres (1 imperial gallon) based on tests done between June 1st and November 1st (summer testing) and 9 litres (2 imperial gallons) based on tests done between November 2nd and May 31st (winter testing).

OR

ii) a well on each new parcel capable of producing a minimum daily yield of 2273 litres (500 imperial gallons) and a letter from a certified well driller or professional engineer with groundwater assessment experience stating the well is adequate for domestic use.

OR

iii) a groundwater capability report, prepared by a professional engineer with groundwater assessment experience, which provides reasonable assurance that all parcels in the subdivision will be capable of supporting wells capable of producing the minimum water yields required in 8.3 (b)(i) above.

(c) Testing

All testing and reports relating to groundwater supply shall be submitted to the Cowichan Valley Regional District for review and approval prior to subdivision approval.

(d) Shared Groundwater Sources

four or less parcels may jointly utilize one groundwater source provided that:

i) the well is established prior to subdivision approval and is capable of producing the yield as required in Section 8.3(b) or (ii) for each parcel being served, and;
ii) all parcels served by the shared well are provided with full and equal legal access to the water supply as guaranteed by an easement agreement which shall be registered by the owner in the Land Titles Office prior to, or concurrent with the registration of the plan of subdivision. The easement agreement shall accurately indicate the location and width of all easements required for water lines and/or service access to the well site.

8.4 the standards and specifications set out in Schedule 'A" do not apply to community water systems, operated, and maintained by an Improvement District.

## 13.0 SERVICES – SEWAGE DISPOSAL

### 13.1 Community Sewer System

Where a parcel proposed to be created by subdivision is within an area served by a community sewer system, or requires community sewer service in order to meet minimum parcel size requirements specified in a zoning bylaw, the costs of connecting to the community sewer system shall be borne by the applicant, and the specifications shall be submitted to CVRD Engineering Services Department for approval, using the MMCD Standards as the standards and specifications.

13.2 Drawings

(a) General: Drawings must be clear and legible and drawn to a scale which will permit all necessary information to be plainly shown. The maximum size shall be 75 cm by 100 cm over all. Without limiting the generality of the foregoing the preferred scales are as follows:

Key Plans 1:5,000
Plan Views: 1:500
Profiles: 1:50 (vertical)

(b) Where the topography is such that the above scales are inappropriate other scales of the same ratio may be used.

(c) Drawings must show the name of the project, scale in meters, north point, engineer's name and designation, the engineer's signature, and imprint of his or her registration seal.

(d) The drawings must include such plan views elevations sections and supplementary views which taken together with any specifications provide adequate working information for the construction of the works.

(e) Three copies of each design drawing are to be submitted to the Operations Manager for approval prior to construction. One set will be returned with the approval documents.

13.3 Revisions to Approved Plans:

Application for revision to approved plans during construction shall be submitted in sufficient time for decision to be made. Minor changes not affecting capacities flows or operation will be permitted during construction without approval provided that notification is made at the earliest opportunity to the Operations Manager.

13.4 “As Constructed” Plans:

Within sixty days of the completion of a project, plans showing the works as installed shall be submitted to the Cowichan valley Regional District. The plans, in conformity with requirements for design drawings, shall consists of one set of mylar copies and one set of paper prints all marked “as constructed.” Service connection cards will be provided by Cowichan Valley Regional District for completion by the Developer’s engineer.

13.5 Operation and Maintenance

(a) General: The Developer shall maintain the works for a period of one year from the date of completion of the system established by the Operations Manager. This maintenance shall relate to all matters affecting the installation of the works. Should the works include lift stations, the day to day running and payment of energy accounts will be undertaken by the Cowichan Valley Regional District from the time of acceptance by the Operations Manager.

(b) Manhole Keys: One set of manhole keys shall be provided to the Cowichan Valley Regional District to fit the style of manhole cover utilized on the project.

(c) Final Acceptance: Upon the expiration of the one year maintenance period referred to in section 13.5(a) of this specification a final inspection shall be made by the Operations Manager. Any deficiencies noted at that inspection shall be rectified within thirty days. Following completion of any rectification works the system shall be certified as maintainable at public expense by the Operations Manager.

13.6 Private Sewage System

(a) Where a parcel proposed to be created by subdivision is not within an area served by a Regional District community sewer system, and does not require connection to a community sewer service in order to meet minimum parcel sizes specified in a zoning bylaw, each parcel must be serviced by a sewage treatment and disposal system that is designed, built and operated in accordance with the *Sewerage System Regulation* under the *Public Health Act*.

14.0 SERVICES – DRAINAGE

14.1 Each parcel of land created by subdivision must be serviced by a drainage collection and disposal system that is designed and constructed in accordance with the standards of the MMCD.

14.2 In determining whether the design of any drainage collection and disposal system for a proposed subdivision is adequate to provide satisfactory drainage, the Regional District may require:

a) an engineering study (sealed by a professional engineer) to determine:

i) the drainage characteristics of the site;

ii) the drainage characteristics on-site retention/storage; overland flow; channel capacity and volume/storage; and storage retention and routing;

iii) design options including on-site retention/storage; overland flow; channel capacity and volume/storage; and storage retention and routing;

iv) impact of eventual discharge of the water from the subdivision;

v) environmental and physical impacts;

b) on-site retention and storage facilities;

c) the channel capacity of the system given the volume and storage capacity.

14.3 The applicant must provide a copy of the approved plans for design of the drainage collection system, as approved, by the Regional District, to the Approving Officer.

~~8.5 SERVICES – SEWAGE DISPOSAL~~

~~a) Where a parcel created in a proposed subdivision is not served by a community sewer system, a copy of the percolation test results as carried out on the said parcel, in accordance with established criteria pursuant to the Health Act, shall be submitted to the Approving Officer.~~

b) Where there is to be no community sewer system installed in the subdivision, all sewage effluent shall be disposed of in accordance with the Health Branch or Waste Management requirements.

c) Any community sewer system or part thereof provided within the subdivision to service the subdivision or to connect the sewage collection system with the subdivision to a Regional District trunk sewage main shall, if constructed after the enactment of this bylaw, be constructed an installed at the expense of the owner of the land being subdivided or in accordance with the provisions of a specified area bylaw, and shall be carried out in accordance with the standards and specifications et out in Schedule "B",which is attached to and forms part of this bylaw.

8.6 SERVICES – DRAINAGE

8.7 In determining whether the design of any drainage collection system for a proposed subdivision is adequate to provide satisfactory drainage, the Approving Officer may require:

a) an engineering study (sealed by a professional engineer) to determine:

the drainage characteristics of the site;

the drainage characteristics on-site retention/storage; overland flow; channel capacity and volume/storage; and storage retention and routing;

design options including on-site retention/storage; overland flow; channel capacity and volume/storage; and storage retention and routing;

Impact of eventual discharge of the water from the subdivision;

Environmental and physical impacts;

b) on-site retention and storage facilities;

~~c) the channel capacity of the system given the volume and storage capacity.~~

~~8.8 A copy of the drainage collection systems, as approved, shall be deposited with the Approving Officer.~~

## ~~9~~15.0 HIGHWAYS

~~9~~15.1 The minimum width of any highway in any proposed subdivision shall be 20 metres, except:

a) where the Approving Officer deems a lesser minimum width better suited to use or to local conditions; or

b) where a highway is a frontage road, then it shall have a minimum width of 15.0 metres, unless the Approving Officer deems a lesser or greater minimum width better suited to use or to local conditions; or

c) where a highway is a lane, then it shall have a minimum width of 6.0 metres; or

d) where in the opinion of the Approving Officer and soil conditions are such that a roadway having a width of 7.3 metres plus the width required to maintain any fill material or any cut material at the natural angle of repose of that material; plus

e) the additional width required for any drainage facilities including ditches needed to drain the highway; plus

f) any further width required for the physical protection of the highway by construction of fences, barricades, or walls that cannot be contained within a 20 metres right-of-way then the minimum width shall be of sufficient land to support, drain, and protect such roadway as described above;

g) where additional rights-of-way are required to protect a major road network or controlled access highway.

~~9~~15.2 Vehicular access shall be provided by the owner prior to subdivision approval from the travelled portion of the highway onto any parcel where required by the

Regional District or the Approving Officer of the Ministry of Transportation and Infrastructure.

~~9~~15.3 Lanes shall be provided by the owner prior to subdivision approval where terrain and natural features render vehicular access practicable and where:

(a) they form an extension of any existing system of lanes; or

(b) the Approving Officer deems it necessary to provide secondary access in order that reasonable traffic flow can be assured on the main highway.

~~9~~15.4 In cases where a parcel is adjacent to a controlled access highway, a highway, other than the controlled access highway shall be provided to provide access to all parcels prior to subdivision approval.

15.5 As a condition of subdivision, the provision of public highway access to all parcels created (including the remainder of the parent parcel) shall be required.

~~9~~15.6 Where any subdivision contains parcels less than 90 metres in width intersecting highways shall be dedicated at intervals not greater than 400 metres and on the same side of the highway and beginning at any existing lateral highway, except:

a) where difficult terrain or other natural features render vehicles access impracticable; or

b) where the pattern of existing subdivision precludes the necessity of providing access.

15.7 In any proposed subdivision, a highway which is a cul-de-sac shall have a terminal area for a turn-around the size of which shall be determined by having regard to the local snow, terrain, and soil conditions, provided that any area shall be large enough to contain a circle with a radius of 15 metres.

~~9~~15.8 The number of highway intersections within a subdivision shall be kept to a minimum, and where practicable.

a) Y-shaped intersections shall be avoided;

b) T- shaped intersections shall only be used when the intersecting highway is to carry a small amount of local traffic;

c) intersections shall not be located in or near sharp curves or near the rest of any rise or hill;

d) intersections of more than four highways shall be avoided.

~~9~~15.9 Whenever practicable, no intersection shall be less than 40 metres form any other intersection or likely future intersection. Measurement shall be made along the centre line of the intersected highway.

~~9~~15.10 Unless extremely difficult terrain or the pattern of existing subdivision precludes it, a minimum of 16 metres of an intersecting leg shall be as close to right angles as practicable with intersected highway. This distance shall be measured at the boundary of the intersecting leg on the side of the contained angle.

~~9~~15.11 The right-of-way width of any walkway or trails (excluding a sidewalk) in any subdivision shall be 3 metres.

~~9~~15.12 All subdivisions of three or more parcels, where the smallest lot created is less than 2.0 hectares, shall be required to surface all highways created by the subdivision to a good an all-weather standard, acceptable to the Approving Officer, prior to subdivision approval.

~~9~~15.13 The Approving Officer may require that utilities such as telephone and hydro be underground as recommended by the Regional District.

Read a first time this ___ day of _____, 20__
Read a second time this ____ day of _____, 20__
Read a third time this ____ day of _____, 20__

**SCHEUDLE "A"**

**COMMUNITY WATER SYSTEM STANDRS AND SPECIFICATIONS**

Horizontal curves will be permitted where the configuration of the right-of-way requires curvature for a constant offset and where the design velocity exceeds 1m/sec (3.281 feet/sec.).

Vertical curves will be permitted under special circumstances where excessive rock cutes are to be avoided and where energy dissipation is required.

Horizontal curvature shall be uniform throughout the curves and shall not be less than 60 metres (196.9 feet) radius.

WATER DISTRIBUTION SYSTEM

GENERAL REQUIREMENTS

A system of water distribution piping shall be provided complete with valves, hydrants and service connections, and appurtenant structures. Except as may be otherwise specified the system shall be designed and installed to the standard prescribed by the American Water Works Association. Drawings and specifications shall be submitted to the Provincial Ministry of the Environment, Regional Public Health Engineer, for approval and the original copy of the final certificate forwarded directly to the Regional District.

DESIGN CRITERA

(a) Water Pressure:

Generally, water systems shall be designed for pressures in the range 275-690 kpa (39.88 – 100.1 osi). Whenever maximum pressure would otherwise exceed 690 kpa (100 psi) in a subdivision, the developer shall provide pressure reducing valves on the mains as required by the Approving Officer. Conversely, whenever the minimum pressure in the mains would fail below 275 kpa (39.88 psi), the developer shall provide whatever facilities are required to maintain a minimum of 275 kpa (39.988 pis) at peak hour demand conditions. The minimum residual pressure at fire hydrants shall be 140 kpa (20.31 psi) at maximum demand plus fire demand conditions.

(b) Design Flows:

i) The peak hour demand condition shall be assumed to be:
- 0.07 1/s (0.924 gpm) per single family dwelling unit
- 0.06 1/s (0.792 gpm) per medium density garden apartment dwelling unit
- 0.04 1/s (0.528 gpm) per high density apartment dwelling unit.

ii) The maximum day demand condition shall be based on a minimum rate of use of 2650 litres (800 imperial gal.) per parcel per day.

iii) Design fire flows shall be accordance with the "Water supply for Public Fire Protection - A Guide to Recommend Practice" as published by Public Fire Protection Survey Services and are available through areas – 30 1/s – 60 1/s (395.9 – 791.8 Igpm). Greater requirements for larger dwellings, duplexes, apartments, schools, commercial, industrial, etc.

Where the final system creates a weak water main network, a supplementary connection of a minimum of 150 mm (6 inches) diameter to an existing main shall be required at the discretion of the Approving Officer and may necessitate the provision of a 3 metre (9.843 feet) right-of-way in favour of the Regional District.

DESIGN

(a) Pipe Sizes:

The minimum pipe size for mains shall be 160 mm (6 inches) dimeter, except in a cul-de-sac with ultimate length not over 60 metres (196.8 feet) minimum diameter may be 100mm (4 inches)l. The minimum pipe size for service connections shall be 20 mm (3/4 inch). The maximum length of dead end mains shall be 150 metres (492.1 feet).

In medium and high density residential, commercial and industrial areas, the minimum size water main shall be 200mm (8 mich) dimeter.

(b) Fire Hydrants:

Hydrants shall conform to American Waterworks Association standard dry barrel fire hydrants (AWWA C502) or Underwriters' Laboraties of Canada listing. The number and spacing of hydrants shall be in accordance with the recommendations contained in the latest edition of "Water Supply for Fire Protection – A guide to Recoomend Practice" published by the Fire Underwriters Survey.

(c) Gate Valves:

Gate valves shall be located at all junctions of mains as required by the Approving Officer. Generally, at least two gate valves will be required at TEE junctions and at least three will be required at CROSS junctins.

For continuous mains, gate valves will be required every 250 metres (820.2 feet).

(d) Air Valves:

Air release valves shall be provided at all summit points on mains 200mm (8 inch) dimeter and larger.

(e) Flushouts:

Flushouts shall be provided at all dead ends.

(f) Cover:

Minimum cover over the crown of water mains shall be 1.2 m (3.937 feet).

(g) Clearance:

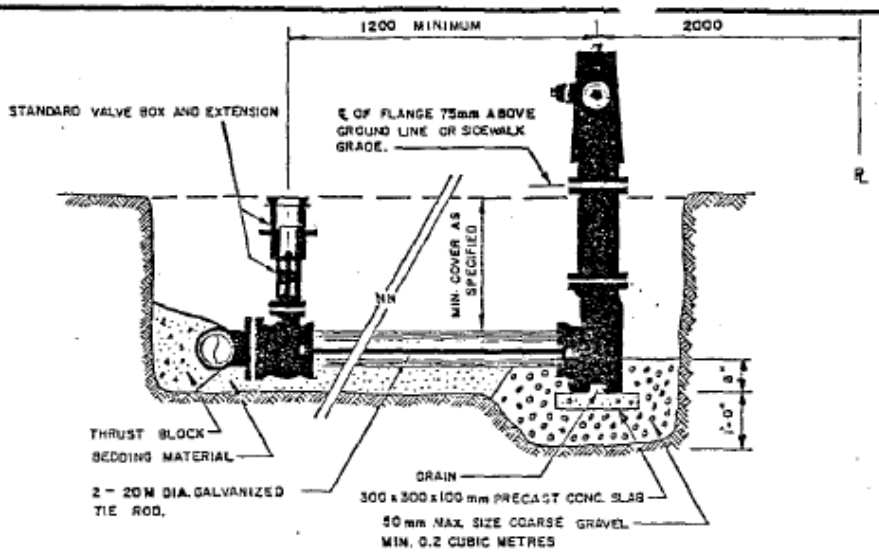
Minimum vertical clearance between water mains and sanitary sewers shall be 450 m (17.72 inches) with the water main on top. Minimum horizontal separation between water main and sanitary sewer shall be 3 m (9.843 feet).

Where storm sewers are located in areas of septic tank title fields, the clearance will be the same for the sanitary sewers.

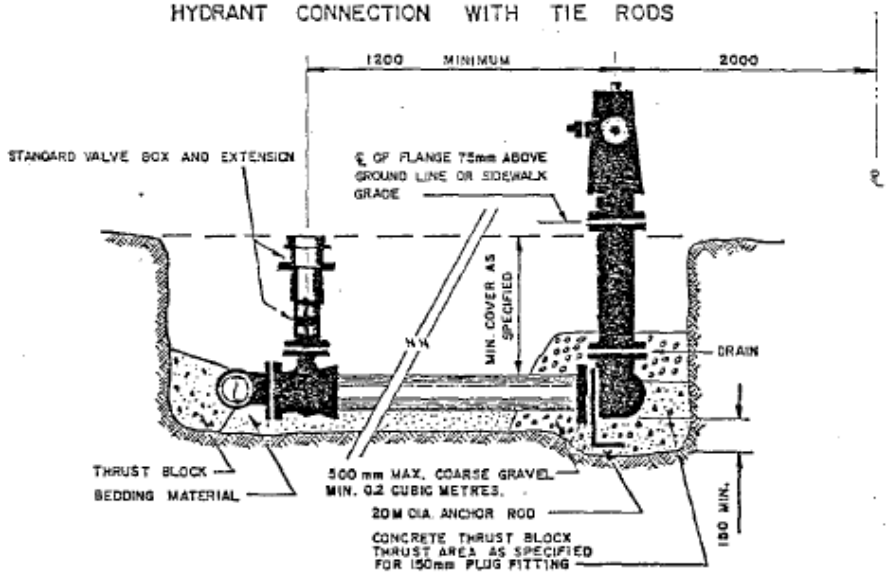
Minimum clearance with all other pipe shall be 150 mm (5.905 inches).

(h) Curved Mains:

On a curve the minimum permissible pipe line radius shall not be less than the manufacturer's recommended minimum. The design drawing shall indicate where the short pipe lengths are required on curves.




HYDRANT CONNECTION WITH TIE RODS

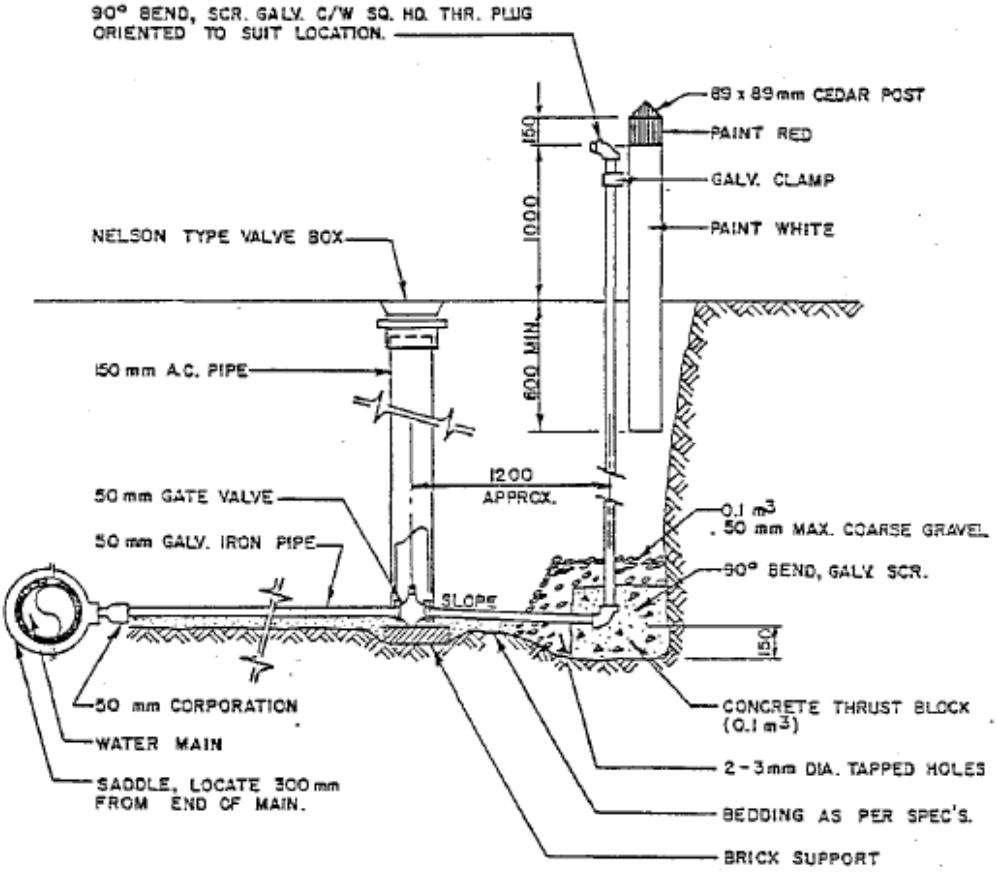



HYDRANT CONNECTION WITH THRUST BLOCK

NOTES :

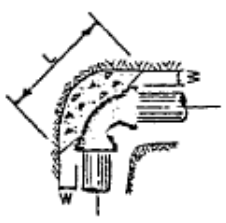
1. HOSE & PUMPER NOZZLE MUST FACE ROAD.
2. HYDRANTS AT INTERSECTIONS TO BE LOCATED AT CLOSEST CORNER TO FIREHALL WITH A 6m SETBACK.
3. HYDRANTS TO BE COMPRESSION TYPE, TERMINAL CITY IRONWORKS C71 - P
4. VALVE BOXES TO BE OF THE ROUND PATTERN TYPE AS SUPPLIED BY ALBERNI FOUNDRY OR EQUIVALENT.
5. VALVE BOX EXTENSIONS SHALL BE 150mm DIA. AC OR PVC. WATERMAIN PIPE.

| COWICHAN VALLEY REGIONAL DISTRICT | | |
|---|---|---|
| ENGINEERING STANDARDS | ISSUED | SCALE N. T. S. |
| HYDRANT CONNECTION DETAILS | REVISION<br>REVISION | STD. DWG. NO. W I |

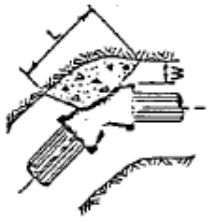



NOTE:
ALL DIMENSIONS ARE GIVEN IN millimetres UNLESS OTHERWISE INDICATED.

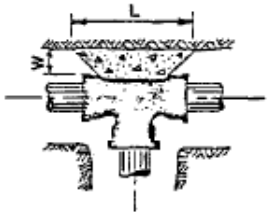
| COWICHAN VALLEY REGIONAL DISTRICT | | |
|---|---|---|
| ENGINEERING STANDARDS | ISSUED | SCALE N.T.S. |
| FLUSH OUT STANDPIPE | REVISION | STD. DWG. NO. W2 |
| | REVISION | |



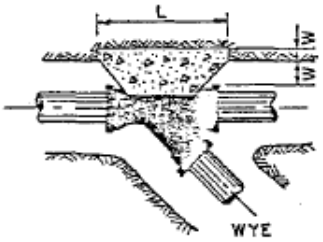

HORIZONTAL 90° BEND



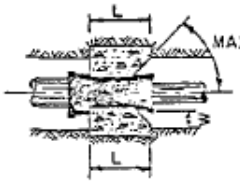

HORIZONTAL 45° BEND



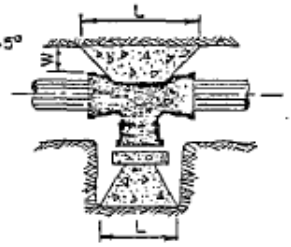

TEE



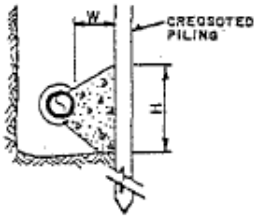

WYE

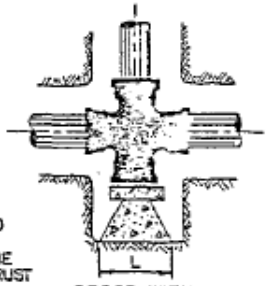



REDUCER

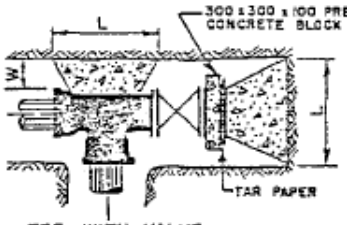



TEE WITH PLUG




CROSS WITH PLUG




TEE WITH VALVE

NOTES:

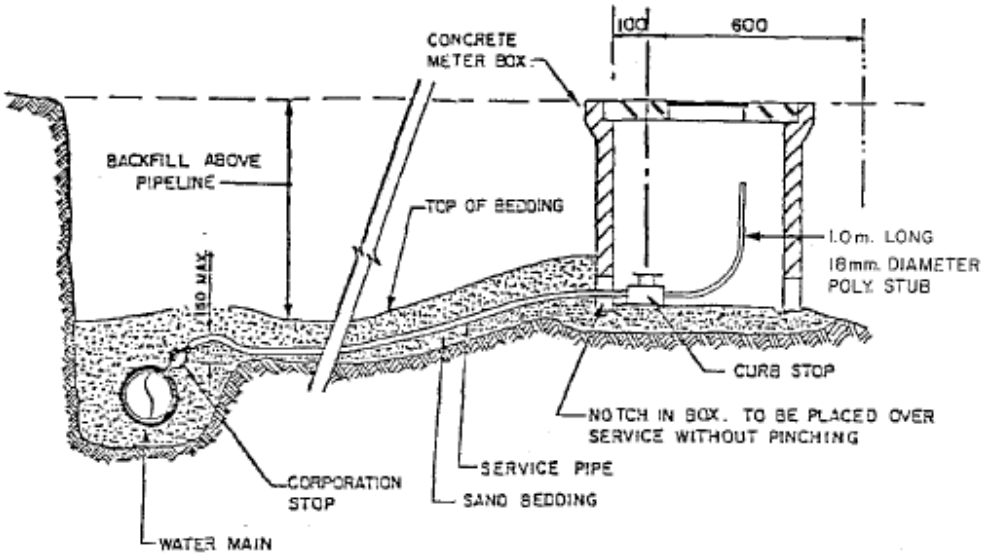
1. WHERE GROUND CANNOT BE EXCAVATED TO FREE STANDING UNDISTURBED SOIL SMALL PLANK SHEET PILING SHALL BE DRIVEN TO PROVIDE UNDISTURBED THRUST AREA. PILING TO BE DRIVEN PRIOR TO EXCAVATING FOR THRUST BLOCK. PILING SHOULD BE USED ONLY BELOW THE PERMANENT WATER TABLE.
2. ALL DIMENSIONS ARE GIVEN IN millimetres UNLESS OTHERWISE INDICATED.

MINIMUM THRUST AREAS FOR FITTINGS AT 1030 kPa PRESSURE AND FOR SOILS WITH MIN. BEARING OF 960 kPa
(NOT TO BE USED FOR SOFT CLAY, MUCK, PEAT ETC.)

| TYPE OF FITTING | FITTING SIZE | OUTSIDE OF FITTING TO BEARING FACE | RECESS IN TRENCH WALL | LENGTH | HEIGHT | TYPE OF FITTING | FITTING SIZE | OUTSIDE OF FITTING TO BEARING FACE | RECESS IN TRENCH WALL | LENGTH | HEIGHT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D | W | W | L | H | | D | W | W | L | H |
| 90° bend | 150 | 300 | | 920 | 460 | cross | 150 | 300 | | 610 | 460 |
| | 200 | 350 | | 1220 | 610 | | 200 | 350 | | 760 | 610 |
| | 250 | 380 | | 1450 | 760 | | 250 | 380 | | 990 | 760 |
| | 300 | 400 | | 1650 | 920 | | 300 | 400 | | 1220 | 920 |
| 45° bend | 150 | 300 | | 460 | 460 | 45° wye | 150 | 300 | 300 | 460 | 460 |
| | 200 | 350 | | 610 | 610 | | 200 | 350 | 400 | 610 | 610 |
| | 250 | 380 | | 760 | 760 | | 250 | 380 | 500 | 760 | 760 |
| | 300 | 400 | | 920 | 920 | | 300 | 400 | 600 | 920 | 920 |
| 22 1/2° bend | 150 | 300 | | 460 | 230 | reducer* | 150 | 300 | 150 | 460 | 460 |
| | 200 | 350 | | 610 | 300 | | 200 | 350 | 200 | 610 | 610 |
| | 250 | 380 | | 640 | 460 | | 250 | 380 | 250 | 760 | 760 |
| | 300 | 400 | | 920 | 460 | | 300 | 400 | 300 | 920 | 920 |
| tee | 150 | 300 | | 610 | 460 | caps and plugs (if not bolted) | 150 | 300 | | 460 | 460 |
| | 200 | 350 | | 760 | 610 | | 200 | 350 | | 610 | 610 |
| | 250 | 380 | | 990 | 760 | | 250 | 380 | | 760 | 760 |
| | 300 | 400 | | 1220 | 920 | | 300 | 400 | | 920 | 920 |

*DIMENSIONS APPLY TO THE LARGER DIAMETER END OF FITTING

| COWICHAN VALLEY REGIONAL DISTRICT | | |
|---|---|---|
| ENGINEERING STANDARDS | ISSUED | SCALE N.T.S. |
| THRUST BLOCK DETAILS | REVISION<br>REVISION | STD. DWG. NO.<br>W3 |

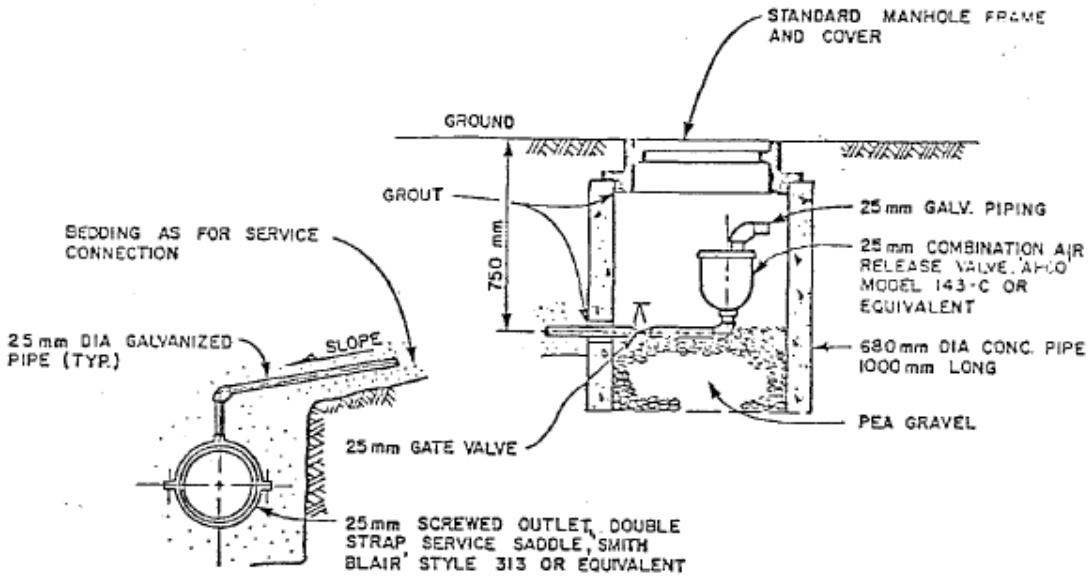



NOTES:

1. SINGLE FEEDER LINE FOR DOUBLE 20 DIA. CONNECTIONS TO BE 25 DIA. BRONZE TEE WITH COPPER FLANGE INLET AND OUTLETS TO BE INSTALLED 3.0 m FROM PROPERTY LINE.
2. COPORATION STOP SHALL BE WITH STANDARD CORPORATION INLET AND COPPER FLARED OUTLET OR WITH COMPRESSION TYPE CONNECTION.
3. SERVICE SADDLES TO BE USED ACCORDING TO WATERMAIN MANUFACTURERS SPECIFICATIONS.
4. SERVICE CONNECTION PIPE 20 DIA. TO 50DIA. TO BE TYPE K COPPER.
5. CURB STOP SHALL BE WITH INLET COPPER FLARED AND OUTLET FEMALE I.P. THREAD. DRAINS WILL NOT BE PERMITTED.
6. METER BOX SHALL BE TYPE No. 37; 450 HIGH COMPLETE WITH CONCRETE COVER AND A CAST IRON READING LID AS SUPPLIED BY A.E. CONCRETE CASTINGS LTD., COQUITLAM, B.C. METER BOXES TO BE INSTALLED WITH THE SMALL SIDE PARALLEL TO THE PROPERTY LINE.
7. MINIMUM COVER OVER SERVICE PIPE IN ALL AREAS TO BE 1.0 m EXCEPT AT METER BOX.
8. SAND BEDDING FROM 50mm BELOW TO 300mm ABOVE PIPE, COMPACTED BY HAND.
9. BACKFILL ABOVE PIPE ZONE AND SURFACE RESTORATION TO BE AS SHOWN ON DRAWING OF TYPICAL TRENCH SECTION FOR UNDERGROUND UTILITY INSTALLATION.

NOTE: ALL DIMENSIONS ARE EXPRESSED IN MILLIMETRES UNLESS NOTED.

| COWICHAN VALLEY REGIONAL DISTRICT | | |
|---|---|---|
| ENGINEERING STANDARDS | ISSUED | SCALE N.T.S. |
| WATER SERVICE CONNECTION | REVISION<br>REVISION | STD. DWG. NO. W4 |




NOTE.
CHAMBERS LOCATED ON GRAVEL ROADS OR SHOULDERS REQUIRE A 1.5x1.5m HOT MIX ASPHALT APRON, 50mm THICK.

NOTE.
ALL DIMENSIONS ARE IN *millimetres.*

| COWICHAN VALLEY REGIONAL DISTRICT | | |
|---|---|---|
| ENGINEERING STANDARDS | ISSUED | SCALE N.T.S. |
| AIR RELEASE VALVE ASSEMBLY & CHAMBER FOR 200mm DIA. TO 300mm DIA. MAINS | REVISION<br>REVISION | STD DWG NO.<br>W5 |

**SCHEDULE "B"**

**SPECIFICATION FOR DESIGN AND ISNTALLTION OF SANTIARY SEWERS AND APPURTENANCES**

INDEX



STANDARD DRAWINGS

## General

1.01 Scope:

This specification covers materials, workmanship/ installation practices, design, rights-of-way procedures, inspection and testing operations, preparation of drawings and matters affecting the operation and maintenance of the sanitary sewer systems within the Cowichan Valley Regional District.

1.02 Specifications or Standards:

When references to the following abbreviations are made, they refer the specifications standards or methods of the respective association as the context demands. Abbreviations listed herein but not mentioned in the specifications shall be disregarded.

The numbers of and letters following the abbreviations denote the association's serial designation for the specification or standard to which reference is made. All references to the specifications, standards or methods shall, in each instance, be understood to refer to the latest adopted revision, including all amendments.

ANSI American National Standards Institute
ASTM American Society for Testing and Materials
CAN 3 National Standards of Canada
CSA Canadian Standards Association

1.03 Interpretation

In this specification, unless the context otherwise requires:

"Developer" shall mean the person or organization responsible for the installation of the sanitary sewer system. Where a contractor is employed by the Developer be shall have responsibility for all matters referred to in this specification as stated for "Developer."

"Operations Manager" shall mean the Operations Manager for the Cowichan Valley Regional District or such other person appointed by him in writing.

2. Materials

2.01 Pipe and Fittings:

Sewer pipe and fittings employed on mains shall normally be:

PVC pipe in accordance with ASTH 03034, SDR for 200 mm diameter or greater.

Pipe shall, in addition to the above, be specified to meet the actual installed loading conditions.

Joints for sanitary sewer pipes and fittings shall be capable of meeting specified exfiltration and infiltration tests.

100 mm and 150 mm diameter service connection pipe shall be VC, SDR 28 to the same specifications as sewer pipe above.

2.02 Bedding Gravel:

The bedding material shall be clean, well graded or crushed gravel, evenly graded from coarse to fine, with a maximum size of 25 mm and 90 percent retained on a 0.075 m screen. If the trench conditions are dry and otherwise suitable, sand bedding may be used, subject to prior approval of the Operations Manager.

2.03 Manholes

Manholes shall conform to the typical details shown on the standard drawings.
Manholes shall, unless otherwise specified, be of preformed 1050 mm inside diameter reinforced concrete, conforming to ASIM C478, complete with 19 mm galvanized steps at 300 mm centres. Concrete lids shall be designed to withstand H 20 highway loading conditions. Eccentric cone precast concrete may be used as top manhole sections.

Base shall be 21 MPa concrete with minimum thickness of 150 mm. Brickword shall be one to three courses of bricks used to support the case iron frame and cover. Manhole frames and covers shall be of cast iron, conforming to ASIM 448. Bearing surfaces between the frame and cover shall be machined. The clear opening in frames shall be not less than 500 mm. A minimum of two lifting holes 22mm in diameter shall be cored in each cover.

2.04 Concrete:

Concrete work shall conform to CAN3-A23.1, except as modified herein.

Concrete shall develop a minimum compressive strength of 20 MPa at 28 days. Slump shall not exceed 75 mm.

## 3. WORKMANSHIP/INSTALLATION

### 3.01 Clearing and Grubbing:

All sewer alignments shall be cleared and grubbed to a sufficient width to allow for proper installation of the system components. Where alignments transverse virgin areas, care shall be taken to ensure that the cleared strip is only wide enough to permit proper excavation and temporary storage of excavated material. All necessary precautions shall be taken to preserve the indigenous aesthetic values of the location. Waste material shall be disposed of to locations obtained by the Developer.

All trees and brush, except those selected for preservation, shall be cut, and along with all stumps, logs, roots, rotten wood, and other organic materials shall be disposed of by burning or other approved means.

Topsoil shall be stockpiled as required.

The above material shall be removed from the ground surface and to a minimum depth of 300 mm below ground surface.

All other rubbish and debris existing on the site shall be removed and disposed of by burning or other approved means.

Trees shall be felled within the designated clearing area and those falling outside this area shall be cut up and returned to the clearing area for disposal.

Individual leaning or dangerous trees or snags adjacent to but outside the designated clearing area shall be cut and disposed of.

Excavations resulting from removing of tree trunks, roots, or other material shall be filled by the Developer as a part of the clearing and grubbing operation.

### 3.02 Burning:

Burning shall be carried out at points located centrally in the area being cleared. The fire of the fires burning at one time shall be limited by the ability of the Developer's equipment and organization to provide adequate protection against spreading of fires to adjacent timber or property.

Burning shall be carried out subject to the provisions of the Provincial Acts and Regulations thereto. In the event of Forestry Regulations prohibiting burning, materials to be burned may either be piled until such time as the regulations are rescinded, or removed from the site.

Restrictions of federal, provincial, municipal, or other recognized authorities established to control burning the area shall be complied with. If burning cannot be done on the clearing site, the material shall be hauled to an approved location for burning or disposal. Burning sites, as required, shall be obtained by the Developer.

Restrictions of federal, provincial, municipal, or other recognized authorities established to control burning in the area shall be comp0lied with. If burning cannot be done on the clearing site, the material shall be hauled to an approved location for burning or disposal. Burning sites, as required, shall be obtained by the Developer.

3.03 Trench Excavation and Backfill

Trenching and Backfilling Equipment

Mechanical trenching and backfilling equipment may be used except where by doing damage to trees, buildings, sidewalks, curbs, piping, or other existing structures or manmade obstacles above or below ground cannot be avoided. Trenches shall be hand excavated and backfilled where such obstacles prevent the use of mechanical equipment.

Caution in Excavation

Trenches shall be excavated only as far in advance of the pipe laying operation as safety, traffic, and weather conditions permit. Caution shall be exercised with respect to structures, piping, or other manmade obstacles that may exist within the working area and due consideration given the protection and support of such properties and structures.

Precutting Paved Surfaces

When trenching along or across a paved surfaced, pavement shall first be cut by hand or mechanical means in straight lines. The total cut width of pavement shall not be greater than that which is necessary for trench excavation under existing soil conditions and shall not, in any case, exceed the specified maximum trench width at the ground surface shown on the drawings. Where existing pavement is in such poor condition that precutting is not warranted, pavement may be cut by trenching equipment. Pavement that has been removed to permit

trenching shall be disposed of as waste material and shall not be placed in the trench backfill. All work shall be to the satisfaction of the District Highways Manager.

Excavated Trench Material

Excavated trench material may be piled alongside the trench provided the working space is adequate for this purpose and provided that by doing the backfill material does not spill onto private properties adjacent to line of trench thereby disturbing fences, buildings, shrubs, lawns, or other items of value.

Piling of excavated material along the trench shall not unduly restrict cross tariff at road intersections. Material shall be cleared from road intersections and provision made for use of the cross road by traffic as soon as possible after excavation has taken place. Pedestrian traffic to individual properties shall be maintained at all times and temporary bridges shall be provided where it is necessary to cross open trenches. Roadways, driveways, and drainage facilities shall not be blocked unnecessarily. The spoil pile shall be located such that hindrance to local traffic is minimal.

Trench Widths

Trenches shall be excavated such that there is no less than 150 mm clearance between the outside of the pipe at its largest section and the trench sheeting or earth wall, and no more than 375 mm clearance between the pipe and the earth wall regardless of the existence of trench support works. The above condition shall govern from the bottom of the trench to a distance 100 mm above the top of the pipe at its largest section. Trench widths above this level shall be maintained within the allowable limits shown the drawings.

Ledge rock, boulders, and large stones shall be removed to provide clearance of at least 150 mm below and on all sides of the pipe and fittings.

Bracing and Sheeting

Trenches shall be sheeted and braced in accordance with the requirements of the Workers' Compensation Board or as may be necessary to protect life, property, and structure adjacent to the work, the work itself, or to maintain trench width within the specified limits. Trench sheeting and bracing shall be located no closer than 150 mm to the widest section of any installed pipe.

Whenever possible, vertical trench timber or sheeting shall be placed so that it

does not extend below the springline of the pipe being installed. When it is necessary to place sheeting or timber below the pipe springline, as in the case of over excavation for trench bottom stabilization, sheeting shall be raised in 600 mm lifts and all backfill placed below the level of the pipe springline shall be thoroughly compacted on each lift to fill the void left by the raising sheeting.

Trench sheeting and bracing shall be removed where its removal will not result in damage to adjacent structures, otherwise it shall be left in place. When sheeting and bracing is left in place, it shall be cut so that no sheeting remains closer than 900 mm to existing ground surface.

Where sheeting or timber is removed from a trench in which backfill is to be compacted, it shall be removed in a manner which permits compaction of the backfill in the manner specified.

Dewatering

Ground and surface water shall be controlled to the extent that exaction and pipe installation can proceed in the specified manner and such that trench bottom is not disturbed to the detriment of the pipe installation. Trench water shall not be permitted to enter the pipe being installed unless approval is received from the Operations Manager.

The necessary pumps, well points, or other equipment shall be employed to keep excavations free of water. Caution shall be exercised to make sure that foundation problems with existing structures and works under contrition do not result from the selected method of dewatering excavations. Discharge from pumps, well points, or other dewatering equipment shall be located and controlled such that loss, damage, nuisance, or injury to the public does not result.

(h) Trench Bottom Conditions

Trenches shall be maintained such that pipe can be installed without getting water, muck, silt, gravel, or other foreign material into the pipe. Material remaining in the trench bottom on completion of machine excavating which has been disturbed or softened by workmen or trench water shall be removed before bedding material is placed. The trench bottom shall be firm and capable of supporting the pipe to be installed otherwise the bottom shall be stabilized by means of over excavation or special foundation designed to support the pipe as hereinafter described.

When the material in the trench bottom is found to be unstable or otherwise unstable for pipe support or support of appurtenant structures, the trench shall be over excavated to the level at which stable material is encountered and backfilled to the level at which stable material is encountered and the excavation backfilled to the level of normal bedding with base gravel material. This material shall be compacted with approved mechanical compactors in lifts having a maximum depth of 300 mm to provide a thoroughly consolidated pipe base. Bedding material, as specified for normal pipe bedding, may be employed for this purpose to a maximum depth of 300 mm below the normal depth of bedding.

(i) Backfill Within Pipe Zone

The pipe zone is defined as that portion of the trench between the bottom level of the pipe bedding and a level 300 mm above the top of the installed pipe. Bedding of the pipe and backfill of the trench within the pipe zone shall be carried out with materials as specified in Section 2, "Bedding Gravel" and Section 3, "Sanitary Sewer Piping", Subsection (a), Bedding."

(j) Concrete Fill

Concrete shall be used for pipe base, encasement, or backfill as shown on the approved drawings. Concrete shall have adequate time to set before backfill material is placed.

(k) Placing Backfill

In order that consolidation of backfill is not hampered, trench water, if present, shall be removed prior to commencement of backfilling. To p prevent damage to the installed pipe, backfill shall be placed in the trench by rolling down a slope and not by pushing it over the edge of the trench and allowing it to drop vertically. Every effort shall be made to plan the backfilling operation such that exposure of backfill material to wet weather is kept to a minimum. The trench shall be backfilled as close to the pipe laying operation as conditions permit.

(l) Backfill Above Pipe Zone

Materials and methods employed in backfilling trenches above the pipe zone shall depend on the location of trench with respect to travelled and untraveled surfaces.

Travelled surfaces are graveled, or paved, roadways, lanes, driveways, parking areas, road shoulders, walkways, or other graveled, or paved, s surfaces over which vehicular or pedestrian traffic normally travel.

Subject to provisions contained elsewhere herein, backfill above the pipe zone and surface restoration of trenches shall be carried out in accordance with the following paragraphs:

1. Untraveled Surfaces

In untraveled surfaces, unless otherwise specified, trench backfill above the pipe zone shall be native backfill material. Backfill may initially be built up to a height above original ground level equal to 10 percent of the trench depth and allowed to settle. Prior to acceptance, however, the trench surface shall be restored to its original level and to a condition which at least is equivalent to that which existed prior to construction unless the approval of the Operations Manager is given to leaving trench surfaces in a bermed condition.

2. Gravel Travelled Surfaces

In travelled surfaces which exist as gravel surfaces, trench backfill above the pipe zone to a level 300 mm below the original trench surface shall, unless otherwise specified, be native backfill material. The top 300 mm of backfill shall be road base gravel.

3. Paved Travelled Surfaced

When trenches have been excavated in existing paved surfaces which are to be repaved , trench backfill shall be mechanically compacted native backfill material to a level 350 mm below finished surface grade. The remainder of the trench shall be backfilled with 300 mm of compacted road base gravel and finished with a minimum thickness of 50 mm of compacted hot

asphalt mix.

If the edges of the cut pavement have become ragged as a result of the construction operation, pavement shall be recut to form a straight line and the base compacted prior to placing new pavement. The edges of the existing pavement shall be thoroughly cleaned an coated with approved bituminous bonding agent prior to placing the hot asphalt mix. The asphalt shall be thoroughly compacted using an approved steel wheeled roller having a minimum weight of 7.3 tonnes or a vibrancy surface shall conform with that of the existing surface such that no rises, depressions, or ridges result from the repaving process.

(m) Imported Backfill Material

Where excavated trench material is not suitable for backfill, it shall be hauled out and disposed of an imported backfill material shall be provided and placed.

(n) Compaction of Backfill

Subject to the provision contained elsewhere herein, compaction of backfill above the pipe zoe shall be obtained by using approved, mechanical, power-driven compactors. Compaction shall be carried out with the soil at optimum moisture content such that compaction to 95 percent of Standard Proctor Density (ASTM D698) is obtained. Backfill shall be compacted in lifts of not greater than 300 mm uncompacted depth.

(o) Road Shoulder Gravel

Trenches in road shoulders adjacent to paved surfaces shall be resurfaced with shoulder gravel placed to a minimum depth, equivalent to the thickness of the adjacent pavement.

(p) Disposal of Waste Excavated Material

Surplus excavated material shall be removed from the trench area at the time of backfilling and shall not be left along the trench following completion of the backfilling operation.

Waste material which is not required for the works, shall be disposed of at

its sites obtained by the Developer. Waste material shall not be dumped on private property without the written permission of the owner of the property.

(q) Restoration

Surfaces adjacent to the trench or otherwise which have been disturbed by the trenching or backfilling operation shall be restored to a condition which it is at least the equivalent of that which existed prior to the construction and shall be maintained in this condition until the project has been accepted by the Cowichan Valley Regional District.

Working areas are those areas which are affected by the construction operation but which lie outside the specified limits of trench excavation. Working areas shall be restored in the following manner:

1. Travelled Surfaces:

Working areas in untraveled surfaces shall be restored as near as is practical to their original condition.

2. Gravelled Surfaces

Working areas in graveled surfaces shall be restored by scarifying and regrading the surface or, if necessary, by regravelling the surface with material which is equivalent to that which existed prior to commencement of construction.

(r) Trench Settlement During Guarantee Period

The Developer shall replace materials and rectify all failures that occur as a result of settlement of trench backfill or collapse of trench walls during the guarantee period.

Trenches in which backfill settles shall be refilled with the specified backfill material, and paved surfaces that are adjacent to trenches or on trench backfill, which fail during this period, shall be replaced or repaired

in an approved manner.

## 3.04 Sanitary Sewer Piping

### (a) Bedding

Prior to installing pipe, a cushion of bedding material shall be placed in the trench bottom and compacted to grade by approved hand tampers or mechanical means to form a firm pipe base. This cushion shall cover the full width of the trench bottom have a minimum depth of 100 mm on completion of compaction. In rock excavation, the minimum depth of bedding below the pipe shall be 150 mm. Bell or coupling holes shall be dug such that the full barrel of the pipe is supported throughout its length by the bedding material. After the pipe is in position, bedding material shall be placed around the pipe to the limits shown on the drawings. This material shall be compacted in lifts, each having maximum compacted depth of 150 mm.

### (b) Pipe Alignment and Grade

The pipe shall be laid to lines and grades shown on the approved drawings.

Construction tolerances for sewer pipes shall be 6 mm in elevation and 1/10 of pipe diameter but not exceeding 50 mm in alignment.

### (c) Pipe Installation

Pipe shall be checked before being lowered into the trench to ensure that no foreign material, manufacturer's defects, or cracks exist that might prevent the proper jointing of the pipe or its operation as a sewer. Pipe and fittings shall be carefully lowered into the trench by means of derricks, ropes, or other approved tools or equipment in a manner that will prevent damage to the pipe and injury of workmen.

Pipe shall be jointed in strict accordance with the manufacturer's recommended practice. Sufficient pressure shall be applied in

making the joint to assure that the distance between the end of the pipe installed and the pipe in place is within the tolerances recommended by the pipe manufacturer. Once the joint is home, restraint shall be applied to the pipe by tamping of backfill or placement of temporary blocking to assure that the pipe does not creep and dislodge the joint. At the end of the day's work, or if the work is shut down for an extended period throughout the day, the last pipe shall be blocked to prevent creep in the pipeline and plugged to prevent entry of foreign material.

(d) Service Connection Junction

Connections of services to the sewer shall be made using tee or wye fittings. Service saddle may be used only with the approval of the Operations Manager.

(e) Connections to Existing Sewers

Caution shall be exercised in uncovering existing pipe to ensure that no damage occurs. Connections to the existing system shall not be made until all sewers have been tested and flushed to the satisfaction of the Operations Manager. Plugs shall be installed until construction is completed to prevent the eroding of material into the downstream system.

(f) Cleaning and Flushing

On completion, sewer pipe shall be cleaned by flushing or the use of mechanical equipment as necessary to remove foreign material from the pipe.

3.05 Sewer Service Connection:

(a) Grade

Service connections shall be installed at a grade of not less than 1/4 percent. Service pipe shall be installed at a uniform grade between the terminus at the property line and junction fitting (or upper end of a service drop) at the sewer.

(b) Pipe Installation

Pipe shall be checked before being lowered into the trench to ensure that no foreign material, manufacturer's defects, or cracks exist that might prevent the proper jointing of the pipe or its operation. Pipe and fittings shall be carefully lowered into the trench in a manner that will prevent damage to the pipe and injury of workmen.

Pipe shall be jointed in strict accordance with the manufacturer's recommended practice. Sufficient pressure shall be applied in making the joint to assure that the distance between the end of the pipe installed and the piped in place is within the tolerance recommended by the pipe manufacturer.

(c) Capping Services

Approved watertight caps shall be installed on sanitary services at the terminus of each service.

(d) Marking Service Terminus

A marker stake shall be placed at the service terminus as shown the standard drawing to facilitate future location of the service pipe.

3.06 Sewer Manholes:

(a) Concrete Bases

All water shall be removed from the excavations prior to placing base concrete. The base shall be constructed such that the first section of a precast section can be set plumb with uniform bearing throughout its full circumference.

If material in the bottom of the trench is unsuitable for support, the bottom shall be over excavated to a firm base and backfilled to the required grade with thoroughly compacted well graded gravel.

(b) Precast Sections

Precast sections shall be placed plumb with joints mortared or otherwise effectively sealed to exclude any entrance of ground water.

(c) Frames and Covers

Frames shall be set on a concrete brick base as shown on the drawings. Brick shall be mortared in an approved manner and the inside and outside face of the brick shall be "buttered" with mortar such that a neat, even finish results. Frames shall be firmly embedded in mortar and shall be set to provide a cover surface which is even with and true to the contour of the road.

(d) Manhole Steps

Manhole steps shall be placed as shown on the drawings.

(e) Manhole Channeling

Manhole channeling shall be constructed as shown on the drawings. Wherever possible, channeling shall be formed using half sections of pipe or fittings. When pipe is set in the manhole base, the base shall be placed immediately following the installation of the main sewer pipe to prevent settlement of the pipe. Particular cares shall be taken when constructing manhole bases to ensure that the invert levels of the pipe entering and leaving the manhole are set at the proper elevations. Invert levels of pipe at the manhole shall be checked by the Developer prior to and following placement of base concrete around the pipe. This shall be done by means of batter board, sight rail, or level instrument. Variation in manhole inverts from established grade or elevation shall be corrected.

(f) Drop Structures

Manhole drop structures shall be constructed as shown on the standard drawings.

(g) Stubs

Blind stub sections for connection of future sewers and service connections to the manhole shall be installed where shown on the drawings. The stub shall consist of a one meter length of the specified size

of pipe installed in the manhole and capped with a removable, watertight cap as shown on the drawings. Where stubs are installed, the bottom of the manhole shall be channeled to the stub entrance.

3.07 Concrete:

(a) Concrete Installation

Mixing, placing and compacting shall be carried out in such a manner as to produce a good quality, homogenous concrete conforming to the dimensions shown on the drawings. Continuous moist curing shall be utilized for 7 days after placing.

(b) Reinforcement

Reinforcement shall be free of any bond reducing coating. It shall be securely tied and placed with a minimum cover of 35mm, except that, when concrete is placed against the ground, the cover shall be 75mm.

(c) Joints

The surface of the joint shall be thoroughly cleaned, with all laitance removed, and the surface thoroughly saturated with water before placement of new concrete

(d) Finish

Surfaces shall be screeded and shall be give a wood float finish unless otherwise noted on the approved drawings.

3.08 Ground Water Infiltration:

With the exception of surface water entrance to the manhole through lifting holes in the cast iron cover, manholes shall be constructed watertight.

3.09 Clean-Up

The working area shall be maintained in an orderly manner and shall not be encumbered with equipment, materials, or debris.

Clean-up shall be a continuing process from the start of the work to final acceptance of the project. The Developer shall at all times, and without further order, keep property on which work is in progress free from accumulations of waste materials or rubbish caused by employees or by the work. Accumulations of waste materials which might constitute a fire hazard will not be permitted. Spillage from the Developer's hauling vehicles on travelled public or private roads shall be promptly cleaned up. On completion of construction, the Developer shall remove all temporary structures, rubbish and waste materials resulting from his operations.

## 4. DESIGN

### 4.01 GENERAL

Design of all extension to Cowichan Valley Regional District sewer systems shall be undertaken under the direction of a professional engineer licenses to practice within the Province of British Columbia. The standards are generally to be adopted are those contained within the 1980 edition of "Guidelines for Assessing Sewage Collection Facilities" issued by the Province of British Columbia with due regard for the climatic and other conditions experienced within the Cowichan Valley Regional District. Deviations from these standards should be discussed with the Operations Manager prior to completion of detailed design.

### 4.02 Basic Criteria

No sewer shall be less than 200 mm in diameter except for the upstream 400 metres of sewers serving residential property where extension in the future is precluded for obvious reasons. In any case no sewer shall be less than 150 mm in diameter.

Sewers shall be laid sufficiently deep so as to drain all basements at a grade of 2 percent and to prevent freezing. In general, cover should be no less than 1.5 metres in travelled areas and 1 meter elsewhere. The minimum grade for house connections shall be 1 ¼ percent/ Where the topography of a development is such that a gravity service is not attainable without considerable cost, approval may be given for some lots to be

created so that the sewage is to be pumped to the main sewer.

Sewers shall be designed and constructed to give mean velocities when flowing full of not less than 0.6 m/s. Sewers shall be laid with uniform slope between manholes, Sewers on steep grades shall be anchored as required to ensure stability.

Sewers 375 mm or less in diameter shall be laid with straight alignment between manholes except that horizontal curving of not less than 107 metres radius may be permitted where conditions so warrant and where continuous and adequate engineering supervision of laying and backfilling is provided. Simple circular curves only will be permitted.

Community sewers are preferably laid within a road right-of-way. Where this is not possible due to topographic or other justifiable considerations sewers may be located within the rights-of-way. Section 5 of this specification details the requirements for rights-of-way.

Changes in grade and pipe size shall be made with due consideration to sound hydraulic principles. Without prejudice to the generality of the foregoing sewers shall not decrease in size progressing downstream except on trunk sewers where it can be shown that special circumstances apply.

4.03 Infiltration

The method of jointing and materials to the used shall be such as to minimize infiltration and to prevent the entrance of roots. See Section 6 of this specification for testing requirements.

4.04 Structural Strength

The pipe material and bedding shall be so designed as to adequately support the anticipated trench and other loads to be applied to the pipeline.

4.05 Manholes

Manholes shall be installed at all changes in grade, size, or alignment; at all intersections; and at a distances not greater than 120 meters for sewers 375 mm diameter or less, and 150 meters for sewers 450 mm to 750 mm

diameter. A clean-out arrangement may be provided at the end of end non-extendable line. Where a line is scheduled to be extended in the future a capped stub shall be placed at the manhole ready for such future extension.

Drop manholes should be provided for a sewer entering a manhole to an elevation of 600 mm or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 200 mm benching will be designed to prevent solids deposition. Drops between 200 mm and 600 mm should be avoided adjusting sewer gradients.

## 5. RIGHTS-OF – WAY

### 5.01 General:

Where the laying of sewers within rights- of - way is unavoidable a right-of-way shall be granted to the Cowichan Valley Regional District for the purpose of laying and maintained the system of sewerage works. The form right-of-way agreement will be provided by the Cowichan Valley Regional District but the Developer shall be responsible for executing the documents, preparing the necessary surveys and plans, payment of all registration fees and depositing in the Land Titles Office.

### 5.02 Width of Right-of-Way:

The normal width for a right-of-way shall be 6 metres with the pipeline located of center towards the adjacent property line. Where this impractical the right-of-way may be reduced in width to 3 meters provided that a 3 meter working strip is added thereto accommodate side casting of materials should maintenance work require to be performed in the future.

### 5.03 Registration:

Right-of-way documents shall be registered in the Land Titles Office concurrently with the plan of subdivision. Sufficient time must be allowed within the schedule to permit the execution of the documents by the appropriate officers of the Cowichan Valley Regional District.

## 6. INSPECTI ON AND TETSING

## 6.01 Notices:

The Developer shall be responsible for serving all notices required by statute and regulation prior to commencement of the work. This includes but it is not limited to W.C.B., other utilities and the like. In addition, seven days notice of intention to commence the works shall be given to the Operations Manager.

## 6.02 Inspection:

Installation of works shall be under the direction of the engineer employed by the Developer and at the Developer's expense. In addition, inspection visits will be made to the works from time to time by the Operations Manager or his duly authorized representative. Deficiencies noted at the time of the inspection visits will be brought to the attention of the Developer's engineer. The Developer shall advise the Operations Manager 24 hours in advance of any infiltration or exfiltration leakage test being applied.

## 6.03 Testing:

Test results shall be provided if required for any of the following on request:

Soils – compaction and moisture content tests
Concrete – slump, air entrainment and compressive strength test
Sewer Main and Appurtenances – infiltration and/or exfiltration test

All testing shall be carried out at the expense of the Developer. Tests for pressure mains shall be carried out on behalf of the Developer as follows.

1. The section of the pipe to be tested shall be slowly filled with water from an approved source. The pipeline shall remain filled for not less than 24 hours prior to the pressure test. When all the air has been removed the pressure inside the pipe shall be raised by means of a pump until the pressure reading at the gauge located at the lowest elevation registers one-half times the normal working pressure.

2. The pressure test shall be successful if no appreciable loss of pressure occurs throughout the duration of the test. Appreciable loss of pressure is understood to mean that the pressure shall be maintained to within 4 percent of the test pressure. Testing shall be carried out only after backfilling and the duration of tests shall be not less than one hour.

3. Infiltration tests shall be conducted on all gravity mains installed where the groundwater is above the crown of the pipe. In all other cases, exfiltration tests shall be made.

4. The maximum allowable infiltration or exfiltration rate for water shall be 9.3 litres per millimeter of pipe diameter per day per kilometer of pipe.

5. As an alternative to the exfiltration test, sewer mains and services may be tested with low pressure air.

6. Open ends shall be plugged so as to be air-tight. Air shall be slowly supplied until the air pressure reaches 20.7 kpa. At least two minutes shall be allowed for pressure stabilization before proceeding. This time, in minutes, for the pressure to drop from 20.7 kpa to 17.2 kpa shall not be less than the following:

| Pipe Size | 100 | Diameter (mm) 150 | 200 | 250 |
|---|---|---|---|---|
| Maximum Air Pressure Loss Time | 2 min 32 sec | 3 min 50 sec | 5 min 6 sec | 6 min 22 sec |

6.04 Cleaning and Flushing:

All sewer mains, manholes, services, and other appurtenances shall be flushed to removed all foreign materials. The Developer shall provide a temporary screen at the manhole outlet stub to collect all large objects. The Developer shall ensure that all large objects which could plug

downstream sewers are removed prior to discharging the water into the existing system.

When requested by the Operations Manager the Contractor shall clean the sewer mains with a test ball not more than 13 mm smaller in diameter than the main to be cleaned.

## 7. DRAWINGS

### 7.01 General:

Drawings must be clear and legible and drawn to a scale which will permit all necessary information to be plainly shown. The maximum size shall be 75 cm by 100 cm over all. Without limiting the generality of the foregoing the preferred scales are as follows:

Key Plans 1:5,000
Plan Views: 1:500

Profiles: 1:50 (vertical)

Where the topography is such that the above scales are inappropriate other scales of the same ration may be used.

Drawings must show the name of the project, scale in meters, north point, engineer's name and designation, his signature and imprint of his registration seal.

The drawings must include such plan views elevations sections and supplementary views which taken together with any specifications provide adequate working information for the construction of the works. In general, the details required by the Waste Management Branch, Ministry of Environment, Province of British Columbia, in the 1980 edition of "Guidelines for Assessing Sewage Collection Facilities" shall be followed. Three copies of each design drawing are to be submitted to the Operations Manager for approval prior to construction. One set will be returned with the approval documents.

### 7.02 Revisions to Approved Plans:

Application for revision to approved plans during construction shall be submitted in sufficient time for decision to be made. Minor changes not affecting capacities flows or operation will be permitted during construction without approval provided that notification is made at the earliest opportunity to the Operations Manager.

7.03 "As Constructed" Plans:

Within sixty days of the comp0letion of a project, plans showi8ng the works as installed shall be submitted to the Cowichan valley Regional District. The plans, in conformity with requirements for design drawings, shall consists of one set of mylar copies and one set of paper prints all marked "as constructed." Service connection cards will be provided by Cowichan Valley Regional District for completion by the Developer's engineer.

8 . OPERATION AND MAINTENANCE

8.01 General

The Developer shall maintain the works for a period of one year from the date of completion of the system established by the Operations Manager. This maintenance shall related to all matters affecting the installation of the works. Should the works include lift stations, the day to day running and payment of energy accounts will be undertaken by the Cowichan Valley Regional District from the time of acceptance by the Operations Manager.

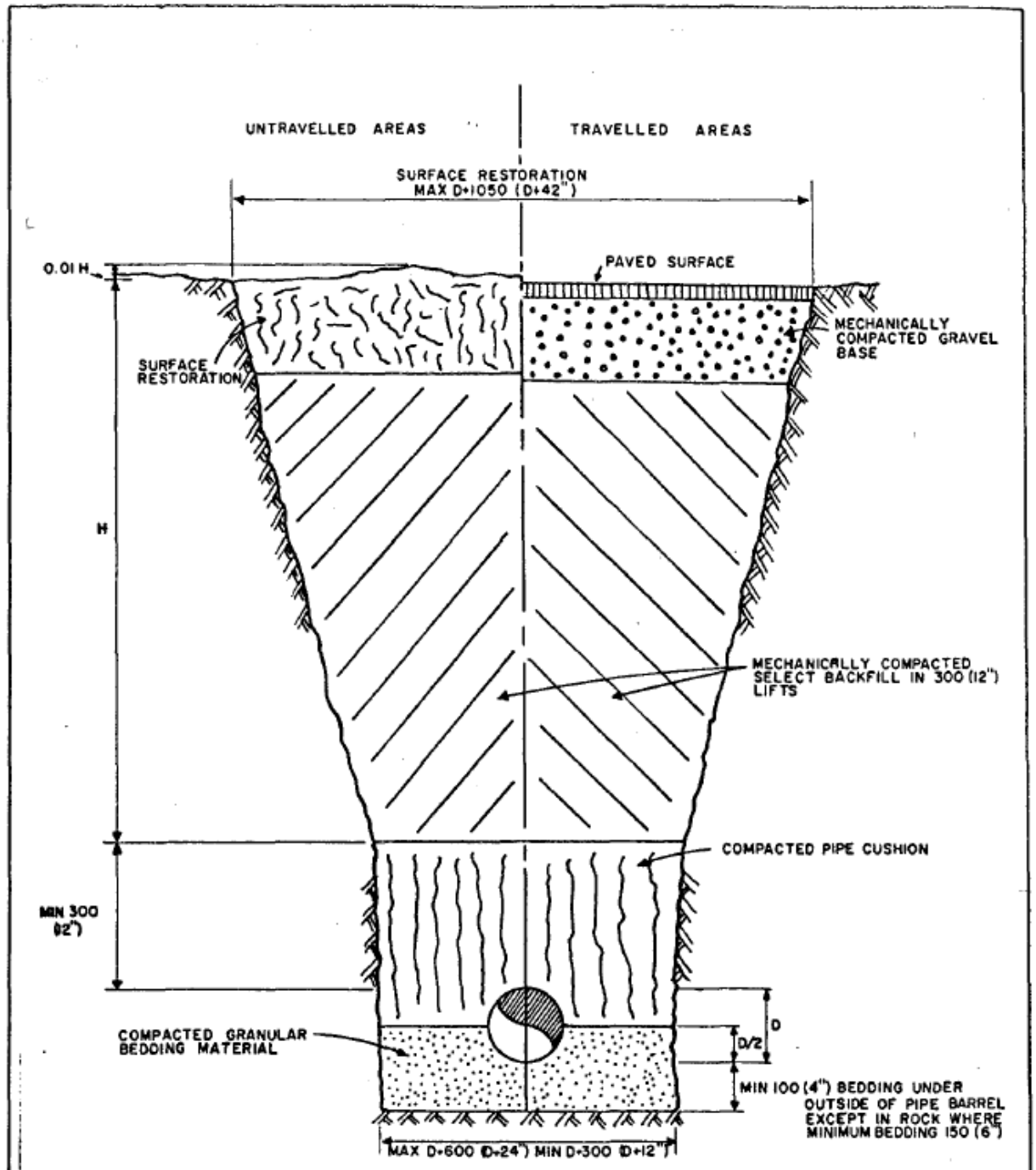
8.02 Manhole Keys

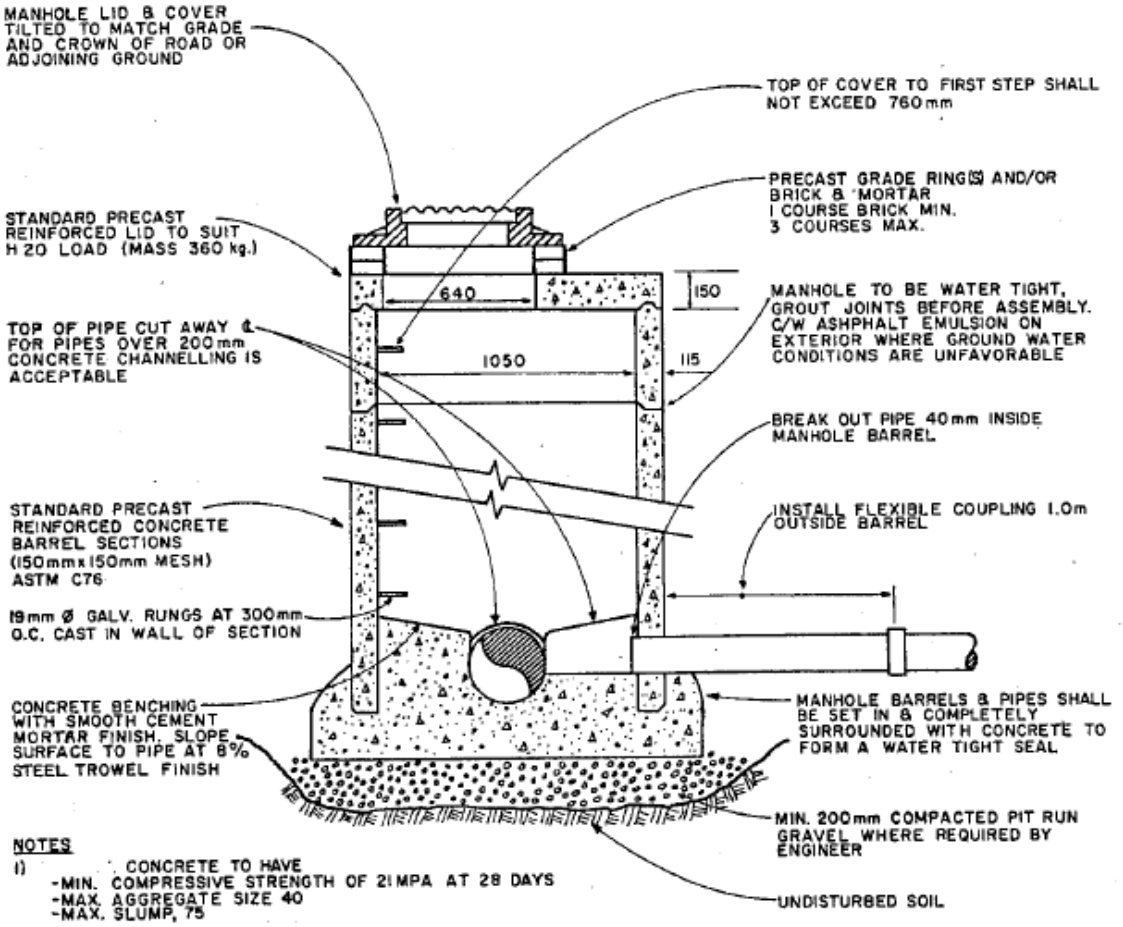
One set of manhole keys shall be provided to the Cowichan Valley Regional District to fit the style of manhole cover utilized on the project.

8.03 Final Acceptance:

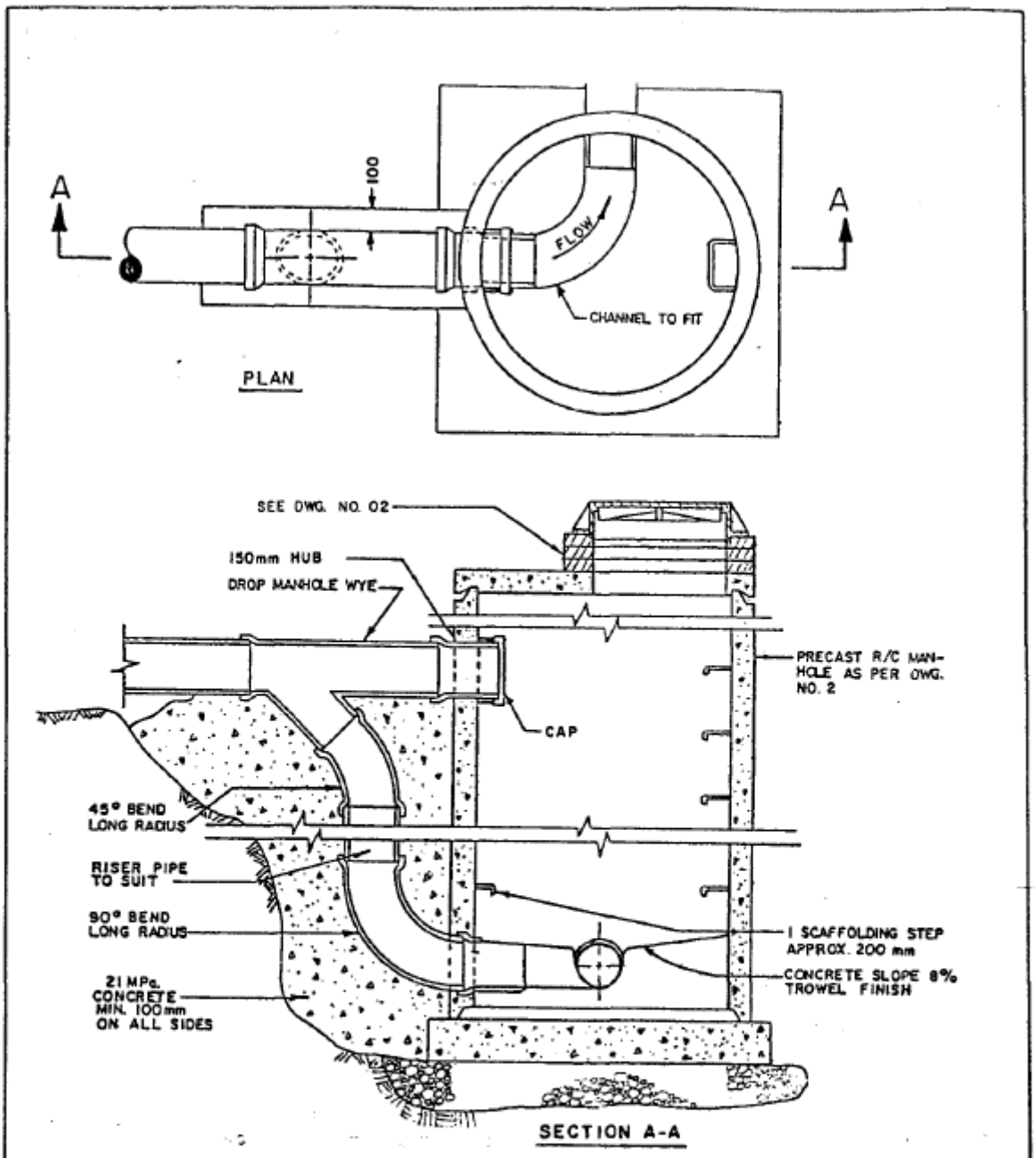
Upon the expiration of the one year maintenance period referred to in section 8.01 of this specification a final inspection shall be made by the Operations Manager. Any deficiencies noted at that inspection shall be rectified within thirty days. Following completion of any rectification

~~works the system shall be certified as maintainable at public expense by the Operations Manager.~~

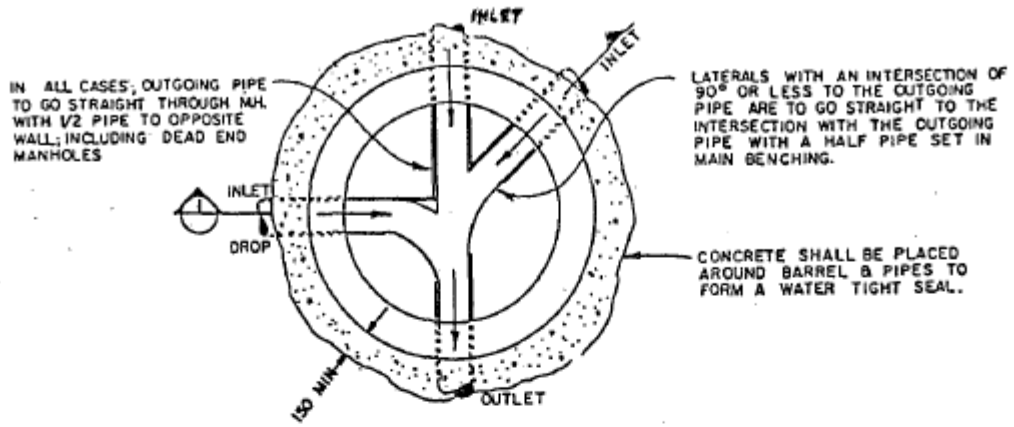

UNTRAVELLED AREAS
TRAVELLED AREAS
SURFACE RESTORATION
MAX D+1050 (D+42")
0.01 H
PAVED SURFACE
MECHANICALLY COMPACTED GRAVEL BASE
SURFACE RESTORATION
H
MECHANICALLY COMPACTED SELECT BACKFILL IN 300 (12") LIFTS
COMPACTED PIPE CUSHION
MIN 300 (12")
COMPACTED GRANULAR BEDDING MATERIAL
D
D/2
MIN 100 (4") BEDDING UNDER OUTSIDE OF PIPE BARREL EXCEPT IN ROCK WHERE MINIMUM BEDDING 150 (6")
MAX D+600 (D+24") MIN D+300 (D+12")
DATE: JAN, 1987
SCALE: N.T.S.
DWN: L.N.
CHECKED:
STANDARD TRENCH SECTION
COWICHAN VALLEY REGIONAL DISTRICT
137 EVANS STREET, DUNCAN, B.C.
V9L 1P5
STANDARD DRAWING
SS 01



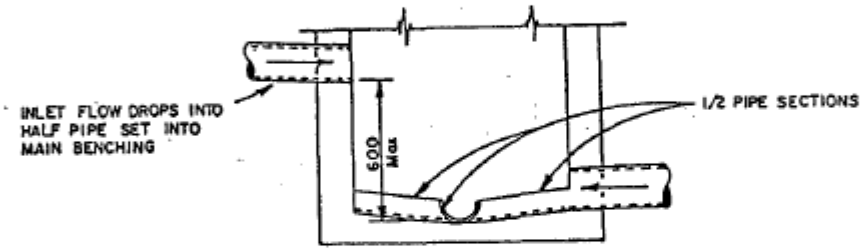

| | | |
|---|---|---|
| DATE: JAN, 1987 | TYPICAL MANHOLE<br>For 200 mm-460 mm Diameter Mains | **COWICHAN VALLEY REGIONAL DISTRICT**<br>137 EVANS STREET, DUNCAN, B.C.<br>V9L 1P5 |
| SCALE: N.T.S. | | |
| DWN: L.N. | | |
| CHECKED: | | STANDARD DRAWING — SS/02 |



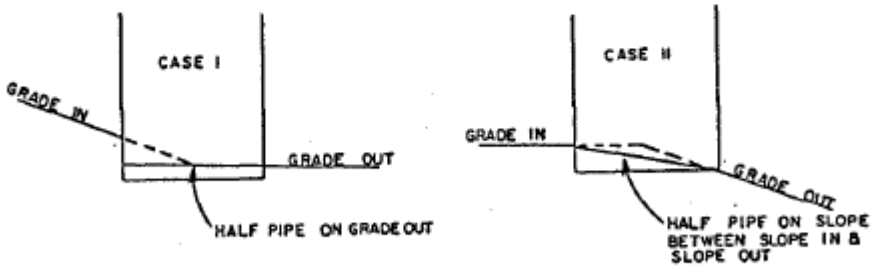

| | | |
|---|---|---|
| DATE: JAN, 1987 | EXTERIOR DROP MANHOLE | COWICHAN VALLEY REGIONAL DISTRICT<br>137 EVANS STREET, DUNCAN, B.C.<br>V9L 1P5 |
| SCALE: N.T.S. | | |
| DWN: L.N. | | STANDARD DRAWING SS/03 |
| CHECKED: | | |



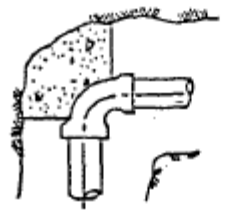

PLAN OF MANHOLE



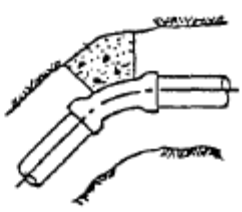

SECTION THROUGH MANHOLE (1)




| | | |
|---|---|---|
| DATE: JAN, 1987 | MANHOLE BENCHING & CHANNELLING | COWICHAN VALLEY REGIONAL DISTRICT<br>175 EVANS STREET, DUNCAN, B.C.<br>V9L 1P5 |
| SCALE: N.T.S. | | |
| DWN: L.N. | | |
| CHECKED: | | STANDARD DRAWING SS 04 |

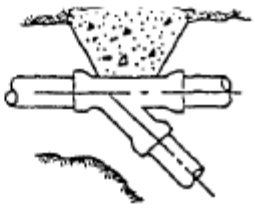


90° BEND

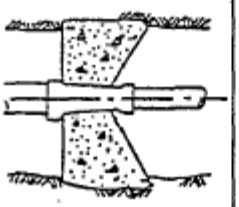


45° & 22 1/2° BEND

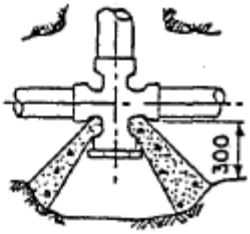

VERTICAL BEND



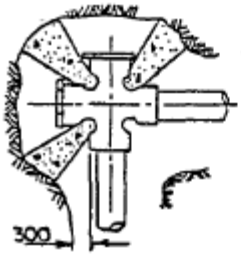
45° WYE



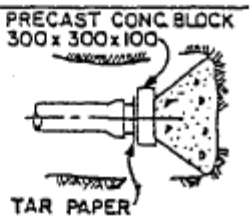
REDUCER




PLUGGED TEE




PLUGGED CROSS



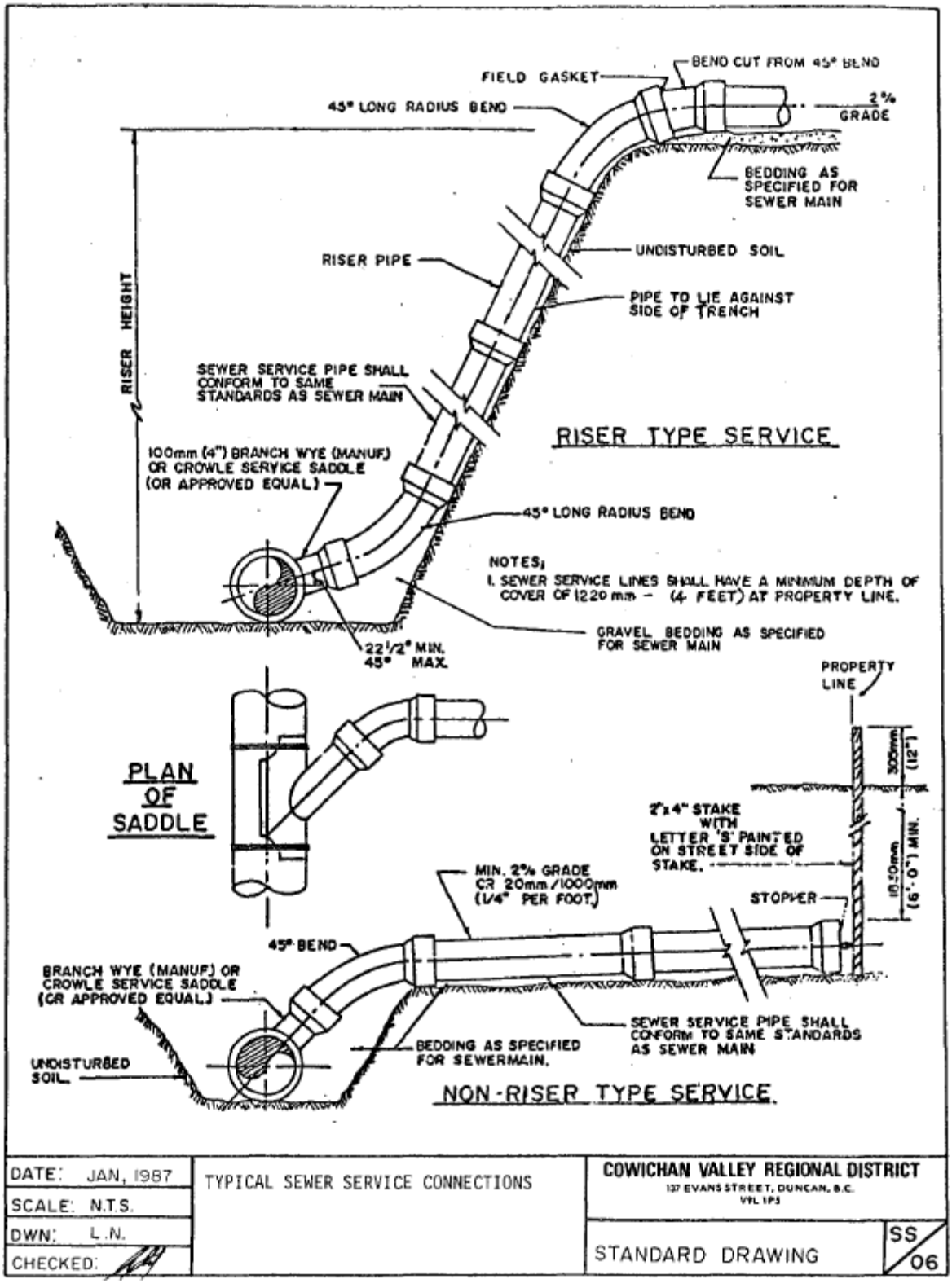

CAPPED END OR TEE

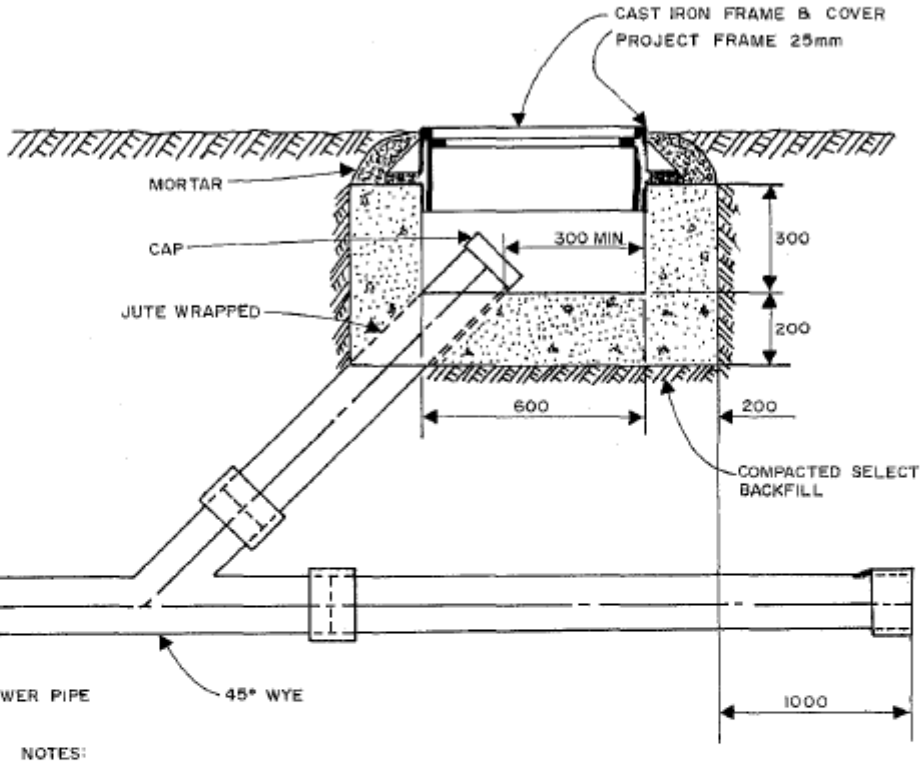
MIN THRUST AREA BASED ON WATER PRESSURE OF 700 KPa AND SOIL BEARING CAPACITY OF 50 KPa

| FITTING | PIPE DIAMETER Millimetres | MIN. THRUST AREA Sq. Metres | FITTING | PIPE DIAMETER Millimetres | MIN. THRUST AREA Sq. Metres |
|---|---|---|---|---|---|
| 90° BEND | 100 | 0·2 | 22 1/2° BEND | 100 | 0·1 |
| | 150 | 0·4 | | 150 | 0·2 |
| | 200 | 0·7 | | 200 | 0·2 |
| | 250 | 1·1 | | 250 | 0·3 |
| | 300 | 1·6 | | 300 | 0·5 |
| 45° BEND OR WYE | 100 | 0·2 | CAPPED END OR TEE | 100 | 0·2 |
| | 150 | 0·3 | | 150 | 0·3 |
| | 200 | 0·4 | | 200 | 0·5 |
| | 250 | 0·6 | | 250 | 0·8 |
| | 300 | 0·9 | | 300 | 1·1 |

NOTES –
1. VALUES GIVEN IN TABLE ARE BASED ON A SOIL BEARING CAPACITY OF 50 kPa FOR SOFT CLAYS AND SATURATED SAND-CLAY SOILS IN AN UNDISTURBED STATE.
2. FOR FIRM DRY CLAY OR COMPACT SAND OR GRAVEL, DIVIDE THRUST AREAS BY 2·0.
3. FOR CROSSES USE 45° BEND VALUE IN EACH QUADRANT.
4. WHERE PIPE SIZE DIFFERS IN ANY ONE FITTING, USE THE VALUE FOR THE MAX. SIZE.
5. THRUST BLOCKS OF 15 MPa CONCRETE
6. WHERE 1030 kPa OR 1380 KPa WATER PRESSURE ARE USED MULTIPLY THRUST AREAS BY 1·5 & 2·0 RESPECTIVELY. ALLOW FOR TEST PRESSURES IN SELECTION OF THRUST AREAS.
7. THRUST BLOCK CONCRETE SHALL NOT ENCROACH ON THE PIPE, BUT SHALL BEAR ON THE FITTING ONLY.

| | | |
|---|---|---|
| DATE: JAN, 1987 | STANDARD THRUST BLOCK DETAILS | COWICHAN VALLEY REGIONAL DISTRICT<br>131 EVANS STREET, DUNCAN, B.C. V9L 1P3 |
| SCALE: N.T.S. | | |
| DWN: L.N. | | STANDARD DRAWING SS 05 |
| CHECKED: | | |


FIELD GASKET
BEND CUT FROM 45° BEND
45° LONG RADIUS BEND
2% GRADE
BEDDING AS SPECIFIED FOR SEWER MAIN
RISER PIPE
UNDISTURBED SOIL
PIPE TO LIE AGAINST SIDE OF TRENCH
RISER HEIGHT
SEWER SERVICE PIPE SHALL CONFORM TO SAME STANDARDS AS SEWER MAIN
RISER TYPE SERVICE
100mm (4") BRANCH WYE (MANUF) OR CROWLE SERVICE SADDLE (OR APPROVED EQUAL)
45° LONG RADIUS BEND
NOTES;
1. SEWER SERVICE LINES SHALL HAVE A MINIMUM DEPTH OF COVER OF 1220 mm - (4 FEET) AT PROPERTY LINE.
GRAVEL BEDDING AS SPECIFIED FOR SEWER MAIN
22 1/2° MIN. 45° MAX.
PROPERTY LINE
300mm (12")
PLAN OF SADDLE
2"x4" STAKE WITH LETTER 'S' PAINTED ON STREET SIDE OF STAKE.
1810mm (6'-0") MIN.
MIN. 2% GRADE OR 20mm/1000mm (1/4" PER FOOT)
STOPPER
45° BEND
BRANCH WYE (MANUF) OR CROWLE SERVICE SADDLE (OR APPROVED EQUAL)
SEWER SERVICE PIPE SHALL CONFORM TO SAME STANDARDS AS SEWER MAIN
BEDDING AS SPECIFIED FOR SEWERMAIN.
UNDISTURBED SOIL
NON-RISER TYPE SERVICE.
DATE: JAN, 1987
SCALE: N.T.S.
DWN: L.N.
CHECKED:
TYPICAL SEWER SERVICE CONNECTIONS
COWICHAN VALLEY REGIONAL DISTRICT
137 EVANS STREET, DUNCAN, B.C. V9L 1P3
STANDARD DRAWING
SS 06




NOTES:

1. PRECAST SECTION OF 600 DIA. CONCRETE PIPE MAY BE USED INSTEAD OF POURED-IN-PLACE BOX SHOWN.

| | COWICHAN VALLEY REGIONAL DISTRICT | | |
|---|---|---|---|
| DRAWN: L.N. | CLEAN OUT STRUCTURE - TYPE 2 | | |
| DATE: JULY, 1987 | | | |
| | DWG NO. SS-07 | | REV |

Province of British Columbia

No. 900087

# Statutory Approval

*Under the provisions of section* 973

*of the* MUNICIPAL ACT

*I hereby approve Bylaw No.* 1215

*of* COWICHAN VALLEY REGIONAL DISTRICT, *a copy of which is attached hereto.*

*Dated this* 20th *day of* Feb, 1990

Minister of Municipal Affairs, Recreation and Culture

M28-2065