SUNSHINE COAST REGIONAL DISTRICT
BYLAW NO. 320

THIS DOCUMENT HAS BEEN REPRODUCED FOR CONVENIENCE ONLY and is a consolidation of *"Sunshine Coast Regional District Subdivision Servicing Bylaw No. 320, 1987"* with the following amendment bylaws:

Date Adopted	Date Bylaw comes into Effect	Bylaw Number	Section Amended
2024-MAR-14	2024-MAR-14	320.18	a) Insert a new definition in Section 104 as follows: "MMCD Design Guidelines" means the edition of the Master Municipal Construction Document Design Guidelines published by the Master Municipal Construction Documents Association that is in place at the time of the design of the works and services; b) Delete Section 4.02 (a) in Schedule B in its entirety and replace with the revised Section 4.02 (a) as follows: 4.02 Waterworks (a) Design Pressure Generally, water systems will be designed for pressures in the range of 205 – 1035 kPa. Fire flows are to be determined in accordance with the requirements of the current editions of the MMCD Design Guidelines and of "Water Supply for Public Fire Protection – A Guide to Recommended Practice" published by the Fire Underwriters Survey. Where a difference arises between MMCD minimum requirements and the current edition of the "Water Supply for Public Fire Protection – A Guide to Recommended Practice" published by Fire Underwriters Survey, the more stringent requirements shall take precedence.

Individual copies of any of the above bylaws are available from the Sunshine Coast Regional District Legislative Services Division. For legal purposes, copies of the original bylaws should be obtained.

Consolidated June 3, 2024 to incorporate up to 320.18

SUNSHINE COAST REGIONAL DISTRICT

BYLAW NO. 320

SUBDIVISION SERVICING BYLAW

A bylaw to regulate or control the subdivision of
land pursuant to the provisions of
Division (7), Part 29 of the Municipal Act.

The Board of the Sunshine Coast Regional District in open meeting assembled enacts as follows:

100 Interpretation and Administration

101 Title

This Bylaw may be cited as the "Sunshine Coast Regional District Subdivision Servicing Bylaw No. 320, 1987".

102 Organization

This bylaw is divided into four parts dealing with the following subjects:

Part 100 - Interpretation and Administration
Part 200 - General Requirements
Part 300 - Servicing
Part 400 - Adoption

Attached to and hereby made an integral part of this bylaw are the following schedules:

Schedule `A' - Servicing Requirements
Schedule `B' - Subdivision Servicing Manual
Schedule ‘C’ – Agreement for Transfer of Community Sewer Systems

103 Application

1. This bylaw shall be applicable to Electoral Areas A, B, D, E, and F of the Sunshine Coast Regional District, as defined in the letters patent.

104 Definitions

In this bylaw:

1. **APPLICANT** means a person who has made application to subdivide land or his duly appointed representative;

2. **APPROVAL** means approval in writing from the authority having jurisdiction;

3. **APPROVING OFFICER** means the approving officer appointed as such pursuant to the Land Title Act;

4. **COMMUNITY SEWER SYSTEM** means a common sewer or system of sewerage or sewage disposal which serves two or more parcels;

5. **COMMUNITY WATER SYSTEM** means a system of water works which serves two or more parcels;

6. **IMPROVEMENT DISTRICT** means an improvement district pursuant to the Water Act or Municipal Act;

7. **LOT OR PARCEL** means a piece of land registered in the Land Titles Office or with the Ministry of Forests & Lands under a separate title from all other lands;

8. **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;

9. **MMCD DESIGN GUIDELINES** means the edition of the Master Municipal Construction Document Design Guidelines published by the Master Municipal Construction Documents Association that is in place at the time of the design of the works and services.

10. **NATURAL BOUNDARY** of a body of water means the visible high water mark of that body of water, where the presence and action of the water are so common, and so long continued in all ordinary years, as to mark upon the soil of the bed of the body of water a character distinct from that of the banks thereof, in respect to vegetation as well as in respect in the nature of the soil itself;

11. **REGIONAL DISTRICT** means the Sunshine Coast Regional District;

12. **ROAD** means a highway, constructed to the standards of the Ministry of Highways for the passage of motor vehicles, excluding lanes;

13. **SUBDIVISION** means the division of land into two or more parcels, whether by plan, apt descriptive words, or otherwise.

200 General Requirements

202 Examination

The approving officer shall examine each complete application for subdivision, and shall notify the applicant in writing either that the subdivision is approved, tentatively approved or disapproved.

For the purpose of carrying out his duties, the approving officer may:

1. Require the applicant to provide any additional relevant information, including but not limited to topographic and soil condition data;

2. Conduct inspections and tests in the vicinity of the site of the proposed subdivision;

3. Hear objections to the proposed subdivision from the owners of the neighbouring properties, other public bodies or officials, or utility companies.

203 Maintenance Agreement

Upon written notice that construction completion has been certified, the subdivider will enter into an agreement with the Regional District to maintain the said works for a period of one year from the date of certified completion. The subdivider will provide the Regional District with cash or a bond equal to 10% of the value of the works for the duration of the maintenance period, from which the Regional District may deduct the cost of maintaining the works remedying any defects or damages should the subdivider fail to do so.

300 Servicing Requirements

Works and service shall be provided in accordance with Schedule `A' of this bylaw and meet the subdivision regulations under the Local Services Act.

301 Sewage Disposal

1. Prohibition of Sewage Ocean Outfalls within the Halfmoon Bay OCP Area and the Roberts Creek OCP Area

1.1 No sewage ocean outfalls shall be constructed for the purpose of disposing of sewage effluent

(a) within the area identified as the Halfmoon Bay Official Community Plan Area of Electoral Area B – Halfmoon Bay pursuant to *"Halfmoon Bay Official Community Plan Bylaw No. 325, 1989"*; or

(b) within the area identified as the Roberts Creek Official Community Plan Area of Electoral D – Roberts Creek pursuant to *"Roberts Creek Official Community Plan Bylaw No. 375, 1990"*.

2. Independent Disposal

2.1 Where no community sewer system exists, or is proposed, soil and site conditions for on-site sewage disposal systems shall be subject to the approval of the Medical Health Officer or Public Health Inspector as required by the subdivision regulations pursuant to the *Local Services Act* and the sewage disposal regulations pursuant to the *Health Act.*

Section 301, subsection 3 "Community Sewer System" replaced per BL 320.17.

3. Community Sewer System

3.1 Each community sewer system shall be designed and constructed in compliance with the standards of the Regional District, Schedule 'B' of this bylaw, and in compliance with the Environmental Management Act and Health Act and regulations pursuant to both acts.

3.2 The Regional District reserves the right to acquire any existing or newly constructed community sewer system under this bylaw that has been designed, constructed and maintained to the standards of the Regional District, for which the relevant plans to ensure a sustainable service delivery have been approved by the SCRD, and that meet the terms of the agreement set out in Schedule "C."

3.3 Where a community sewer is to be acquired by the Regional District, every community sewer system design shall be submitted to the Regional District for approval prior to the commencement of construction as required by this bylaw.

3.4 Where the community sewer system will be constructed after final approval of a subdivision or issuance of a building permit for a non-single family building, a servicing agreement shall be entered into as set out under Schedule "B" and shall, notwithstanding Schedule "B," have a security submitted by the developer that:

a) is an automatically renewing, irrevocable letter of credit with a Canadian financial institution; and

b) be based upon a cost estimate for the community sewage system prepared by the registered professional engineer (P.Eng.) of record for the design of the system to the satisfaction of the Regional District, and that includes a 10% contingency, 4% inflation and applicable GST.

3.5 Construction shall be carried out under periodic inspection by Regional

District staff and supervision of the registered professional engineer (P. Eng.) of record prior to acceptance of substantial completion of the community sewer system by the Regional District.

3.6 Notwithstanding Schedule "B", regardless of whether a servicing agreement is entered into under Section 3.4, twenty (20) percent of value of community sewer system as determined under Section 3.4 will be held until the end of a two (2) year maintenance period, commencing at the date of acceptance of substantial completion, and until such time that a written final inspection of the sewer system has been made by professional engineer of record to the satisfaction of the Regional District and the system has been inspected to the satisfaction of the Regional District.

302 Water Supply

1. Community Water Supply

1.1 Each water system shall be constructed and provide water quality in compliance with the Health Act and Ministry Health drinking water standards and to the standards of the Regional District, as set out in Schedule `B' of this Bylaw, and shall be approved by the Regional District prior to construction.

1.2 An extension to a water system shall only be connected to an existing community water system if the water sources used for the combined system are adequate to serve each parcel to be served by the combined system with at least 2,500 litres of water per day year round.

1.3 Where a new community water system is not to be connected to an existing system;

(a) the water source to be used by the system shall be adequate to serve each parcel to be served by the system with at least 2,500 litres of water per day, and

(b) when the water source to be used comes under the terms of the Water Act, a licence to divert and use the amount of water required to serve the subdivision shall be obtained by the applicant and be in force at the time of final approval.

1.4 All works constructed or installed as part of a community water system shall become the property of the Regional District, or of any Improvement District having the function of water supply to the land being subdivided, as soon as the works have been satisfactorily installed and tested.

400 **Adoption**

READ A FIRST TIME this 25th day of August, 1988.

READ A SECOND TIME this 15th day of December, 1988.

READ A THIRD TIME this 23rd day of February, 1989.

APPROVED BY THE MINISTER OF MUNICIPAL AFFAIRS
this 30th day of May, 1989.

RECONSIDERED AND ADOPTED
this 8th day of June, 1989.

_____ _____

P. Connor, Chairman L. Jardine, Secretary

SCHEDULE - A
SERVICING REQUIREMENTS

ZONING BYLAW 310 SUBDIVISION DISTRICT	COMMUNITY WATER REQUIRED
A (1000 m²)	YES
B (1500 m²)	YES
C (2000 m²)	YES
D (3500 m² average and 2800 m² minimum)	YES
E (5000 m² average and 4000 m² minimum)	YES
CD1 (Comprehensive Development One) (360 m²)	YES
F (10,000m² and) (8000 m² min)	NO
G (1.75 ha)	NO
I (4.00 ha)	NO
Z (100 ha)	NO

ZONING BYLAW 337 SUBDIVISION DISTRICT	COMMUNITY WATER REQUIRED
A (640 m²)	YES
B (1000 m²)	YES
C (2000 m²)	YES
D (4000 m²)	YES
CD1 (Comprehensive Development One) (2,000 m²)	YES
CD2 (Comprehensive Development Two) (24,000 m²)	YES
G (10,000m² and) (8000 m² min)	NO
G1(10,000 ha)	NO
H (1.75 ha)	NO
I (4.00 ha)	NO
J (2.75 ha)	NO
M (100 ha)	NO

SCHEDULE - B

BEING THE SUNSHINE COAST REGIONAL DISTRICT

SUBDIVISION SERVICING STANDARDS (WATER AND SEWER)

MAY BE PURCHASED ON REQUEST.

SUNSHINE COAST REGIONAL DISTRICT

SUBDIVISION SERVICING STANDARDS
(WATER AND SEWER)

CONTENTS

SCHEDULE B

OF

"SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING BYLAW NO. 320, 1987"

SUNSHINE COAST REGIONAL DISTRICT

SUBDIVISION SERVICING STANDARDS
(WATER AND SEWER)

METRIC CONVERSION TABLE

(APPROXIMATIONS)

WHEN YOU KNOW	MULTIPLY BY	TO FIND
	LENGTH	
millimetres	.04	inches
metres	3.30	feet
kilometres	0.60	miles
inches	2.54	centimetres
feet	0.305	metres
miles	1.60	kilometres
AREA		
square metres	10.80	square feet
hectares	2.50	cubic feet
square feet	0.09	square metres
acres	0.4	hectares
VOLUME		
litres	0.22	imperial gallons
cubic feet	35.00	cubic feet
imperial gallons	4.50	litres
cubic feet	0.03	cubic metres

RELATED SENIOR ACT/REGULATION INFORMATION

APPENDIX

The following senior Act/regulation portions are reprinted and attached to the bylaw for convenience only. This information does not form part of Bylaw 320 and is intended to supplement the bylaw. It should be noted that the particulars of the senior Act/regulations are liable to change by the Province of B.C. from time to time. It should also be noted that the following is a selected and incomplete compilation of related senior government act or regulation portions.

Development Cost Charges

983. (2) A local government may, by bylaw, for the purpose of providing funds to assist the local government to pay the capital costs of

(a) providing, constructing, altering or expanding sewage, water, drainage and highway facilities, other than off-street parking facilities, and

(b) providing park land to service, directly or indirectly, the development for which the charge is being imposed, impose development cost charges on every person who obtains

(c) approval of a subdivision, or

(d) a building permit authorizing the construction, alteration or extension of a building or structure.

Subdivision Servicing Requirements

989. (1) A local government may by bylaw regulate and require the provision of works and services in respect of the subdivision of land, and for that purpose may

(a) regulate and prescribe minimum standards for the dimensions, locations, alignment and gradient of highways in connection with subdivisions of land, and may make different regulations for different uses and for different zones in the municipality or regional district,

(b) require that within a subdivision, highways, sidewalks, boulevards, boulevard crossings, transit bays, street lighting or underground wiring be provided, and be located and constructed in accordance with the standards prescribed by the bylaw, and the bylaw may prescribe different standards for different zones and highway classifications and for different abutting uses of land, and

(c) require that within a subdivision, a water distribution system, a fire hydrant system, a sewage collection system, a sewage disposal system, a drainage collection system or a drainage disposal system be provided, located and constructed in accordance with the standards prescribed in the bylaw, and the bylaw may prescribe different standards for different zones.

(2) Where a local government, an improvement district or greater board operates a community water or sewer system, or a drainage collection or disposal system, the local government may by bylaw require that a system referred to in subsection (1) (c) be connected to the local government, improvement district or greater board system, in accordance with standards prescribed in the bylaw.

(3) Where there is no community water system, the local government may by bylaw require that each parcel to be created by the subdivision have a source of potable water having a flow capacity at a rate prescribed in the bylaw.

Completion of Works and Services

991. All works and services required to be constructed and installed at the expense of the owner of the land being subdivided or developed shall be constructed and installed to the standards prescribed in the bylaw before the approving officer approves of the subdivision or the building inspector issues the building permit, unless the owner of the land

(a) deposits with the municipality or regional district a security in the form and amount prescribed in the bylaw or, if there is no bylaw, in a form and amount satisfactory to the approving officer or building inspector having regard to the cost of installing and paying for all works and services required under the bylaw, and

(b) enters into an agreement with the municipality or regional district to construct and install the required works and services by a specified date or forfeit to the municipality or regional district the amount secured under paragraph (a).

Provision of Park Land

992. (1) An owner of land being subdivided shall, at his option,

(a) provide, without compensation, park land of an amount and in the location acceptable to the local government, or

(b) pay to the municipality or regional district an amount that equals the market value of the land that may be required for park land purposes under this section determined under subsection (6).

(2) Where an official community plan or a rural land use bylaw contains policies and designations respecting the location and type of future parks, the local government may, notwithstanding subsection (1), determine whether the owner shall provide land under subsection (1) (a) or money under subsection (1) (b).

(3) Where a regional district is not, under its letters patent, authorized to exercise a community parks function, the owner shall, notwithstanding the option provided in subsection (1), provide land.

(4) The amount of land that may be required under subsection (1) (a) or used for establishing the amount that may be paid under subsection (1) (b) shall not exceed 5% of the land being proposed for subdivision.

(5) Subsection (1) does not apply to a

(a) subdivision where fewer than 3 additional lots would be created,
(b) subdivision where the smallest lot being created is larger than 2 ha, or

(c) consolidation of existing parcels.

(6) Where an owner opts to pay money under subsection (1) (b), the value of the land is calculated on the basis of the average market value of all land in the subdivision, as that value would be on the date of the final approval of the subdivision by the approving officer, minus the costs of designing, surveying, engineering and servicing.

(7) Where, for the purpose of subsection (6), an owner and a local government do not agree on the market value, it shall be determined in the manner prescribed in the regulations that the minister may make for the purpose.

(8) Where an area of land has been used to calculate the amount of land or money provided or paid under this section, that area shall not be taken into account for a subsequent entitlement under subsection (1) in respect of any future subdivision of the land.

(9) Land or payment referred to in subsection (1) shall be provided or paid to a municipality or regional district before final approval is given or the owner and the local government may enter into an agreement that the land or payment be provided or paid by a date, specified in the agreement, after final approval has been given.

(9.1) Notwithstanding subsection (9), the minister may, by regulation, authorize the payment that may be required by this section be made by instalments and may prescribe the conditions under which instalments may be paid.

(10) Notice of this agreement shall be filed with the registrar in the same manner as a permit may be filed and section 980 (8) to (11) applies.

(11) Where the owner pays money for park land under this section, the municipality or regional district shall deposit this in a reserve fund established for park land acquisition purposes, and sections 378 and 387 apply, but the approval of the minister under section 378 is not required.

(12) Where land is provided for park land under this section, the land shall be shown as park on the plan of subdivision.

Parcel Frontage on Highway

994. (1) Where a parcel being created by a subdivision fronts on a highway, the minimum frontage on the highway shall be the greater of

(a) 1/10 of the perimeter of the lot that fronts on the highway, or

(b) the minimum frontage that the local government may, by bylaw, provide.

(2) The local government may exempt a parcel from the statutory or bylaw minimum frontage provided for in subsection (1).

(3) The local government may delegate its powers under subsection (2) to an approving officer.

Highway Provision and Widening

995. (1) An approving officer may require that the owner of the land being subdivided provide, out of the land that is being subdivided and without compensation, land not exceeding

(a) 20 m in depth, for a highway within the subdivision, or

(b) the lesser of

(i) 10 m in depth, or

(ii) the difference between the current width of a local highway and 20 m, to widen an existing local highway that borders or is within the subdivision.

(2) Where the approving officer believes that, due to terrain and soil conditions, a roadway of a width of 8 m cannot, within the 20 m limit referred to in subsection (1), be adequately supported, protected or drained, he may determine that the owner provide, without compensation, land of a greater width than that referred to in subsection (1) (a) or (b) that, in the approving officer's opinion, would permit the local highway to be supported, protected or drained.

Residence for Relative

996. (1) Notwithstanding a bylaw under this Act or a regulation under the Local Services Act, an approving officer may approve under this section a subdivision of any parcel of land that has been owned by the person applying for the subdivision for not less than 5 years before he makes the application, to provide a separate residence for the owner, or for his father, mother, father-in-law, mother-in-law, son, daughter, son-in-law, daughter-in-law or grandchild.

(2) A parcel created by a subdivision under this section shall be not less than 1 ha, unless a smaller area, in no case less than 2500 m, is approved by the medical health officer.

(3) This section does not apply where the parcel being subdivided is classified as farm land for assessment and taxation purposes, and the remainder of the parcel, after the subdivision, would be less than 2 ha.

(4) The use of a parcel subdivided under this section is restricted to residential use for a period of 5 years, and the use of the remainder of the parcel shall not be changed for 5 years.

(5) An owner shall not subdivide more than one parcel from a parcel under this section in any 5 year period.

Land Title

Requirements as to subdivision and reference plans

67. Every plan tendered for deposit, other than an explanatory plan or sketch plan, shall

(a) be based on a survey made by a British Columbia land surveyor; and

(b) comply with the regulations respecting surveys and plans issued by the Surveyor General for the purposes of this section,

and shall comply with the following additional requirements:

(c) the plan shall have a title that includes the legal description, in accordance with the register, of the land subdivided and indicate whether the whole or part of that land is being subdivided;

(d) the land intended to be dealt with by the plan shall be shown on it surrounded by a line in red ink or another method that may be prescribed by the Surveyor General;

(e) where a whole district lot, section or parcel is subdivided, the plan shall show the boundaries of the district lot, section or parcel;

(f) where a portion of a district lot, section or parcel is subdivided, the plan shall show the boundaries of that portion; and

(i) such number of angular and line measurements to indicate its inclusion within the boundaries of the district lot, section or parcel and its connection with one or more of those boundaries as may be necessary to determine its location; and

(ii) such number of similar measurements to indicate its connection with any other parcel forming a portion of the same district lot, section or parcel as may be necessary to determine the relative location of the several parcels and of the highways serving them;

(g) every plan shall indicate the district lots, sections or parcels adjacent to the land dealt with;

(h) where the plan is of a resubdivision of a parcel shown on a previously deposited plan, or of a parcel described on the register by metes and bounds as a portion of a larger parcel, there shall be shown in a distinct manner on the plan the numbers of distinguishing letter, if any, of the parcel subdivided, and the boundary lines of that parcel;

(i) there shall be marked on the plan the dimensions and courses of the boundaries of each parcel into which the land is divided, or there shall be shown on the plan a sufficient number of angular and linear measurements and bearings from which the dimensions can be deduced;

(j) where there are curved lines on a plan, the plan shall indicate the radius, point of curvature and point of tangency of the curved lines;

(k) where the rights of all affected parties are not prejudiced, a terminal curve may be substituted for a transition curve referred to in section 116 (1) (e) and (g);

(l) all bearings shall refer to the astronomical meridian, and the point of observation for the meridian shall be indicated on the plan, and where an observation cannot be conveniently obtained, information as to the derivation of the meridian used shall be given on the plan;

(m) each angle of each parcel shall be defined on the ground by a post or monument of a durable character, and the manner in which each angle is defined on the ground and the exact position of all posts and monuments placed in or on the ground shall be shown on the plan, and if any offset is made it shall be shown on the plan;

(n) unless the registrar is satisfied that convenience of reference will be served by adopting a particular method of marking, each parcel into which the land is divided shall be marked with a distinct number or letter on the plan, and shall continue an existing series or commence with "1" or "A" and shall number or letter consecutively or alphabetically; but in no case shall the parcels be designated as sections or ranges;

(o) on every parcel created with an area of 0.5 ha or more, the area shall be shown on the plan and shall be expressed in hectares to 4 significant digits;

(p) every highway, park or public square appropriated or set apart for public use shall be shown as such, and distinctly delineated with its measurements marked on the plan;

(q) where a watercourse is included in the land shown on the plan as surrounded by a red line; and

(i) is owned by the Crown; or

(ii) by dedication is returned to the Crown on the subdivision of land; and

(iii) lies within the boundaries of a parcel of one hectare or more in area being created by the plan; and

(iv) is less than 1/10 of the area of the parcel it passes through, the natural boundaries of the watercourse may be indicated on the plan, without dimensions, by photogrammetric means, compass and stadia, or other similar method approved by the Surveyor General;

(r) each plan shall be prepared on tracing linen or on such other material approved by the Surveyor General and shall not exceed 0.75 m in width without the prior consent of the Surveyor General;

(s) except where colours are necessary or the Surveyor General previously approved another process, all lettering, drawing or figures on the plan shall be made in black India ink or printed in black printer's ink;

(t) where the use of colours is necessary, the colours used shall be of a permanent character;

(u) unless otherwise provided by regulation, the plan shall be accompanied by a duplicate linen tracing and white print on print cloth or, in lieu of the duplicate tracing, by one ozalid transparency or other machine made copy of a type approved by the Surveyor General, together with the number of other white prints that may be necessary for the purpose of taxing authorities, the Surveyor General, the Ministry of Transportation and Highways and the regional board of the regional district in which the land is situated;

(v) all abbreviations or symbols used and all necessary particulars not otherwise expressed shall be explained by a legend on the face of the plan;

(w) the correctness of the survey and plan shall be verified by the surveyor by his statement in the prescribed form.

Restrictions on subdivision

73. (1) Except on compliance with this Part, no person shall subdivide land into smaller parcels than those of which he is the owner for the purpose of

(a) transferring it; or

(b) leasing it, or agreeing to lease it for a life, or for a term exceeding 3 years.

(2) Except on compliance with this Part, no person shall subdivide land for the purpose of a mortgage or other dealing that may be registered under this Act as a charge if the estate, right or interest conferred on the transferee, mortgagee or other party would entitle him in law or equity under any circumstances to demand or exercise the right to acquire or transfer the fee simple.

(3) Subsection (1) of this section does not apply to a subdivision for the purpose of leasing a building or part of a building.

(4) No instrument executed by a person in contravention of this section confers on the party claiming under it a right to registration of the instrument or a part of it.

Requirements as to Subdivisions

75. (1) A subdivision shall comply with the following, and all other, requirements in this Part:

(a) necessary and reasonable access

(i) to all new parcels; and

(ii) through the land subdivided to land lying beyond or around the subdivided land shall to the extent of the owner's control be provided by a sufficient highway, and all existing highways provided for in subdivision plans of adjoining land or otherwise legally established shall be continued without unnecessary jogs;

(b) where the land subdivided borders

(i) on a body of water, the bed of which is owned by the Crown;

(ii) on the boundary of a strip of land established as the boundary of a water reservoir, and the strip of land and reservoir are owned by the Crown; or

(iii) on a strip of Crown land 20 m or less in width contiguous to a natural boundary as defined in the Land Act, access shall be given by highways 20 m wide to the body of water and to the strips at distances not greater than 200 m between centre lines, or, in a rural area where the parcels into which the land is subdivided all exceed 0.5 ha, at distances not greater than 400 m between centre lines;

(c) where

(i) the land subdivided borders on a body of water, the bed of which is owned by a person other than the Crown; and

(ii) in the case of a lake or pond, where the surface of the body of water at mean annual high water is at least 1.5 ha, and the mean depth at mean annual high water is at least 0.6 m; or

(iii) in the case of a river, creek or watercourse, where the average width at mean annual high water is at least 6 m and the average depth at mean annual high water is at least 0.6 m, access shall be given by highways 20 m wide to the body of water and to the strips at distances not greater than 200 between centre lines, or, in a rural area where the parcels into which the land is subdivided all exceed 0.5 ha, at distances not greater than 400 m between centre lines; but subparagraph (ii) does not apply to a reservoir or pond where the bed is owned by a public body other than the Crown and used for the purpose of domestic or industrial water supply;

(d) suitable lanes shall be provided in continuation of existing lanes and in every case where lanes are considered necessary by the approving officer.

(2) In considering the sufficiency of a highway shown on a plan and to be dedicated to the Crown, the approving officer shall consider

(a) the location and width of the highway;

(b) the suitability of the highway in relation to the existing use of the subdivided land and the use intended by the subdivision;

(c) the configuration of the land subdivided;

(d) the relation of the highway to be dedicated to an existing main highway or approach, whether by land or water, and local circumstances;

(e) on the question of width, the extent of the use, present and future, to which the highway may be put; and

(f) the likely or possible role of the highway in a future highway network serving the area in which the subdivided land is situated.

(3) An approving officer may, in circumstances that may be defined by regulation, grant relief in whole or in part from a compliance with the provisions of subsection (1) (a).

Matters to be considered by approving officer on application for approval

86. (1) Without affecting the generality of section 85 (3), in considering an application before him for subdivision approval in respect of land not within a municipality, the approving officer may

(a) at the cost of the subdivider, personally examine or have an examination and report made on the subdivision;

(b) hear from all persons who, in his opinion, are affected by the subdivision; and

(c) refuse to approve the subdivision plan, if he considers that

(i) the anticipated development of the subdivision would injuriously affect the established amenities of adjoining or reasonably adjacent properties;

(ii) the plan does not comply with the provisions of this Act relating to access and the sufficiency of highway allowances shown in the plan, and with all regulations of the Lieutenant Governor in Council relating to subdivision plans;

(iii) the highways shown in the plan are not cleared, drained, constructed and surfaced to his satisfaction, or unless, in circumstances he considers proper, security in an amount and in a form acceptable to him is provided;

(iv) the land has inadequate drainage installations;

(v) the land is subject, or could reasonably be expected to be subject, to flooding, erosion, land slip or avalanche;

(vi) after due consideration of all available environmental impact and planning studies, the anticipated development of the subdivision would adversely affect the natural environment to an unacceptable level; or

(vii) the cost to the Province of providing public utilities or other works or services would be excessive.

(2) The Lieutenant Governor in Council may, by regulation, amend, add to, substitute or repeal any of the grounds for refusal enumerated in this section or stated in section 85 (3).

Matters to be considered by approving officer in respect of land within municipality or regional district

87. Without affecting the generality of section 85 (3), in considering an application before him for subdivision approval in respect of land within a municipality or a regional district, the approving officer may refuse to approve the subdivision plan if he considers that the subdivision does not conform to

(a) all applicable provisions of the Municipal Act;

(b) the respective municipal or regional district bylaws regulating the subdivision of land and zoning; and

(c) the official settlement plan, if any, adopted pursuant to the Municipal Act.

SCHEDULE "C "

AGREEMENT FOR TRANSFER OF COMMUNITY SEWER SYSTEMS

"The Owner and the SCRD hereby sets out their understanding and agreements in this matter with respect to community sewer system (CSS) as follows:

1. Collection System

The land owner, developer, strata corporation or other legal entities (collectively referred to as the "Owner") who have constructed or have ownership of a CSS for a strata subdivision, subdivision, non-residential or multi-family building (a "Development"), will at the Regional District's option, be responsible for any repairs or maintenance of the sewage collection system from the building connections to the sewage treatment plant.

2. Operation and Transfer of CSS to SCRD

a. The SCRD will take over operation and maintenance of the CSS commencing that day (the "Takeover Date") at such time that the CSS is substantially completed and commissioned, and subsequently operated by the owner for a period of two (2) years from date of completion to the satisfaction of the SCRD.

b. Upon registration of the strata subdivision or subdivision at the Land Title Office or issuance of an occupancy permit for non-residential or multi-family building (specify one or more as applicable), the Owner will transfer the fee simple title of the lot housing the CSS (the "Lot") to the SCRD. The SCRD will not be responsible for any of the costs of such transfer including applicable taxes and transfer costs. If _____(insert Owner name)_____ and this Development connect in the future to a public sewer system supplied by the SCRD or another entity, thereby eliminating the need for the CSS, then the SCRD will, upon request, transfer the Lot back to the Owner, such transfer to be at the sole cost of the Owner.

c. The Owner will be responsible for all operation, maintenance and repairs costs of the CSS incurred by the SCRD during the first two years of its operation.

d. The Owner will provide or cause to be provided for a period of two years following the Takeover Date (the "Year") an irrevocable letter of credit in favour of the SCRD for $_____ (the "Letter of Credit"), constituting twenty percent (20%) of the total construction cost of the CSS to ensure payment of operation, insure against construction defects, and ensure maintenance and repair of the CSS during the first year of its operation. If the costs of operation, repairs or maintenance to the CSS incurred by the SCRD are not reimbursed by the Owner within 30 days upon invoice by the SCRD during the 2-year period, then the SCRD may draw down funds from the Letter of Credit. The SCRD shall use its best efforts to ensure that the costs of such maintenance or repairs are reasonable.

3. Maintenance Frontage Fees

Upon the issuance of an Occupancy Permit for the building or buildings on a lot within the Development, and after the first year of operation by the Owner, the owner of each lot or strata lot within the Development will be required to pay an annual maintenance fee to the SCRD, in an amount to be determined by the SCRD, for operation, repairs and maintenance of the CSS. For partial year charges, the rate shall be pro-rated, based on the date of occupancy of such lot or strata lot, and paid in advance for the remainder of the year. A sewer frontage fee, in an amount to be determined by the SCRD, will also be imposed on each or lot or strata lot in this after the first year of operation.

The above fees may be adjusted from time to time, according to the actual costs of operation of the CSS and will include an appropriate amount for operating contingent and capital replacement reserve funds.

4. Service Bylaws

Following the Takeover Date, the SCRD will amend Bylaws Nos. 1026 and 428, to include this Development as an area serviced by an SCRD Sewage Treatment Facility and to impose charges against the owners of the strata lots for the use and operation of the CSS.

5. Term of the Agreement

This agreement shall expire one year after the Takeover Date when the SCRD will assume full responsibility of the CSS; and the remaining Letter of Credit, if not totally expended, as per item 2 d, shall be returned to the Owner.

DATED at Sechelt, British Columbia, the _____day of _____.

SUNSHINE COAST REGIONAL DISTRICT,

Per:

_____

(Insert Name of Owner)

Per:

_____

End of Agreement

SUNSHINE COAST REGIONAL DISTRICT

SUBDIVISION SERVICING STANDARDS
(WATER AND SEWER)

CONTENTS

SCHEDULE B

OF

"SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING BYLAW NO. 320, 1987"

SUNSIIINE COAST REGIONAL DISTRICT

S{JBDIVISION SERVICING STANDARDS

(WATER AND SEWER)

SCHEDULEB

OF

"SUNSmNE COAST REGIONAL DISTRICT SUBDIVISION SERVICING BYLAW NO. 320, 1987"

SUNSHINE COAST REGIONAL DISTRICT
P.O. Box800
5477 Wharf Road
Sechelt. B.C.
VON 3AO

II

PROCEDURES TO EXTEND WATER AND/OR SEWER SYSTEMS

1. Preliminary Application for System Extensions

The first step is to submit a Preliminary Application to the Works Superintendent.

The application will be given a reference number which is to appear on all subsequent drawings and correspondence. An examination fee in the amount of ten dollars ($10.00) will be charged.

The Works Superintendent or his assistant should be consulted prior to making the application. In some cases, a feasibility report by a Professional Engineer will be required in support of the application.

If the Works Superintendent is satisfied that the application conforms to Long Term Regional Plans and Policies, he will grant Preliminary Acceptance of the Application.

2. Estimate of Construction Cost

Preliminary Acceptance will be generally granted after the Works Superintendent has prepared a preliminary estimate of the costs.

This estimate is made to confirm feasibility before any detailed engineering design has been done; the estimate is based on standard unit prices for assumed pipe sizes and depths which may vary considerably in the final design.

A final construction estimate will be prepared by the Works Superintendent after the engineering drawings are complete to determine the amount of the security required by the Regional District to ensure that all services required in the development will be completed.

A minimum $2.50.00 is charged for inspection of the work by the Regional District and a minimum $100.00 is charged for office administration.

The Developer is responsible for calling tenders, awarding contracts for construction, supervision of his contractors, progress payments to his contractors and for ensuring that all Regional requirements are carried out to a satisfactory conclusion within the time agreed.

Alternately, the Developer may request that the Regional District does the work.

The final construction cost estimate by the Regional District is not an offer to do the work. However, should the Developer wish the Regional District to construct the work, he may elect to request a price for such construction from the Regionai District and the Regional District may or may not offer to do the work and submit its price for construction on a cost plus basis.

3. Engineering Design

All drawings and design of services shall be in accordance with Regional Standards for Design of Water and Sewer.

4. Submission of Engineering Drawings for Approval

Upon completion of the engineering drawings, two prints of each shall be submitted to the Regional District for approval. The drawings will be checked to ensure that they comply with current by-laws, policies and good engineering practice. If necessary, one copy of the drawings will be returned to the Developer's Engineer for revision. After the suggested revisions have been implemented, another two prints of each of the affected drawings shall be re-submitted, and this process shall be repeated until the drawings are satisfactory.

As soon as the Regional District is satisfied with the drawings, the Developer shall secure the necessary senior government permits.

The Regional District has the right to order additional works if required in the event that unforeseen conditions or circumstances are discovered after the drawings have been approved for construction.

5. Security Deposit

No security deposit is required at present.

6. Water and Sewer Servicing Agreement

Along with the delivery to the Regional District of the Security Deposit, the Developer shall enter into an Agreement with the Regional District, ensuring the completion of the work shown on the approved drawings within an agreed time limit. Should the Developer fail to abide by the terms of the Agreement, the Regional District will exercise its options under the Agreement as secured by the Security Deposit.

7. Legal Surveys

The Developer shall engage a registered British Columbia Land Surveyor to perform ail legal surveys only after final approval. It shall be the responsibility of the Deve!per to ensure that all easements required by the Municipality are registered in the Land Registry Office. Plans of the legal survey shall be done in conformance with standards established by the Engineer.

8. Construction

All construction shall be done in accordance with Regional District Standard Specifications.

Prior to commencement of construction, a site meeting shall be arranged between the Public Works and the Contractor's superintendent In order to clarify the procedures for obtaining approval for each phase of the wol1(.

e. · services

All underground sewer services crossing streets shall be completed before paving, or alternatively double servicing shall be installed to ensure that no cuts are made In the new pavement.

10. •As-Built" Drawings

WIlhIn thirty (30) days of the completion of the wOlk, the Developer's Engineer shall make "as-built" revisions to the drawing. One full-sized positive transparency of each of the •as-built" drawings shall be delivered to the Regional District to a scale and to details prescribed by the Regional District.

11. One Year Maintenance Perfonnance Bond

After acceptance of the wolk, the Developer shall be responsible for maintenance for a period of one year. A tatter of Credit or other acceptable security, in the amount of 10% of the value of the wOlk, shall be deposited with the Regional District for the one year period.

SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING STANDARDS (WATER AND SEWER)

III

WATER AND SEWER

SERVICING AGREEMENT

THIS AGREEMENT made this __ day of _____ in the year 19 _ by and between the Sunshine Coast Regional District, herein called the "Corporation", and _____ hereinafter called the "Applicant".

WITNESSETH: That the Corporation and the Applicant, in consideration for the mutual covenants herein and for other good and valuable considerations, undertake and agree as follows:

ARTICLE 1. Upon delivery to the Corporation of a Security Deposit acceptable to the Corporation in the amount of the Corporation's Estimate of the cost of the work to be performed by the Applicant under this Agreement, the Corporation may grant final approval of the Servicing Extensions.

ARTICLE 2. Upon final approval, the Applicant shall:

(i) provide all necessary materials, labour, supervision and equipment and perform all work shown on the Drawings and fulfill everything as set forth and in strict accordance with the Drawings and Contract Documents for the project entitled:

which have been signed in duplicate by the Corporation and the Applicant and which were prepared by:

(ii) and commence to actively proceed with the work described in the Agreement within _ days of the date on which the Corporation signs and dates the plan of Subdivision, and complete all of the said work within a period of __ calendar months.

The time of completion of the work under the Contract may be extended at the discretion of the Corporation.

Initials: _____

_____

_____

(iii) obtain and maintain in force during the term of this Agreement, insurance policies forming part of this Agreement. Certified copies of said policies shall be filed with the Corporation prior to commencement of the work.

(iv) guarantee the work as specified in the General Conditions for a period of one (1) year from the date of Acceptance by the Corporation.

(v) alternately request that the Corporation do the work at Developers cost plus overhead.

ARTICLE 3. The following is an exact list of the Drawings and Contract Documents referred to in ARTICLE 2 (i) and which are annexed hereto, marked as exhibits respectively and form part of this Agreement:

ARTICLE 4. The Corporation will release partial amounts from the Security Deposit on the percentage basis of the work satisfactorily completed once per month as work progresses.

Upon the expiration of forty {40) days after acceptance of the work by the Corporation and upcn delivery by the Applicant to the Corporation of release from all known claims and liens and a statutory declaration, the Corporation may release ninety-five {9.5) percent of the Security Deposit. The remaining five (5) percent of the Security Deposit will be held until all of the Applicant's obligations under this Agreement have been discharged as specified.

ARTICLE 5. In the event that the Applicant should, in the sole judgement of the Corporation, fail to abide by any of the terms of this Agreement, the Corporation shall have the right to draw upon the Security Deposit at its sole discretion.

ARTICLE 6. All communications in writing between the Corporation and the Applicant shall be deemed to have been received by the addressee if delivered to the individual, or to a member of the firm, or to any officer of the Corporation for whom they are intended, or if sent by mail or by telegram addressed as follows,

Initials: _____

_____

_____

The Corporation at _____

_____
(Address)

The Applicant at _____

_____
(Address)

IN WITNESS WHEREOF the parties herein have hereunto set their respective hands the day and year first written, and where a party hereto is a corporate entity, the corporate seal was affixed in the presence of its duly authorized officers.

SIGNED, SEALED AND DELIVERED by the Applicant in the presence of:

Witness _____

Address _____

Occupation _____

_____
Signature of Applicant

The Corporation Seal of _____

_____

was hereunto affixed in the presence of:

_____

_____

SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING STANDARDS (WATER AND SEWER)

IV

GENERAL CONDITIONS Of CONTRACT

FOR CONSTRUCTION OF WATER AND SEWER
IN SUB-DIVISIONS, DEVELOPMENTS, AND
ON MUNICIPAL PROPERTIES

ARTICLE I DEFINITION OF TERMS

"THE OWNER"	is the Sunshine Coast Regional District.
"THE CORPORATION"	is the Sunshine Coast Regional District.
"THE CONTRACTOR"	is the "Applicant" named in the Agreement.
"THE ENGINEER"	is the Works Superintendent of the Corporation or his duly appointed representative.
"SUPPLY or PROVIDE"	shall mean supply and pay for or provide and pily for.
"THE WORK"	shall mean the whole of the work, materials, labour and all things required to be done, furnished or performed by the Contractor under this Contract.
"PROJECT SUPERVISOR"	is the person designated by the Applicant to coordinate all aspects of this project and to act as liaison man between the Owner and the Contractor.

ARTICLE 2 INTENT OF CONTRACT

The intent of the Contract is that the Contractor shall provide all necessary materials, equipment, labour and supervision and all else necessary for the proper execution of the work. The Contractor shall do all the work shown on t'1e drawings and described in the specifications and all incidental work necessary to complete the project.

ARTICLE 3 UNFORESEEN CONDITIONS

li at any time after the drawings have been approved for construction, unforeseen cond;tions or circumstances become known which make it necessary that changes in the design or extra works be done in order to complete the project in a satisfactory manner, the Engineer shall have the right to order such changes or extra work as he deems necessary to complete the work in a satisfactory manner. All costs of such extra work shall be borne by the Contractor.

Initials: _____

_____

_____

ARTICLE 4 SUBCONTRACTS

The Contractor shall not sublet the work or any part thereof without the consent of the Corporation.

Nothing in the Contract Documents shall create any contractual relationship between any subcontractor and the Corporation. The Contractor shall bind every subcontractor by the terms of the Contract Documents. The Contractor is responsible to the Corporation for the acts and omissions of his subcontractors and their employees, to the same extent that he is responsible for the acts and omissions of his own employees.

ARTICLE 5 CONTRACT DOCUMENTS

The following constitutes a complete set of Contract Documents, and in case of any inconsistency between them, the provisions of such documents shall take precedence in the order in which they are listed below:

1. Agreement
2. Special Provisions
3. General Conditions
4. The Corporation's Standard Specifications
5. The Drawings listed in the Agreement
6. The Corporation's Estimate of the Cost of the Work
7. Letter of Credit
8. List of Subcontractors

In case of inconsistency between drawings, large scale drawings shall take precedence ver those of smaller scale.

ARTICLE 6 SECURITY DEPOSIT

To ensure the faithful execution and proper fulfillment of this Contract, the Contractor shall provide the Owner with a Security Deposit in the amount of the Corporation's Construction Cost Estimate in the form of an irrevocable letter of clean credit or in cash. The Letter of Credit shall be in conformance with the Corporation's standard form. The expiry date shall be at least one (I) year after the date shown on the Agreement for the completion of the wo k.

ARTICLE 7 ENGINEER'S STATUS

The Engineer shall be the Owner's representative during the construction period and shall observe the work in progress on behalf of the Owner. He shall have authority to act on behalf of the Owner only to the extent expressly provided in the Contract Documents or otherwise in writing. The Engineer shall have the authority to stop the work whenever such stoppage may be necessary, in his reasonable opinion, to ensure the proper execution of the Contract.

The Engineer is, in the first instance, the interpreter of the Contract and the judge of its performance. The Contractor shall obey, perform and comply with the Engineer's orders or instructions with respect to the work, or concerning the conduct thereof, promptly, efficiently and to the satisfaction of the Engineer. However, should the Contractor hold such orders or instructions to be

at variance with the Contract Documents or to involve changes in work already done, ordered or underway in excess ol the Contr act, he shall notify the Engineer accordingly in writing within ten (IO) days of the receipt of such orders or instructions and before proceeding to carry them out.

ARTICLE 8 INSPECTION OF WORK

The Contr actor shall allow the Engineer and/or Owner access and provide adequate facilities for access to any part of the works at all times. If the specifications, Engineer's instructions, laws, ordinances, or any public authority requires any work to be specially tested or approved, the Contractor shall give the Engineer advance notice of his preparedness tor such inspection, and if the inspection is by an authority other than the Engineer, of the date fixed for such inspection. The Engineer shall inspect the work promptly and without causing unreasonable delay to the Contractor.

For inspection work carried out during times other than the normal working hours of the Corporation all costs for inspection will be charged to the Contractor. The Contractor shall give the Engineer at least twenty-four (24) hours notice that work will be carried out at times other than normal working hours.

On request by the Engineer, the Contractor shall open for inspection any part of the work that has been covered up. If the Contractor refuses to comply with such request, the Owner may employ other persons to uncover the work. If the work is found to be in accordance with the Contract requirements, then the cost of uncovering and recovering the work sh all be borne by the Owner. If any of the work was covered by the Contractor in contravention of the Engineer's instructions, or if the uncovered work is found not to be in accordance with Contract requirements, then the cost of uncovering and recovering the work shall be charged to the Contractor.

The acceptance, or the lack of comment on the part of the Engineer, of methods of construction employed by the Contractor shall not relieve the Contractor of his responsibility for any errors therein, and shall not be regarded as an acceptance for the work done by the Contractor.

ARTICLE 9 SUPERVISION AND LABOUR

The Contractor shall designate a Project Supervisor to receive and direct communication between the Owner and the Applicant, servants and agents, etc. and will ensure that the project is successfully completed within the specified time limit. The Project Supervisor shall ensure that each phase of the work has been adequately inspected by informing the Engineer twenty-four (24) hours in advance when inspection is required.

The Contractor shall keep on the work at all times during its progress a competent superintendent who is acceptable to the Engineer. The superintendent shall represent the Contractor in his absence and directions given to him shall be held to be given to the Contractor. The superintendent shall give efficient supervision to the work until its completion.

When competent personnel are available locally they shall, whenever possible, be employed by the Contractor.

The Contractor shall comply with the requirements of the Fair Wages and Hours of Labour Act of Canada, the Workmen's Compensation Act of The Province of British Columbia, and all other Federal and Provincial legislation regarding wages and labour regulations.

ARTICLE 10 LANDS AND EASEMENTS

The Contractor shall provide the lands upon which the work is to be performed. Where work is to be performed on lands owned by others, the Contractor shall obtain such easements or rights-of-way as are required by the Corporation. Easements shall be obtained and registered by the Contractor in the name of the Corporation.

It shall be the Contractor's responsibility to ascertain the boundaries of all lands and easements on which the work is to be performed. Any lands, other than those upon whlch the work is to be performed which may be required for temporary facilities, storage or access, shall be provided by the Contractor.

The Contractor shall not enter upon any lands owned by others without first obtaining written permission from the owners of such lands. The Contractor shall not enter upon lands owned by others on which the Corporation has easements or rights-of-way were granted. The Contractor shall abide by any special conditions on which easements or rights-of-entry have been granted to the Corporation.

The issuance of a Certificate of Acceptance by the Engineer may be withheld until the Contractor has obtained signed releases from the owner of all private lands entered upon by the Contractor for the purpose of fulfilling this contract, stating that they have no unsettled claims against the Contractor as a result of his entering upon such pri-,ate lands if such entry became necessary to corn plete the work.

ARTICLE 11 RESTORATION OF LANDS OWNED BY OTHERS

Upon completion of the work, all lands owned by others which ha·,e been disturbed by the Contractor shall be restored to at least their original condition, and nothing shown or anything not shown on the drawings shall relieve the Contractor of this responsibility.

With the exception *oi* replanting, returfing or reseeding, which may be deferred until favourable weather, the Contractor shall restore landscaping and other improvements to the satisfaction of the Engineer within a period of two weeks after completion of the backfilling. If the restoration is not completed within this time, the Corporation reserves the right to carry out and complete the restoration and to charge the cost of such work to the Contractor.

ARTICLE 12 CONNECTION TO EXISTING SERVICES

The Contractor shall not make connections to existing water or sewer mains. This work will be carried out by Corporation crews at cost to the

Contractor.

ARTICLE I 3 LOCATION /\ND PROTECTION OF EXISTING SERVICES

The existing services shown on the drawings are not guaranteed to be accurate or complete. It shall be the responsibility of the Contractor to find and. locate all existing services such as water, gas, electricity, telephone, sewers, drains and culverts, to preserve and protect them from damage during construction, and to arrange and pay for their relocation if necessary. All costs of finding, relocating or repairing existing services shall be borne by the Contractor. In addition, where a delay in the work has been occasioned by the necessity to find, relocate or repair existing services, the cost shall be borne by the Contractor.

ARTICLE 14 REJECTED WORK AND MATERIALS

All materials which do not conform to the requirements of the Contract Documents or are not approved by the Engineer or are in any way unsatisfactory or unsuited to the purpose for which they are intended, will be rejected. Any defective work, whether the result of poor workmanship or the use of defective materials, shall be removed within ten (I 0) days after written notice is given by the Engineer, and the work shall be re-executed by the Contractor. The fact that the Engineer may have previously overlooked such defective work shall not constitute an acceptance. The removal of rejected work and re-execution thereof shall be at the expense of the Contractor, and he shall pay the cost of replacing the work of others which may be damaged or destroyed by the removal of rejected work and subsequent replacement with acceptable work.

If, in the opinion of the Engineer, it is not expedient to re-execute the defective work, the Owner may charge the Contractor the difference in value between the work done and that called for by the Contract, the amount of such difference to be determined by the Engineer.

ARTICLE 15 OWNER'S RIGHT TO CORRECT DEFJCIENCJES

Upon failure of the Contractor to perform the work in accordance with the Contract Documents, and after ten (I 0) day's written notice to the Contractor, or without notice if any emergency or danger to the work or public exists, correct such deficiencies. The cost of work performed by the Owner in correcting deficiencies shall be paid by the Contractor.

ARTICLE 16 PROGRESS ESTIMATES

Progress estimates of the quantity of work done under this Contract will be made by the Engineer at the end of each calendar month, and payments thereon shall be released from the Security Deposit by the Corporation to the Contractor on or about the 15th day of the next ensuing month. The amount of each such payments shall be determined by the Engineer as being the amount provided in his estimate for the completion of such work as is shown in the progress estimates, less ten (I 0) percent thereof and less all previous payment on account thereof. The Corporation shall retain the said ten (IO) percent of the amount of the said monthly payments as additional security for the fulfillment of this Contract.

ARTICLE 17 ACCEPTANCE

Upon satisfactory completion of the work, the Engineer will issue a Certificate of Acceptance. Acceptance of the work shall mean acceptance for the purpose of releasing eighty (80) percent of the original amount of the Security Deposit but not for the purpose of extinguishing any covenant or agreement on the part of the Contractor to be performed or fulfilled at the time of such acceptance, all of which covenants and agreements shall continue to be binding on the Contractor until they have been fulfilled.

Provided there are no known liens or unsettled claims against the Contractor on account of the work done under the Contract, and upon delivery by the Contractor to the Corporation of a Statutory Declaration releasing the Corporation from all claims whatsoever arising out of the Contract, and certifying that all persons who have worked on or have provided materials or services for fulfillment of the Contract have been paid in full, the Corporation may release ninety-five (95) percent of the Security Deposit to the Contractor on the expiration of forty (40) days after the date of acceptance as shown on the Engineer's Certificate of Acceptance.

The remaining five (5) percent of the Security Deposit will be held by the Corporation until the end of the maintenance period.

ARTICLE 18 MAINTENANCE PERIOD AND GUARANTEE

The maintenance period shall be the one year period next ensuing from the date of acceptance shown on the Engineer's Certificate of Acceptance.

The C.ontractor shall guarantee the stability and sufficiency of the materials and workmanship supplied and the whole of the work performed and shall be responsible for and shall make good all defects, imperfections and settlements which become apparent during the maintenance period.

Should the Contractor fail to make good any defects after being given at least seven (7) days notice in writing during the maintenance period, the Owner shall be entitled to make alternative arrangements for the execution of the repairs and to recover the costs from the Contractor.

Should repairs be required in an emergency, the Owner shall be entitled to arrange for the repairs to be done immediately and to recover the costs from the Contractor.

ARTICLE 19 CORPORATION'S STANDARDS

Unless specifically shown to the contrary, all construction under this Contract shall be in accordance with the Corporation's Standard Specifications in effect on the date of this Agreement.

ARTICLE 20 INSURANCE

The Contractor shall, at his own expense, provide the following insurance. Each policy shall contain a clause stating that: This policy will not be cancelled or materially changed without the Insured giving at least fifteen (15) days notice

by registered mail to the Owner. Certified copies of these policies shall be !iled by the Cor, tractor with the Owner prior to commencement of the work. Wherev"r the word Owner or Engineer is to appear in these policies, the legal name shall be inserted.

Builder's Risk Course of Construction Insurance

The Contractor shall at all times during the currency of this Agreement and for a period not less than twelve (12) months after the date of acceptance by the Corporation keep all buildings, structures, works, equipment (other than Contractor's mobile equipment) and supplies, including materials which will form part of such building works or structure, which is the subject matter of this Contract, insured in the names of the Owner and the Contractor for an amount not less than the Contract price against the following perils:

"All risks of direct physical loss or damage from any cause whatsoever, including flood and earthquake, and subject to a maximum deductible or three (3) percent of the Contract price."

Such insurance shall be with Insurers and on forms acceptable to the Owner and shall contain the following clause:

"It is agreed that the right to subrogation against the Owner and the Engineer or any of their parent, subsidiary, affiliated, or associated companies or corporations is hereby waived."

The following exclusions shall be deemed permissible (additional or modified exclusions subject to permission of the Owner):

(a) Any loss of use of occupancy caused.

(b) Penal ties for non-completion or delay in completion of Contract or non-compliance with Contract conditions.

(c) Cost of making good faulty workmanship, construction, or design, Dut this exclusion shall not apply to damage resulting from such defaulty workmanship, construction or design.

(d) Wear, tear, normal upkeep and normal making good.

(e) Loss, damage or liability occasioned by, happening through or in consequence of war, invasion, hostilities, acts of foreign enemies, civil war, rebellion, insurrection, military or usurped power or martial :aw or confiscation by order of any government or public authority.

(f) Any weapon of war employing atomic fission or radioactive force whether in time of peace or war.

(gl Claims or liability arising directly or indirectly from nuclear fission, nuclear fusion or radioactive contamination.

(h) Loss or damage caused by frost or freezing unless resulting from damage occasioned by fire and/or lightning and/or windstorm and/or

hail and/or riot attending a strike and/or civil comotion and/or vehicles and/or smoke.

(i) Loss due to disappearance or revealed by inventory shortage alone.

(j) Mechanical breakdown, but this exclusion shall not be deemed to exclude loss or damage arising as a consequence of mechanical breakdown.

(k) Infidelity of the Assured's employees.

(l) Loss or damage to material and/or equipment while in the course of ocean marine shipment, but this exclusion shall not apply to shipments by regular coas twise vessels, regular ferry lines, or railway car transfer barges.

(m} Automobiles or Contractor's equipment of every description.

Liability Insurance

The Contractor shall buy and keep in force from the commencement until twelve (12) months after the date of acceptance of the work, Personal Injury and Property Damage Liability Insurance. Such insurance shall be in the name of the Contractor and the Owner and shall include a Cross Liability of Severability of Interests clause. Such insurance shall be on a form and with an Insurer acceptable to the Owner. Both Bodily Injury and Property Damage sections are to provide coverage on an "Occurance Basis".

Exclusions_ pertaining to the following operations are to be deleted if such operations are to be performed by the Contractor or anyone on his behalf:

{a) Blasting or use of explosives.
(b) Pile driving.
(c) Excavation.
(d) Underpinning, shoring or removal or rebuilding of support.
(e) Demolition.

Such insurance shall indemnify the Contractor for claims arising out of all premises, operations, subcontracted operations, elevators (if any), property damage assumed by the Contractor under any contract or agreement (including this Contract).

Such insurance shall be for the following minimum limits:

Bodily Injury and Property Damage - $1,000,000 Inclusive.

Automobile Insurance

The Contractor shall buy and keep in force until all conditions of the Contract have been fully complied with, a Standard Automobile Policy covering all licensed vehicles owned by him, registered in his name or leased to him. Such insurance shall include Liability Insurance for the following minimum limits:

Bodily Injury and Property Damage - $1,000,000 Inclusive.

Non-Owned Automobile Insurance

The Contractor shall buy and keep in force until all conditions of the Contract have been fully complied with, a Standard Non-Owned Automobile Insurance Policy including Standard Endorsement S.E.F. No. 96 Contractual Liability. Such insurance shall be for the following limits:

Bodily Injury and Property Damage - $1,000,000 Inclusive.

Contractor's Eouipment Insurance

Notwithstanding anything contained elsewhere herein, it is understood and agreed that the Owner and/or Engineer shall not be liable for any loss or damage to Contractor's equipment to be used on this project shall contain the following clause:

"It is agreed that the right to subrogation against the Owner and the Engineer or any of their parent, subsidiary, affiliated or associated companies or corporations is hereby waived."

ARTICLE 21 REPLACEMENT OF LEGAL SURVEY MARKERS

Upon completion of the work and before acceptance, the Contractor will provide, at his own expense, for the replacement by a B.C. Land Surveyor, of all legal survey markers which have been disturbed, destroyed, buried or otherwise moved during the course of construction.

SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING STANDARDS (WATER & SEWER)

LETTER OF CREDIT

FOR CONSTRUCTION WORKS IN SUB-DIVISIONS, DEVELOPMENTS, AND ON MUNICIPAL PROPERTIES

Name of Bank: _____

Branch: _____

Address: _____

Date: _____

We hereby authorize you to draw on (Bank) _____ _____ for the account of (Applicant) _____ available by drafts at sight for the construction and completion of (Title & Description of Work)

_____

_____

_____

_____

In accordance with the Agreement dated _____ between the Sunshine Coast Regional District and _____.

This irrevocable Letter of Credit is subject to the following conditions:

1. Drafts are to be made in writing by the Sunshine Coast Regional District.
2. The Bank will not inquire as to whether or not the Corporation has a right to make demands on the Letter of Credit.
3. The Letter of Credit is irrevocable until released in writing by the Corporation of the Sunshine Coast Regional District or until _____ whichever occurs first.

We (Bank)_____ hereby agree with drawers, endorsers and bona fide holders of the bills drawn in compliance with the terms of this credit that the bills will be duly honoured upon presentation at the drawees bank.

Yours truly

_____ _____

Accountant Manager

SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING STANDARDS (WATER & SEWER)

V

STANDARDS FOR DESIGN

OF WATER AND/OR SEWER SERVICES IN SUBDIVISIONS

CONTENTS

SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING STANDARDS (WATER & SEWER)

V

STANDARDS FOR DESIGN
Of
WATER AND/OR SEWER
SERVICES IN SUBDIVISIONS

1. DEFINITIONS

Throughout this document, the following words and terms shall have the meaning indicated below unless the context plainly indicates otherwise:

a)	"The Corporation"	means the Sunshine Coast Regional District.
b)	"The Engineer"	is the Works Superintendent of the Corporation or his duly appointed representative.
c)	"These Standards"	means the Sunshine Coast Regional District Standards for Design of Water and Sewer Services in Subdivisions.
d)	"Approved"	means approved by the Engineer.
e)	"The Developer"	means the owner of the land to be subdivided or his agent.
f)	"Contract Drawings"	means the detailed engineering drawings for a particular subdivision.

SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING STANDARDS (WATER AND SEWER)

2. GENERAL REQUIREMENTS

2.01 Design and Construction

a) Design shall be done by a professional engineer registered in the Province of British Columbia.

b) The design shall be in accordance with these Standards.

c) A preliminary plan shall have been submitted to the Corporation before starting detailed design.

d) The Developer's Engineer shall discuss the design with the Superintendent before starting his design.

e) Drawings shall be submitted to and approved by the Corporation before construction is started.

f) Construction shall be in accordance with the Standards for Construction.

2.02 Sanita,y Sewers

Except where the subdivision has previously been approved for septic tank installations by the corporation and the District Medical Health Officer, all subdivisions shall be provided with a complete sanitary sewage collection system including service connections to each lot

2.03 Waterworks

Water supply shall be provided in all subdivision with 150mm D.I. minimum sized watermalns, 19mm minimum service connections to each lot, and standard 150mm fire hydrants spaced not more than 150 metres apart.

3. CONTRACT ORAWINGS

3.01 General Requirements

All drawings shall be sized to facilitate filing. The Corporation will supply the required number of blank drawing sheets with the Corporation's standard title blocks to the Developer's engineer upon request for a nominal charge.

The Corporation's subdivision reference number shall be shown on the title block of all contract drawings.

The drawings shall be neat and legible and they shall clearly describe the work in sufficient detail.

Lettering on drawings must conform to American Standards Association (ASA 214-1-1946) with dimensions, etc., to minimum size equivalent of 80 C L Leroy and street names to minimum size equivalent of 200 C L Leroy.

Standard drafting procedures are to be used for line density, arrow heads, radio, dimensions, etc.

Provisions are to be made on all drawings for insertion of District's numbering system with a lettering size 350 C L Leroy.

All elevations shown on drawings shall be based on Geodetic datum.

A complete set of contract drawings shall consist of a general plan, key plan, plan and profile of roads and services, and additional plans showing any special details.

Standard details such as manholes, hydrants, etc., are shown and described in the Corporation's Standard Construction Specifications and these need not be shown in detail on the contract dr.awings. Standard symbols for the various facilities as attached to these Standards shall be used on all drawings.

The General Plan of the whole subdivision shall be to a scale not less than 1:1000. All mains shall be indicated on the General Plan. More than one drawing may be required to cover the area of the subdivision.

A key plan to a smaller scale (! :5000 is often used), showing the location of the subdivision in relation to major streets and trunk sewers, shall be provided in relation to major streets and trunk sewers, shall be provided for the benefit of the Provincial Ministry of the Environment. Normally, the key plan will drawn on one corner of the General Plan drawing.

Gas mains shall be shown on the General Plan.

In general, Plan and Profile drawings shall be to the scale:

Horizontal	1:500
Vertical	t:50

3.02 Sanitary Sewers

The plan shall show centre line of the sewer together with pipe size, manholes, service connections in relation to street, easement and adjacent property lines. The sewer shall be located by dimensions from adjacent property lines. Dimensions of easements and invert elevations of service connections shall be shown on the plan. Elevations of the existing ground 15 M back from street line, at 15 M intervals along the sewer line, shall be shown on the plan.

The profile of existing ground on centre line, the finished ground on centre line, and the invert of the proposed sewer shall be shown. The invert elevation of each pipe entering and leaving each manhole shall be written on the profile together with the distance between manholes and the percent slope of the pipe between manholes.

3.03 Waterworks

The plan shall show pipe centre line, pipe size and type, service connections, hydrants, valves, fittings, and all related appurtenances in relation to street, easement and adjacent property lines. The profile shall show the existing grade, the finished grade and the invert of the. pipe. Except where the pipe is to be laid at a constant grade over a longer distance, the invert elevation shall be shown on the profile at 15 M intervals.

3.p4 "As-Built" Drawings

All service connections shall be accurately shown on the "as-built" drawings. All revisions made during construction shall be made on the "as-built" drawings.

Upon completion of the work, a set of full sized positive transparency drawings shall be delivered to the Corporation.

4. DESIGN PRINCIPLES

4.01 Sanitary Sewers

(a) General

Sanitary sewers shall be designed in accordance with the requirements of the Waste Management Branch of the Government of British Columbia. These include Recommended Standards for Sewage Works more commonly referred to as "The Ten Standards" and published by:

The Health Education Service
P.O. Box 7283
Albany, N.Y. 12224

(b) Design Flow

The design flow in sanitary sewers for new subdivisions shall be calculated on the basis of the following criteria:

Average daily flow	270	lpcpd
Infiltration allowance	2270	lpcpd

The ratio $\frac{\text{Peak Flow}}{\text{Average Flow}}$, known as the Peak Factor, shall be taken from Drawing No. 1.

The Peak Factor shall be applied to the sanitary contribution only and not to the infiltration allowance.

(c) Pipe Sizes

Minimum pipe **sizes** shall be:

Mains	200mm
Service Connections	100 mm

The pipes shall be designed, using the Manning formula with roughness coefficient n = .013, to flow full (or less than full) at the design flow with a velocity not less than 0.76 M per second.

(d) Depth of Mains

Mains shall be designed to connect *all* possible basements on the assumption that the service pipe leaves the building at the closest point to the sewer at a crown elevation 0.46 M below the basement floor level and runs at a slope of not less than 2.0% to connect crown to crown to the sanitary sewer **main.**

Minimum cover for sanitary sewers shall be 15 M under roadways and I M elsewhere.

(e) Sanitary Sewer Manholes

Manholes shall be spaced not more than 122.0 M apart.

The standard manhole riser shall be 1.07 M inside diameter.

Outside drop connections shall be installed wherever the drop exceeds 0.61 M.

(t) Service Connections

Four inch sanitary sewer services shall be installed to a point 6.0 M from the downstream comer on the side of all lots abutting the main.

(g) Curved Sewers

The radius of curvamre of curved sewers shall not be less than 61.0 M. Manholes shall be spaced at 91.4 M maximum on curved sewers.

4.02 WATER\VORKS

(a) Design Pressure

= - 150 psi

Generally, water systems will be designed for pressures in the range of 205 – 1035 kPa. Fire flows are to be determined in accordance with the requirements of the current editions of the MMCD Design Guidelines and of "Water Supply for Public Fire Protection – A Guide to Recommended Practice" published by the Fire Underwriters Survey. Where a difference arises between MMCD minimum requirements and the current edition of the "Water Supply for Public Fire Protection – A Guide to Recommended Practice" published by Fire Underwriters Survey, the more stringent requirements shall take precedence.

(b)Pipe Size

Minimum pipe sizes shall be:

Mains	200mm *
Services	19mm

*(except in dead end situations where the main cannot be extended when 150 mm not exceeding a length of 152.4 M may be allowed.)

(c) Fire Hydrants

Fire hydrants shall be located within 76.2 M of all possible buildings sites.

(d) Gate Valves

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

For continuous mains, gate valves will be required every 304.8 M.

(e) Air Valves

Air release valves shall be provided at all summit points on mains.

(f) **Blowoffs**

Blowoffs shall be provided at all dead ends.

(g) Cover

Minimum cover over the crown of ductile iron watermains shall be 1.0 M.

(g) Slope

Minimum slope of watermains shall be 0.1%.

(i) Clearance

Minimum vertical clearance betwen watermains and sanitary sewers shall be 300 mm with the watermain on top. Minimum horizontal separation between watermain and sanitary sewer shall be 3.0 M.

Minimum clearance with all other pipe shall be 150 mm.

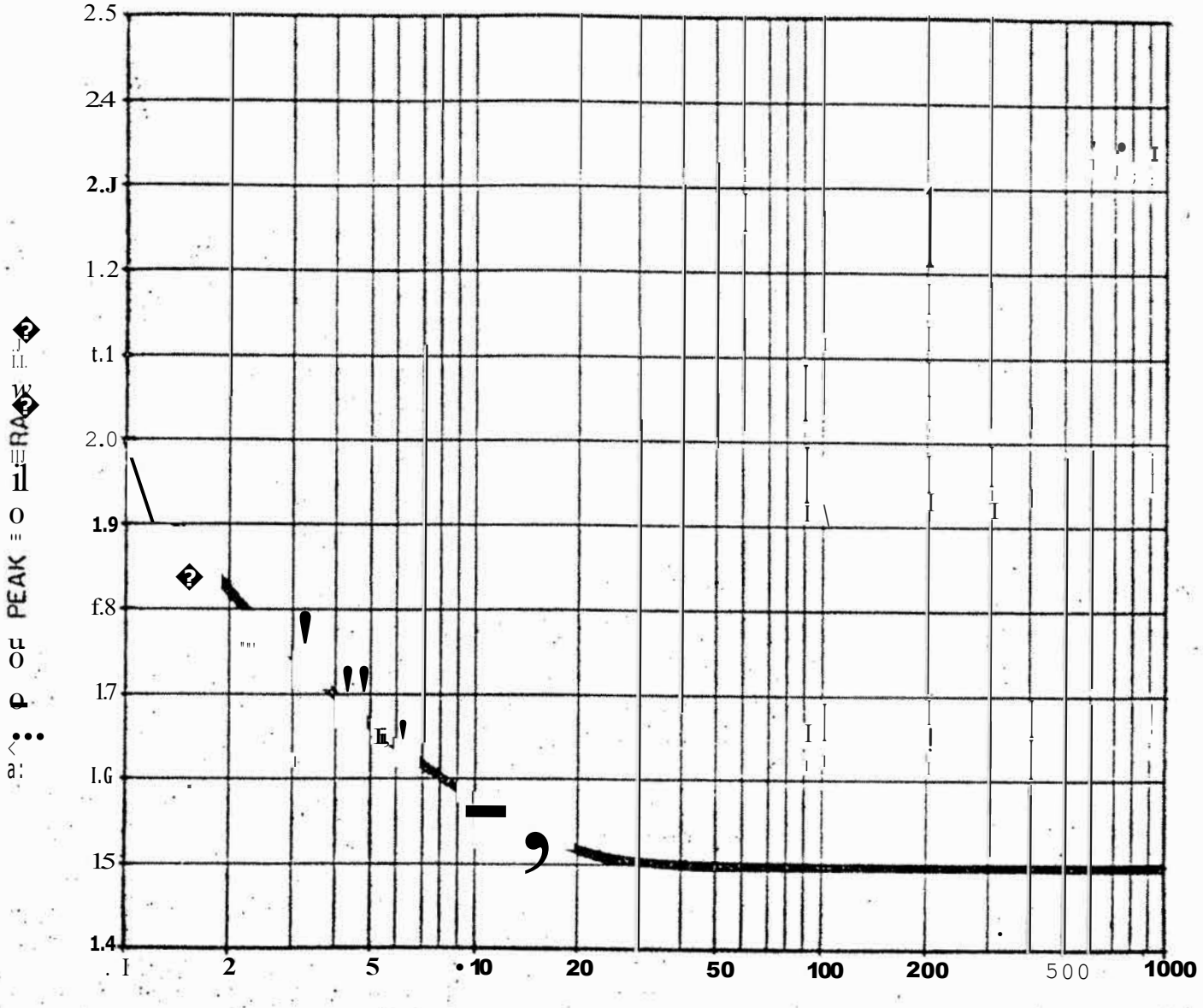
If for any reason the watermain must pass underneath a sanitary sewer, the sanitary sewer shall be concrete encased.

(j) •Service Connections

Minimum 19 mm shall be provided by owner at time of building permit.

5. STANDARD DESIGNS DRAWINGS

Description	DrawinR No.
Peaking Factors for Sanitary Sewer Flow	G-1



No	DATE	_REVISIONS	DWG. - G-1
PEAKING FACTORS FOR SANITARY SEWER FLOW			SUNSHINE COAST REGIONAL DISTRICT PREPARED BY DAYTON 8 KNIGHT LTD. CONSULTING ENGINEERS DATE

SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING STANDARDS (WATER & SEWER)

VI

STANDARD SPECIFICATIONS FOR CONSTRUCTION OF WATER WORKS FACILITIES

CONTENTS

SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING STANDARDS (WATER & SEWER)

VI

STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF WATERWORKS FACILITIES

1. GENERAL

1.01 Definitions

In these Standard Specifications the following words and terms have the meaning indicated below, unless the context plainly indicates different meanings:

(a) "These Standards" means the Sunshine Coast Regional District Standard Specifications for Construction of Waterworks Facilities.

(b) "The Corporation" means the Sunshine Coast Regional District.

(c) "The Engineer" means the Works Superintendent or his representative.

(d) "AWWA" means the American Water Works Association.

(e) "Approved Equal" shall mean a substitute brand or article which may be installed in place of the one named where such substitute has been approved in writing by the Engineer.

1.02 Scope and Use of These Standards

These Standards shall apply to all waterworks installations constructed by or for the Corporation.

The phrase "in accordance with S.C.R.D. Standards" on a waterworks plan or specifications shall have the effect of incorporating all of the provisions of these Standards.

1.03 Revisions to These Standards

Changes to these Standards will be made from time to time as conditions and improvements warrant. The most up to date issue of these Standards shall supersede all previous issues. Contracts in progress shall be completed in accordance with the Standards in effect at the time the work was started.

1.04 List of Standard Drawings

The attached list of Standard Drawings, dated the same as these Standards, is hereby incorporated into and made a part of these Standards.

I.O AWWAStandards

All details not specifically covered in these Standards shall be in accordance with the appropriate AWWA Standards as directed by the Engineer.

I.06 Connections to Existing Mains

Connections to existing mains will be made by the Corporation and charged to the Contractor.

Arrangements for interruptions to existing services shall be approved by the Engineer and all property owners affected shall be notified 24 hours before the proposed service interruption.

In built up areas as directed by the Engineer, it may be necessary to provide temporary service while the existing service is interrupted. Provision o! such temporary water service shall be the sole responsibility of the Contractor.

All existing pipe and appurtenances removed and not reinstalled shall be delivered to the Corporation's Works Yard or as directed by the Engineer.

2. MATERIALS

2.01 General Requirements

All materials and equipment incorporated into work covered by these Standards shall conform to these Standards and to the latest edition of the pertinent AWWA Standard Specifications for the material or equipment. All material shall be new and of the best quality available. Alternative materials shall be covered by up to date specifications of the AWWA. All material must be approved by the Provincial Department of Health for use in public water supply systems.

2.02 Handling

Tools, trucks and other equipment as well as methods of handling and hauling the material shall be such that pipes and other materials will not be dropped or damaged. In no case shall materials be allowed to drop, roll freely, or bump against other materials or objects of any kind. The use of hooks on pipe ends will not be permitted, and special care shall be exercised to prevent damage to machined ends. If pipes or other materials are damaged, they shall be replaced by the Contra::tor at his own expense. The interior of pipe, v<"lves and fittings shaU be kept clean.

2.03 Pipe

Pipe in size 150 mm and larger shall be ductile iron (ductile). Alternatively, Sclairpipe with the approval from S.C.R.D. may be used.

Ductile Iron Pipe shall conform to AWWA Standard C 150 with the following particular requirements:

(a) - The pipe wall thickness shall be designed for each application in accordance with AWWA H3.

(b) Standard Length - The standard length of pipe shall be 5.5 M.

{c) Lining - Ductile iron pipe shall be cement-mortar lined in accordance with AWWA Standard C 104.

(d) Pipe Joints - Pipe joints shall be a rubber gasket type conforming to AWWA C 111, such as Bell-tite, Tyton or approved equal.

(e) Cast Iron Fitting Hubs - Hub connections shall be Bell-tite, Tyton, Ter-Mech or approved equal.

2.04 Main Line Valves

Line valves from 100 mm to 300 mm sizes shall be Terminal City or approved equivalent gate valves conforming to AWWA Standard C500. Valves

shall be iron-body, bronze-mounted, solid wedge or double-disc gate, non-rising stem with flanged or hubbed ends to suit. Flanges shall have Class 125 standard drilling. Valve stems shall be fitted with a standard AWWA nut and they shall turn clockwise to close. Line valves in sizes 14 inch and larger shall be rubber seated butterfly valves conforming to AWWA C504.

All valves shall have the manufacturer's name and catalogue number molded as an integral part of the valve body.

2.05 Cast Iron Fittings

Cast iron fittings such as bends, tees, crosses, adaptors, end caps, etc., shall conform to AWWA Standard C110. Ends of fittings shall be flanged or hubbed to suit. flanges shall be standard Class 125 cast iron flanges.

2.06 Fire Hydrants

All hydra1ts shall be sliding gate type Terminal City Ironworks No. 20P. Hydrants shall be of the post type with 112 mm pumper outlet locked and leaded or screwed in place. Each outlet shall be safeguarded against blowing out, turning or backing out.

Hose and pumper outlet threads shall be manufactured to the B.C. Fire Hose Thread Specifications except in west Howe Sound fire Improvement District where threads are to suit.

All working parts shall be arranged so that they may be removed without disturbing the barrel or base of the hydrant without excavation.

The hydr a,t shall be so designed that its top section may, without excavation, be rotated 45, 90 or 135 degrees to the right or left or 180 degrees from the inlet pipe, if desired, and bolted or locked in place without decreasing its strength or causing it to leak when under pressure. All stems shall open counter-clockwise, as viewed from the top.

All hydrants shall be subject to a hydrostatic pressure test of 2,070 kilopascals certified by the manufacturer. The main operating screw shall be stainless steel.

All hydr a1ts shall be painted red prior to acceptance by the Corporation.

2.07 Valve Boxes

Valve boxes shall be telescopic Robar No. 37-72, R-C Nelson Valve boxes.

2.08 Service Connections

Service connection pipe up to 25 mm diameter shall be Type K soft copper tube conforming to ASTM specification B88.

All bushings, reducers, unions and nipples shall be standard brass.

2.09 Air Valves

Air Valves shall be Terminal City Ironworks double acting air valves or approved equal.

2.10 Pipe Bedding Material

The material immediately under the pipe and on each side of the pipe up to the springline is defined as pipe bedding material.

Sand may be used for pipe bedding in dry trenches where the sand can be successfully compacted.

In wet trenches pipe bedding material shall be a well graded mixture of gravel or crushed stone and sand 100% passing a 19 mm screen.

2.11 Select Backfill

The material placed on each side of the pipe and above the pipe to a level of 300 mm above the top of the pipe shall be select backfill.

For ductile iron pipe, select backfill may consist of trench excavated material free from material and particles larger than 75 mm.

2.12 Nuts and Bolts

All nuts and bolts for flanged or mechanical joints shall be cadmium plated to resist corrosion. All bolts shall be correctly sized and otherwise be in accordance with AWWA Specifications.

3. INSTALLATION

3.0 l General Requirements

All work shall be installed to the lines and grades shown on the drawings using the materials designated on the drawings and in these Standards.

Unless specifically directed otherwise by the Engineer, all material shall be handled and installed in accordance with the manufacturer's instructions.

3.02 Preparation for Excavation

(a) Cutting of Pavement

Where excavation is required through existing pavement, it shall be cut along neat straight lines with a cutting tool and care shall be taken to confine the width of pavement disturbed to a minimum.

(b) Clearing

Where watermains are to be installed through uncleared land, a strip shall be cleared of sufficient width to permit proper excavation of the trench and to accommodate the excavated material during construction. Stumps which lie within 3.0 M of a vertical plane passing through the centre line of pipe shall be completely removed. Stumps outside this area shall be cut off within one diameter of ground level. All brush, stumps, roots, etc., shall be disposed of by burning or removal to an approved disposal area. Trench excavation shall not be started until the Engineer has approved the clearing.

(c) Removal of Topsoil

Topsoil shall be kept separate from other excavated material and preserved for later surface restoration.

3.03 Excavation

Trenches shall be excavated to the precise line and grades shown on the drawings. Control markers shall be set out in the field at a maximum of l*5.0* M apart along pipe lines.

Care shall be taken to avoid disturbing or softening the trench bottom below the required grade and any such disturbed, softened or loosened material shall be removed and replaced with bedding material thoroughly compacted.

Roads and entrances to properties shall not be blocked by trench spoil unless permission has been obtained to close or place material on such roads or entrances.

Where the use of excavating machines would cause damage to trees, buildings or existing structures, excavation shall be done by hand.

For ductile iron, trenches shall be excavated to at least 100 mm below the invert elevations shown on the drawings.

In unstable soil conditions, trenches shall be excavated to a greater than normal depth as directed by the Engineer and backfilled with approved granular material.

Trenches shall be excavated to provide a minimum clearance of 150 mm on each side of the pipe at springiine and a maximum width of 375 mm on each side of the pipe at springline.

3.04 Timbering

Trench timbering shall be installed where required in accordance with the regulations of the Workmen's Compensation Act. All timbering shall be removed before completing the backfilling but not before the pipes have been sufficiently covered to protect them.

3.0.5 Drainage of Excavation

Trenches shall be kept free of water during pipe laying and backfilling by pumping or other means. Water shall be discharged from the excavation in such a manner as not to cause a nuisance.

3.06 Rock Excavation

Where rock is encountered in trenches, it shall be removed to a minimum clearance of 1.50 mm around the outside of pipes.

3.07 Pipe Laying and Bedding

(a) General

Pipes and accessories shall be inspected for defects before lowering into the trench. Pipes shall be cleaned inside before laying and any foreign material that may enter the pipe during laying shall be removed. Open ends of pipe lines shall be plugged when pipe joining is not in progress. Proper tools and equipment shall be provided for handling the joining of pipes and accessories. All pipes and accessories shall be carefully lowered into the trench using ropes or crane in such a manner as to prevent damage to pipe and fittings. No material shall be dropped or dumped into the trench.

Wood blocking shall not be used for setting pipes to grade.

(b) Ductile Iron Pipe

Two mounds of bedding material shall be placed and tamped in the trench bottom 1.06 M from each end of the pipe to be laid. The pipe shall then be laid on the mounds and adjusted to true line and grade. The pipe shall then be moved back and joined to the previously la.id pipe. Any high or low spots in the trench

bottom, other than the two mounds, shall then be levelled to maintain an even clearance under the remainder of the pipe and under the bells. Bedding material shall be worked underneath the pipe with hand tampers taking care not to disturb the position of the pipe. The remainder of the pipe bedding material shall then be placed uniformly on both sides of the pipe in !00 mm layers and compacted firmly to provide uniform support along the full length of the pipe.

3.08 Pipe Joining

Pipes shall be joined together in strict accordance with the pipe manufacturer's instructions. Particular care shall be taken to remove any foreign material from the gasket and pipe ends before joining.

3.09 Fire Hydrants

Hydrants shall be installed in accordance with the Standard Drawings. Before hydrants are installed, drain valves shall be carefully examined and put in working order and the hydrants shall be so installed that the drain valves cannot become plugged or damaged.

3.10 Backfilling

After the pipe has been laid and bedded up to springline, select backfill shall be deposited by hand to a level 300 mm above the top of the pipe. Backfill shall be placed in *150* mm layers and compacted on each side of the pipe but not compacted in the zone immediately on top of the pipe. Succeeding layers of backfill may contain coarser material but shall be free from organic or other material which may prevent .proper consolidation and cause subsequent settlement of the backfill. Backfill pushed into the trench by bulldozer must be rolled down a slope, not pushed directly over the edge of the trench and allowed to drop. No rocks larger than 200 mm will be permitted in the backfill. Backfill shall be mounted on top to allow for settlement.

Along road shoulders and other places where vehicles may otherwise travel, appropriate warning signs and lights satisfactory to the Engineer shall be placed and maintained until the backfill is capable of carrying the traffic.

Where the water main is laid in the travelled portion of the road, the compaction in the trench shall be 95% of maximum density at optimum moisture content as per ASTM D698.

3.11 Gate Valves

Gate valves shall be supported independently of the pipe on concrete blocking in accordance with the Standard Drawing.

3.12 Air Valves

Air valves shall be installed at all high points on mains in accordance with the Standard Drawing.

3. 13 Blowoff

Blowoffs shall be installed in accordance with the Standard Drawings. Drainage branches shall not be connected to any sewer, submerged in any stream, or installed in any other manner that will permit back-syphoning into the distribution system.

3.14 Thrust Blocking

Reaction or thrust blocks shall be placed as shown on the Standard Drawing. Concrete shall be placed so that it bears against undisturbed trench walls, hand trimmed to a vertical face. Concrete shall be kept away from the bells of fittings and shall not be allowed to run around the pipe or into pipe joints.

3.15 Temporary Ends

Thrust blocking of temporary ends of watermains shall be made in accordance with the Standard Drawing.

3.16 Service Connections

Service connections are defined as the installation from the connection at the main up to and including the shut off valve at the property line.

Service connections in new subdivisions shall be installed in accordance with the Standard Drawings. Water service connections shall be at least 3.0 M away from parallel sewer service connections.

The size of service connections will be determined by the Engineer based on available pressure and estimated demand. The standard house service connection shall be 19 mm.

Service shall be connected to the main by a Corporation cock screwed into the main.

Service connection larger than 50 mm diameter require a cast iron tee fitting and valve.

3.17 Flushing

Before testing, all mains shall be flushed out with water to remove all foreign material.

3.18 Leakage Testing

Test sections shall include not more than 300metres of completed main. Temporary test plugs and thrust blocking shall be installed where required. All hydrants and service connections shall be included in the test.

Each section of pipe line to be tested shall be slowly filled with water and all air shall be expelled.

Alter the test section has been filled and air expelled, the pressure at the lowest point In the section shall be raised to 1.380 kPa. The pressure shall be maintained at 1,380 kPa for a period of two (2) hours by pumping additional water Into the system to maintain the pressure at 1,380 kPa which shall be accurately measured.

No pipe Installation will be accepted if the rate of leakage SO measured is more than 1.25 rntres per millimetre diameter per kilometre per 24 hours based on a two hour duration.

Should any section of the pipe line fall to meet the above requirements, the Contractor shall take whatever steps are necessary to locate the leaks and correct them. The test procedure shall be repeated as often as necessary to locate the leaks and correct them. The test procedure shall be repeated as often as necessary until the leakage rate is within the permissible amount.

3.19 Disinfection

Before being placed in service, the water system shall be chlorinated for a period of at least 24 hours, in accordance with A W W A C601.

Water from the existing distribution system shall be made to flow at a constant measured rate into the newly laid pipe line. The water shall receive the required dose of chlorine, also fed at a constant measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the new main Is a minimum of 50 ppm/L available chlorine.

The amount of chlorine required to produce 50 ppm/L concentration in 30.5 M of pipe of various sizes Is given by the following table:

Pipe Size mm	100 Percent Chlorine grams	1 Percent Chlorine Solution litres
100	7.7	1.5
150	27.7	3.3
200	49.1	5.9
250	n.3	9.3
300	109.1	13.1

A one percent (1%) chlorine solution can be prepared with high test calcium hypochlorite (70% free chlorine) by first making a paste and then diluting with water in the following proportions:

High test calcium hypochlorite	454.5 g
Water	34.1 l

During the application of chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main and service connections to be treated are filled with 50 ppm/L chlorine solution. To assure that this concentration has been attained throughout, the chlorine residual shall be measured at a number of points along the main for at least 24 hours during which time all vaJves and hydrants in the section treated shall be operated in order to disinfect them thoroughly.

At the end of the 24 hours period, the residual chlorine shall be measured at several spots along the main. If the residual chlorine measured at several locations averages less than 23 ppm/L the main shall be re-chlorinated.

After completion of chlorination, the heavily chlorinated water shall be flushed from the system and hydrants until the chlorine concentration in the water remaining is less than 1 ppm/L

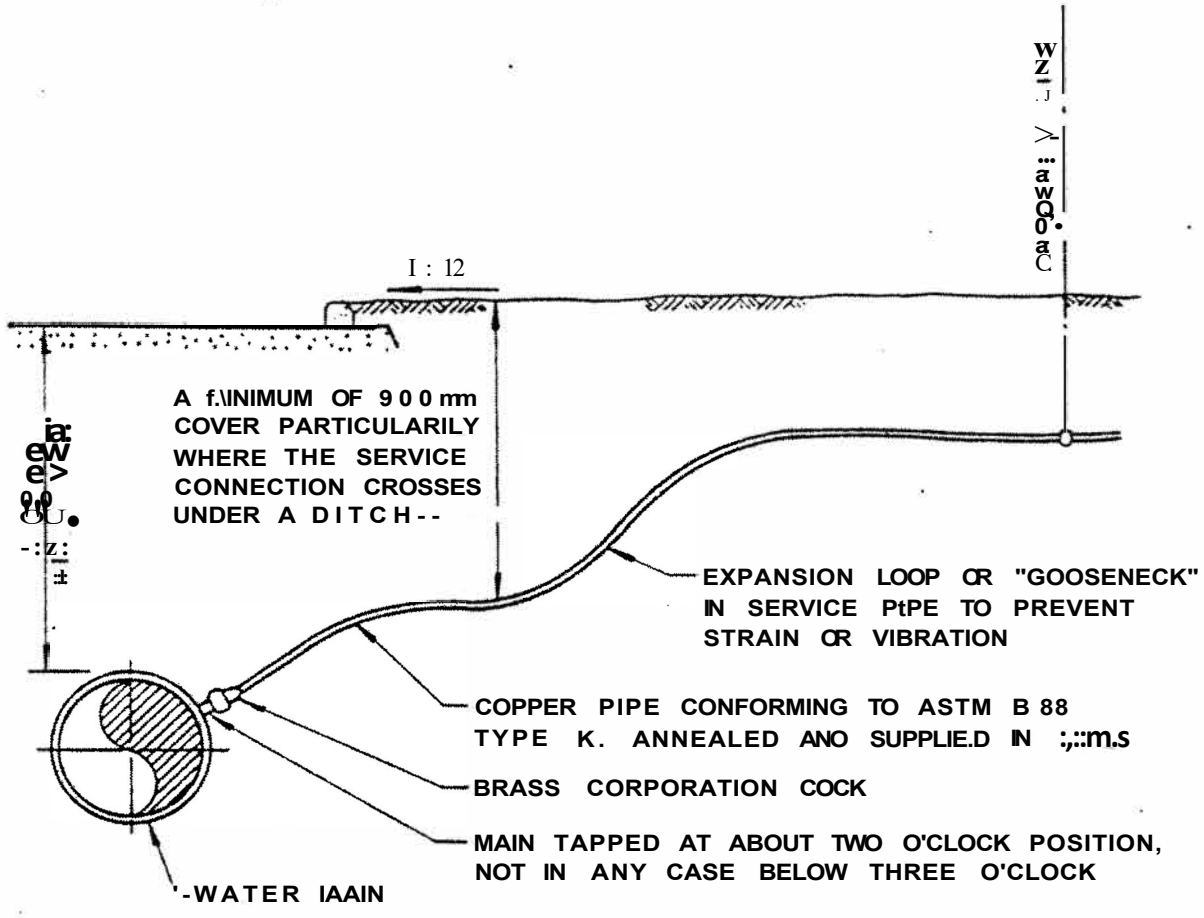
3.20 Clean-Up

Clean-up shall be completed promptly to the satisfaction of the Engineer.

Where excavated material has been temporarily placed on pavement, after backfilling the pavement shall be cleaned up promptly be sweeping or hosing with water. Likewise, spillage on public roads from trucks engaged in the work shall be cleaned up promptly.

4. LIST OF WATER DRAWINGS

Description	Drawing No.
Typical Water Connection between Main and Property Line	W-1
Types of Hub Connections in Fittings	W-2
Temporary End of Watermain	W-3
Typical Hydrant Assembly	W-4
Typical Gate Valve Cover Installation	W-5
Typical Air Valve Installation	W-6
Typical Blow Off at Watermain End Point	W-7
Concrete Blocking	W-8
Suggested Thrust Blocks Locations	W-9
Standard Symbols	W-10
Typical Cross Section Watermain Trench (For Ductile Pipe)	W-11



20 mm OR 25mm CONNECTION

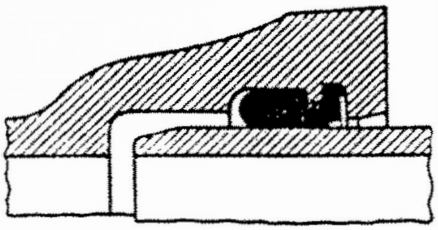
No.	DATE	REVISIONS	OWG. W-1

TYPICAL WATER SERVICE CONNECTION BETWEEN MAIN a PROPERTY LINE

SUNSHINE COAST REGIONAL OISTR

PREPARED BY
DAYTON 8 KNIGHT LTD. CONSULTING ENGINE£
DATE·. . . . . .

FOR USE WITH CAST IRON PIPE

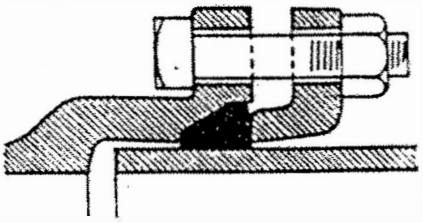


TYTON (TYP)

FOR INSTALLATION WITH ALL TYPES OF RUBBER-RING-JOINT CAST IRON PIPE
LAYING LENGTH ANO METAL THICKNESS TO AWWA SPECIFICATIONS CI!O - 77
METAL SPECIFICATIONS TO ASTM AI26
AVAILABLE IN FITTING SIZES IOOmm TO 300 mm INCLUSIVE.
SUPPLIED WITH NECESSARY RUBBER GASKETS.
TIE ROD LUGS AVAILABLE IN FITTING SIZES 100 mm TO 300mm INCLUSIVE.

FLANGED ENOS

AVAILABLE IN VALVES AND FITTINGS 50mm TO 750mm INCLUSIVE;
HYDRANTS 100mm ANO 150mm.
LAYING .LENGTHS ANO DRILLING TO AMERICAN STANDARD.
FOR CAST IRON FLANGED FITTINGS CLASS 125 (816.1 - 1975)
METAL THICKNESS TO ASTM SPECIFICATIONS (B 16.1 - 1975)
METAL SPECIFICATIONS TO ASTM SPECIFICATION A 126



TER-MECH (MJ)

FOR USE wI'rH CANADIAN, AMERICAN AND BRITISH MECHANICAL JOINT OR GROOVEC HUB TYPE CAST IRON PIPE.
LAYING LENGTHS ANO METAL THICKNESS TO AWWA SPECIFICATION C110 -77.
METAL SPECIFICATIONS TO ASTM AIZ6.
AVAILABLE IN VALVES ANO FITTING 100 mm TO 500mm INCLUSIVE,
HYDRANTS 100mm ANO 150mm
SUPPLIED WITH AWWA RUBBER GASKETS
CORROSION RESISTANT BOLTS ANO NUTS, "SORBO- MAT" CAST IRON GLANDS.
TIE ROD LUGS AVAILABLE ON VALVES AN HYDRANTS 100mm ANO. 150mm ANO ON FITTINGS 100mm TO 300mm.

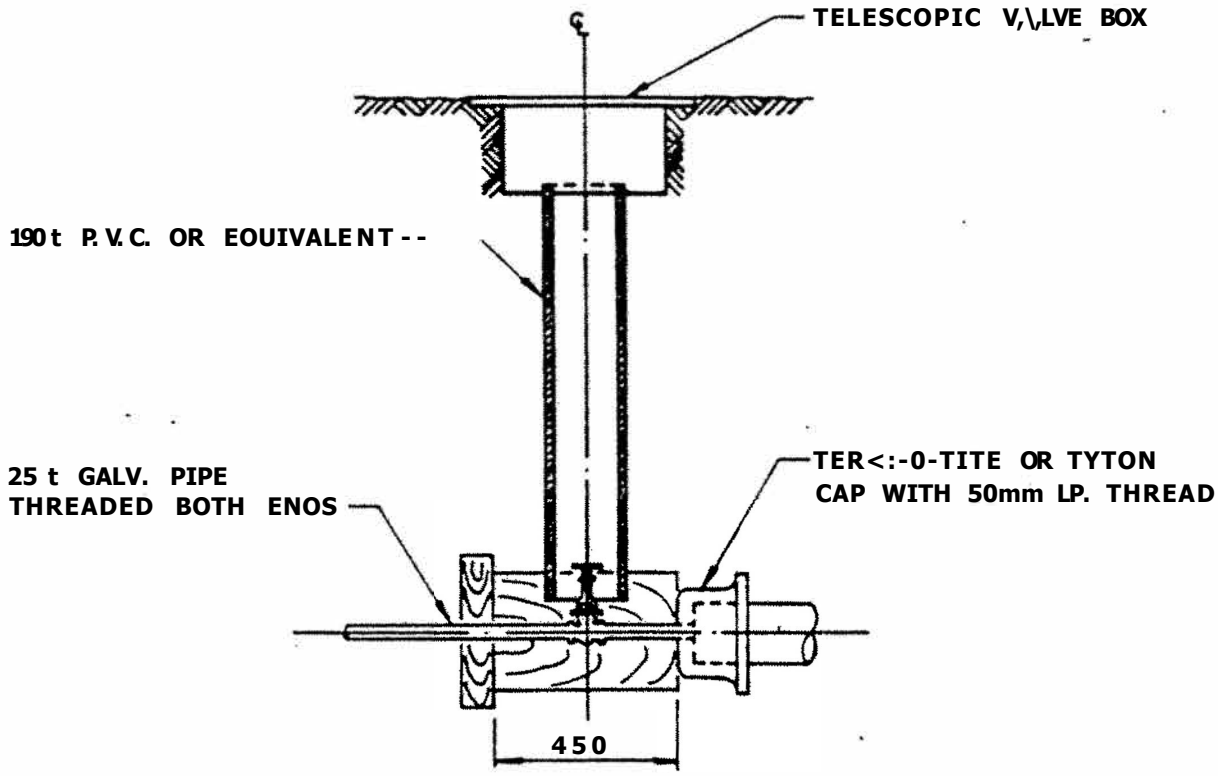
No.	DATE	REVISIONS	OWG. W - 2

TYPES OF HUB

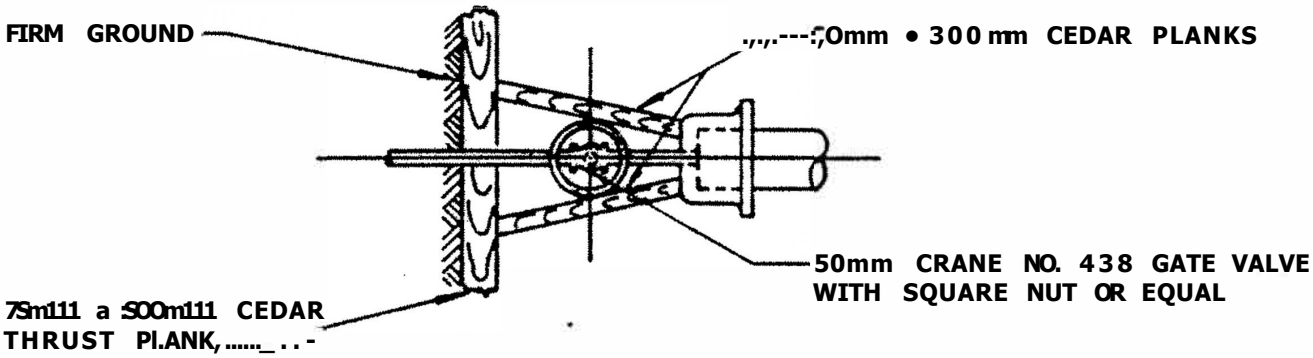
CONNECTIONS IN FITTINGS

SUNSHINE COAST REGIONAL DISTRIC-

PREPARED BY
DAYTON 8 KNIGHT LTO. CONSULTING ENGINEERS
OATE . :



ELEVATION



PLAN

ALTERNATE:

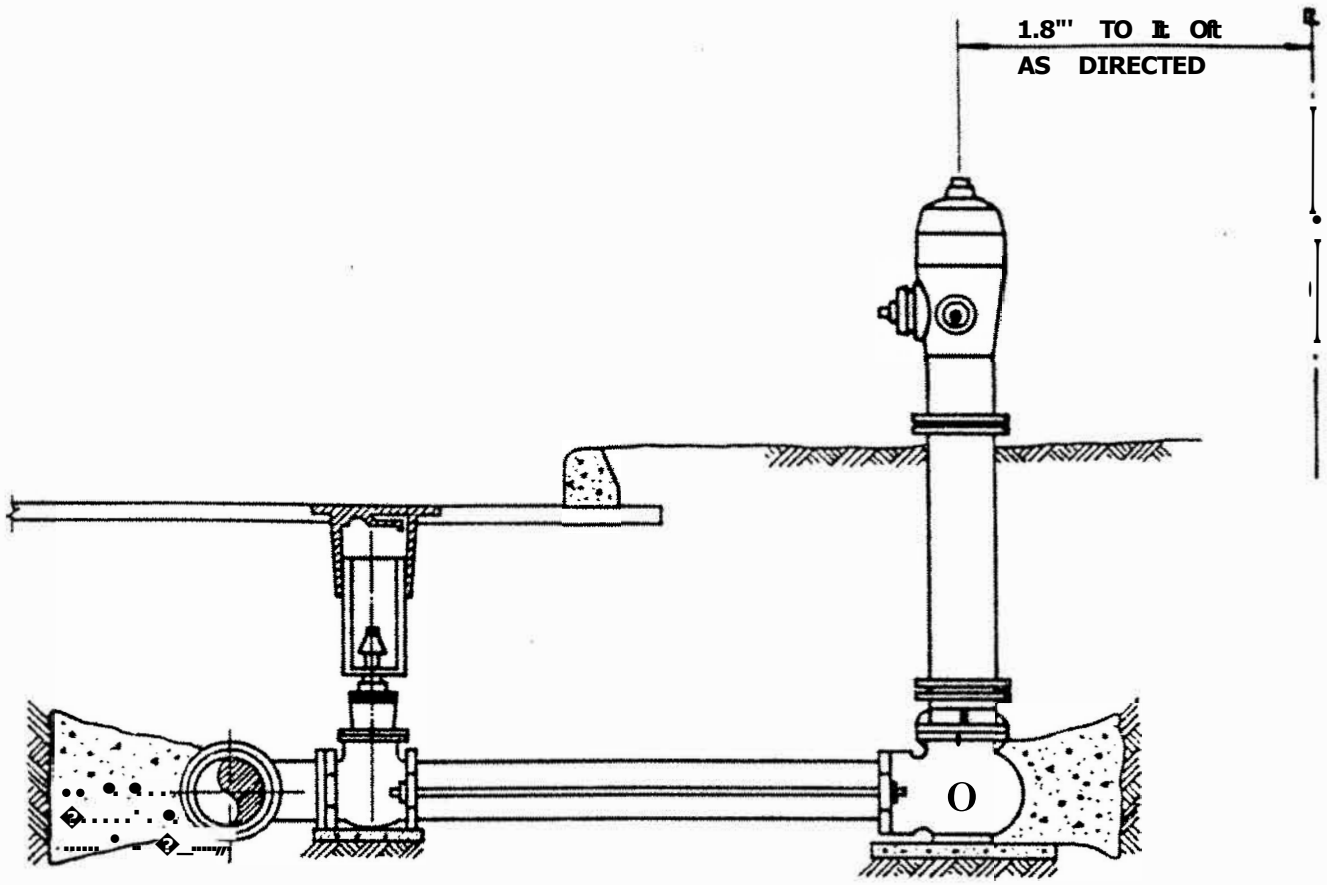
MASS CONCRETE TIED BACK

No.	DATE	REVISIONS	DWG. W- 3

TEMPORARY END
OF WATERMAIN

SUNSHINE COAST REGIONAL DISTRICT

PREPARED 8Y
CAYTON a KNIGHT LTO. CONSULTING ENGINEERS
DATE ..... .



NOTES:

I. STANDARD HYDRANT WITH LUGS FOR TIE BACK ROOS (TYPE T. C. 20PI

2. 0.45m DEEP x O.Glm· CIA. CIRCLE (0.13m[II]) OF 40mm CRAIN ROCK TO SURROUND HYDRANT DRAIN

3. CONCRETE THRUST BLOCKS, SIZED ANO PLACED AGAINST UNDISTURBED VERTICAL FACE. ENCLOSE FITTING IN POLY BEFORE POURING BLOCK

4. TEE AT WATERMAIN-BRANCH SIZE 150 IIIIII- DIA., WITH LUGS FOR TIE BACK ROOS

5. IIIIIPPLE-SIZE 150m... DIA. 1 e o o m... LONG (VARIED IF NECESSARY)

6. HYDRANT CO!tTROL VALVE - 150 mm CI.' GATE VALVE, HUB ENOS, WITH LUGS FOR TIE,ROOc

7. NIPPLE - SIZE 150mm DIA. x MINIMUM OF 300 mm IN LENGTH

O. TIE ROOS-15mm DIA. • 100 mm LONGER THAN THE NIPPLE, THREADED 80TH ENOS ANO COATED WITH COAL-TAR ENAMEL FOR CORROSION PROTECTION. OMIT ROOS IF OVER 6 m

9. CONCRETE VALVE EXTENSION PIPE - 200 mm INSIDE DIA.

10. CRUSHED GRAVEL BACKFILL FOR VALVE EXTENSION PIPE ANO VALVE BOX BASE

II. TELESCOPIC VALVE BOX

12. ◄50 mm 1 450 mm 1 50 mm CONCRETE PAO ON UNOISTURBEO GROUND

13. CONCRE1:E SUPPORT BLOCK (MIN. 150mm • 300mm 1 50mm) TO UNDISTURBED TRENCH BOTTOM

14. DRAIN HOLE FROM BASE OF HYDRANT-MUST BE PROTECTED DURING THE POURING OF THE THRUST BLOCK

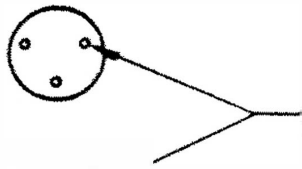
No	DATE	REVISIONS	OWG. W-4

TYPICAL HYDRANT ASSEMBLY

SUNSHINE COAST REGIONAL DISTRICT

PREPARED BY
DAYTON S KNIGHT LTD. CONSULTING ENGINEERS
DATE .....

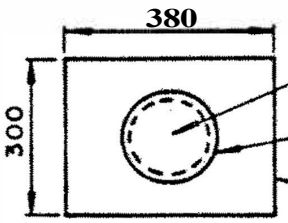
OIAMETER TO SUIT
HOLE IN BAS!'. PLATE



3 PROJECTING LUGS EOUALL'!' SPACEO
TO PREVENT COVER SLIOING OFF PIP!;

2s 1_

COVEB PLATE
DETAIL •A•



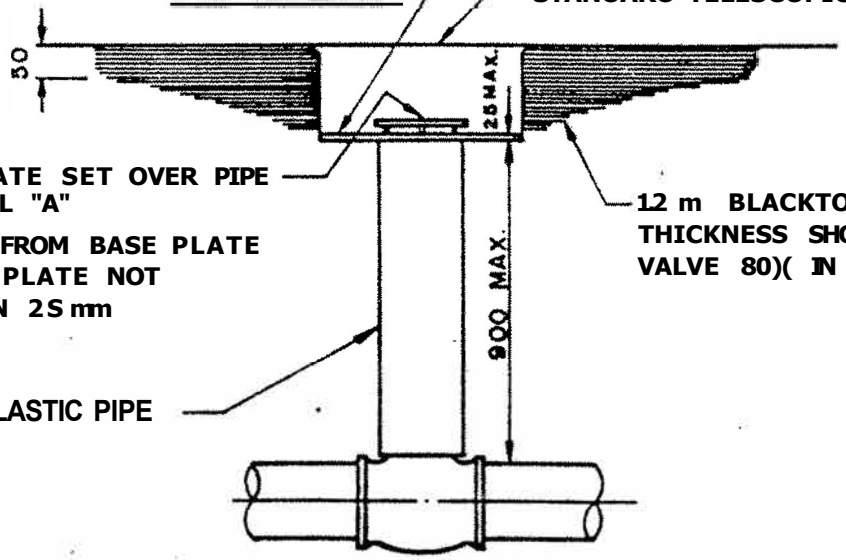
VALVE BOX

BASE PLATE HOLE DIAM. LARGE ENOUGH
TO ALLOW 150♦ PIPE THROUGH

6mm STEEL PLATE SET AS BASE
FOR COVER

PLAN VIEW
STEEL PLATE

STANOARO TELESCOPIC C.t VALVE COVER



COVER PLATE SET OVER PIPE
SEE OETAIL "A"

O!STANCE FROM BASE PLATE
TO COVER PLATE NOT
MORE THAN 2S mm

12 m BLACKTOP CIRCLE AND
THICKNESS SHOWN TO HOLO
VALVE 80)(IN PLACE

150 PVC PLASTIC PIPE

PLAN OF BLACKTOP ANO VALVE BOX
ALIGNMENT WITH WATERMAIN

NOTE:

VALVE BOXES TO BE SET WITH RUN OF WATERMAIN SO THAT LENGTHWISE, COVER 1$ PARALLEL WITH WATERPIPE

BLACKTOP AROUNO COVERS APPLICABLE TO ALL VALVES ON BOULEVAROS AND PAVEhIENTS

No.	DATE	REVISIONS	DWG. W-

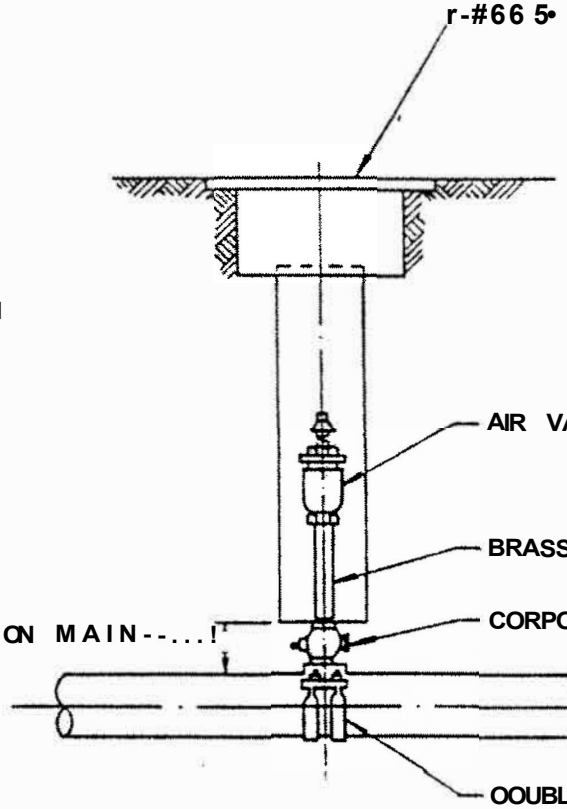
TYPICAL GATE VALVE COVER INSTALLATION

SUNSHINE COAST REGIONAL DISTRICT

PREPAREO 8'!'

OA'!'TON S KNIGHT LTO. CONSULTING ENGINEERS

OATE ..... .



NOTE•

ALL AIR VALVES TO BE OF THE
•DOUBLE ACTING TYPE. TERMINAL
CITY IRON WORKS A.V. 22, A.V. 24
OR EQUIVALE'NT

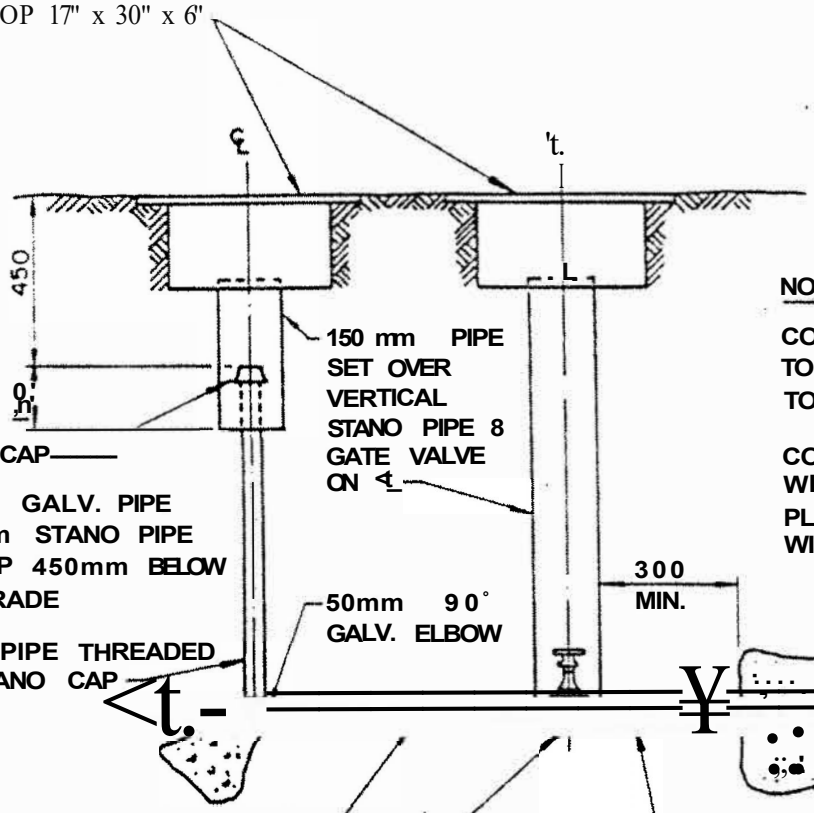
No.	DATE	REVISIONS	DWG. W-6

TYPICAL AIR VALVE INSTALLATION

SUNSHINE COAST REGIONAL OISTR

PREPARED BY
DAYTON 8 KNIGHT LTO, CONSULTING ENGINE[
DATE . . . .

#66 6" METER BOX TOP 17" x 30" x 6"

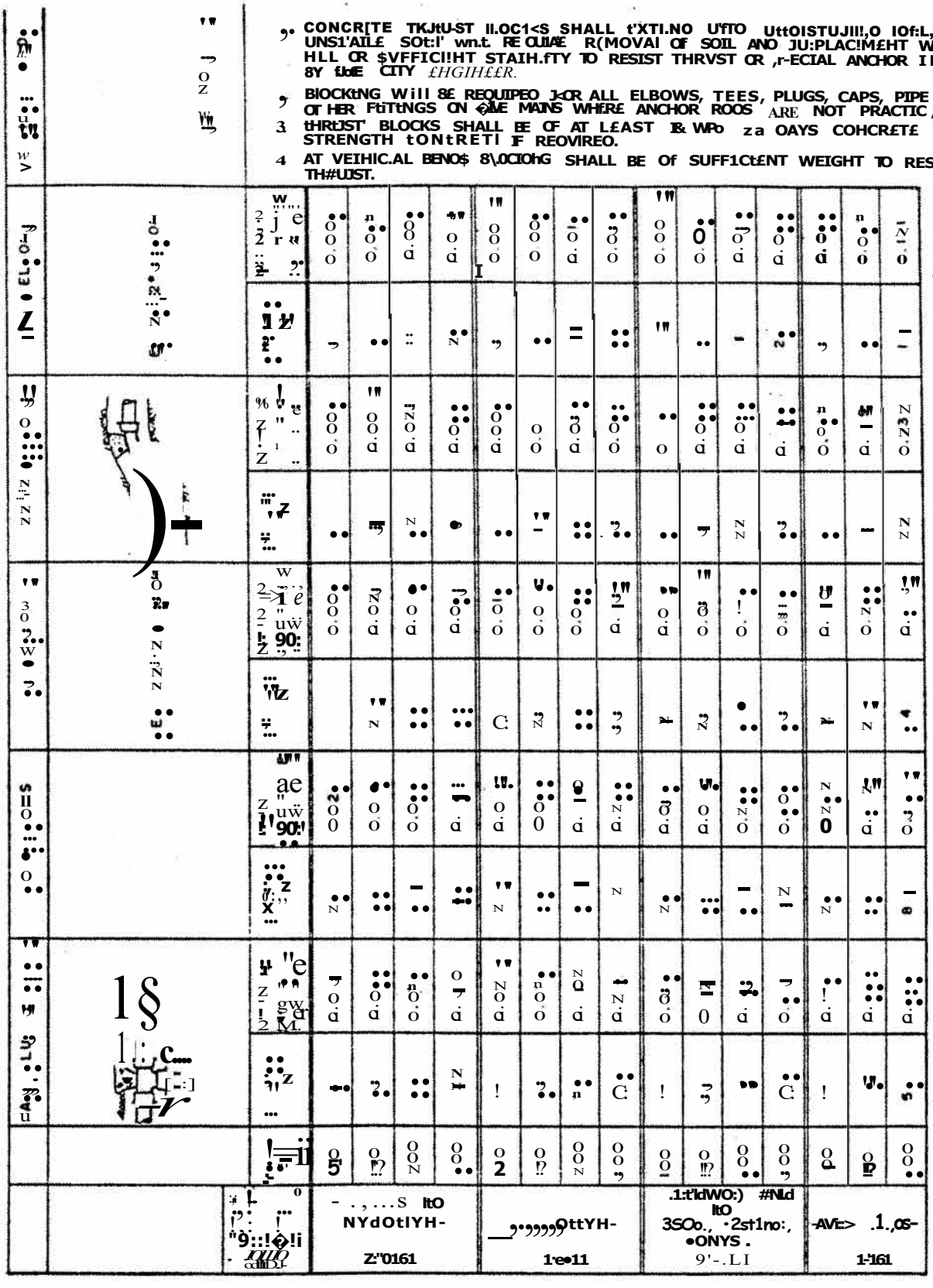


NOTE::

CONCRETE THRUST BLOCK TO BE POURED ON FORM TO PROTECT VALVE 8 PIPE

CONCRETE THRUST BLOCK WITH ENO AREA SIZED B PLACED IN ACCORDANCE WITH DWG. w-e

No.	DATE	REVISIONS	OWG. W-7
TYPICAL BLOW OFF AT WATERMAIN END POINT			SUNSHINE COAST REGIONAL DISTRICT PREPARED BY CAYTON 8 KNIGHT LTD. CONSULTING ENGINEERS DATE .. :....



No.	DATE	REVISIONS	DWG. W-a

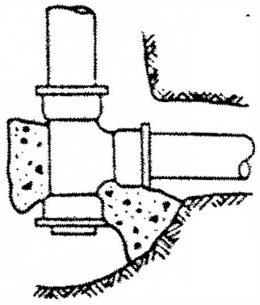
CONCRETE BLOCKING

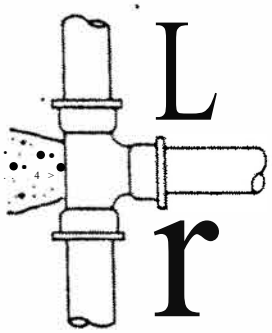
SUNSHINE COAST REGIONAL DISTRICT

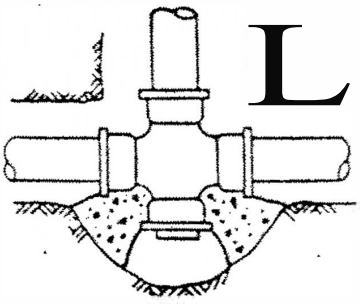
PREPARED BY

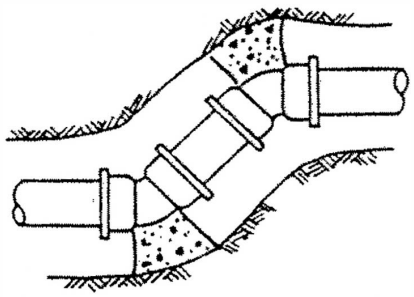
DAYTON & KNIGHT LTD. CONSULTING ENGINEERS

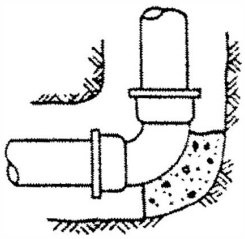
DATE ..

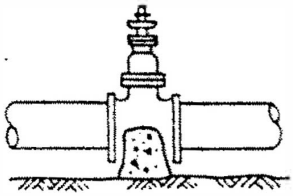




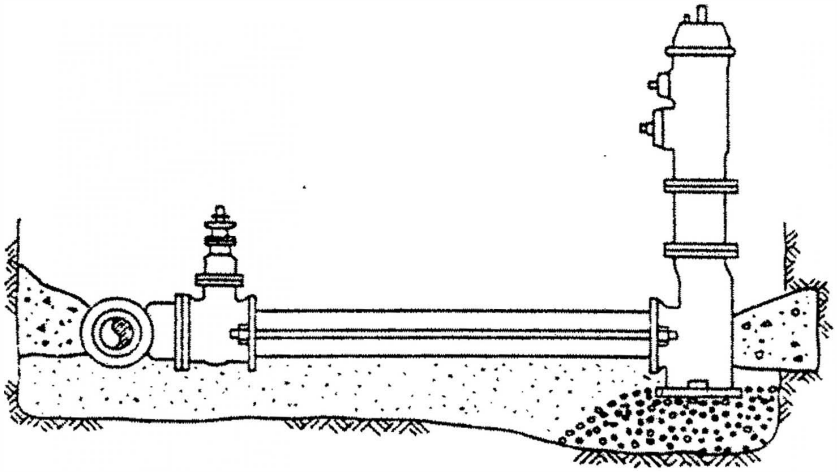


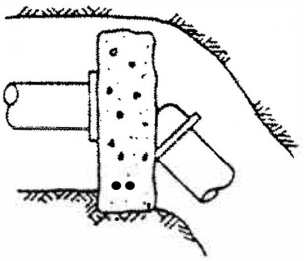




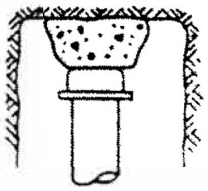


ALL BLOCKING TO EXTEND
INTO UNDISTURBED SOIL





ELEVATION



No.	DATE	REVISIONS	DWG. W-9

SUGGESTED THRUST BLOCK LOCATIONS

SUNSHINE COAST REGIONAL OISTRIC

PREPARED IIY

DAYTON a KNIGHT LTD. CONSULTING ENGINEER

DATE . . . . .

-1

STANDARD SYMBOLS

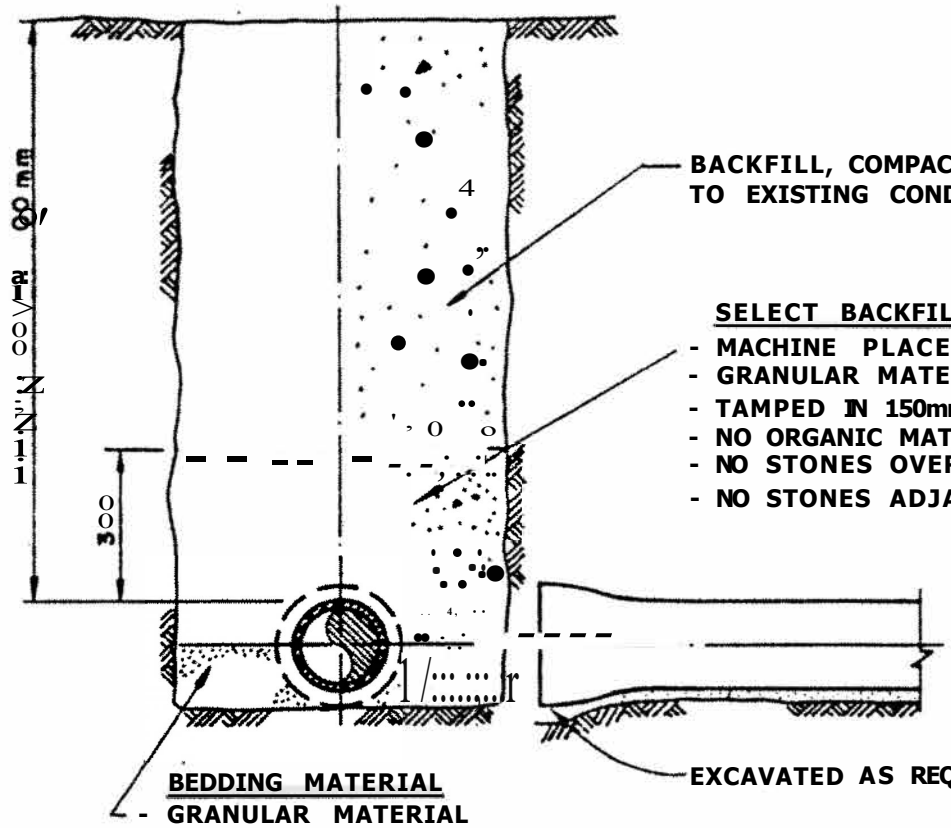
(Fo« USE Oft CONTRA.cT ORAwtNOSI

S	EXISTING SANITARY SEWER
D	EXISTING STORM DRAIN
W	EXISTING WATER MAIN
G	EXISTING GAS MAIN
E	EXISTING UNDERGROUND WIRING
	PROPOSED WATER MAIN
	PROPOSED GAS MAIN
	PROPOSED SANITARY SEWER
	PROPOSED STORM DRAIN
	PROPOSED UNDERGROUND WIRING
G.V.	GATE VALVE
C.V.	CHECK VALVE
A.V	AIR VALVE
PRV	PRESSURE REDUCING VALVE
M	METER
	FIRE HYDRANT
	CAPPED END WITH FLUSHOUT
	CAPPED END
M.t-4	MANHOLE
O.W.	DRAIN WELL
C.O.	CLEAN OUT
C.B.	CATCH BASIN

STANDARD ABBREVIATIONS

TT	TERC-0-TITE
TM	TER-MECH
TYT	TYTON
C. I.	CAST IRON
0. I.	DUCTILE IRON
A.C.	ASBESTOS CEMENT
S	STEEL
p	PLASTIC
F	FLANGE

Na	DATE	REVISIONS	OWG. W-10
STANDARD SYMBOLS			SUNSHINE COAST REGIONAL OISTRIc· PREPJ.REO BY DAYTON 8 KNIGHT LTD. CONSULTING ENGINEER. ::>ATE ...



FOR DUCTILE PIPE

No.	DATE	REVISIONS	DWG. W-11
TYPICAL CROSS SECTION WATERMAIN TRENCH (FOR DUCTILE PIPE)			SUNSHINE COAST REGIONAL DISTRICT PREPARED BY DAYTON & KNIGHT LTD. CONSULTING ENGINEERS DATE .....

SUNSHINE COAST REGIONAL DISTRICT
SUBDIVISION SERVICING STANDARDS (WATER & SEWER}

VII

STANDARD SPECIFICATIONS FOR CONSTRUCTION OF SANITARY SEWERS

CONTENTS

VII

STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF SANITARY SEWERS

I. GENERAL

1.0 I Definitions

In these Standard Specifications the following words and terms have the meaning indicated below, unless the context plainly indicates different meanings:

(a)	"These Standards"	means the Corporation of Sunshine Coast Regional District Standard Specifications for Construction of Sanitary Sewers.
(b)	"The Corporation"	means the Corporation of the Sunshine Coast Regional District.
{c)	"The Engineer"	means the Works Superintendent or his representative.
{d)	"Approved"	means approved by the Engineer.
{e)	"ASTM"	American Society for Testing Materials.
{f)	"CSA o	Canadian Standards Association.
{g}	"CGSB"	Canadian Government Specification Board.
{h)	"USBS"	U.S. Bureau of Standards.
{i}	"Contractor"	means the person, partnership of corporation who has contracted with the Corporation of the Sunshine Coast Regional District to provide the works described in the contract documents or any of their sub-contractors or employees engaged on the said works.

I.02 Scope and Use of Standards

These Standards shall apply to all sewers constructed by or for the Sunshine Coast Regional District.

I.03 Revisions to these Standards

Changes to these Standards will be made from time to time as conditions and improvements warrant. The most recent issue of these Standards shall

supersede all previous issues. Contracts in progress shall be governed by the Standards in effect at the time the Contract was entered into.

1.04 Standard Drawings

The Standard Drawings listed on the attached List of Standard Drawings, dated the same as these Standards, are hereby incorporated into and made a part of these Standards.

1.05 Maintenance and Restoration of Existing Drainage

If the work or any part thereof requires the disturbance of existing drainage, the Contractor shall be responsible for the provision of any temporary drainage facilities necessary to accommodate the drainage in a satisfactory manner.

All existing drainage facilities disturbed by the Contractor in carrying out the work shall be promptly restored to their original condition as the work advances. On completion of the work, the drainage facilities shall have at least the same flow capacity as before and shall be left in a stable condition to the satisfaction of the Engineer.

1.06 Location and Protection of Existing Utilities

The existing underground services shown on the drawings are not guaranteed to be accurate or complete. It shall be the responsibility of the Contractor to find and locate all existing services such as water, gas, oil, electricity, telephone, sewers, drains and culverts, to preserve and protect them from damage during construction and to arrange and pay for their relocation if necessary.

Where sewer lines cross existing utilities which cannot readily be relocated, the Contractor shall determine whether any direct conflict exists sufficiently in advance of construction to allow changes to be made to the design of the work to avoid such conflict with the existing utilities. No claim for damages by the Contractor will be entertained by the Corporation for the cost of locating utilities, adjusting lines and grades to avoid conflict, relaying pipe to avoid conflict, or any delays occasioned thereby.

1.07 Curtailment of Existing Utility Service

Where existing utilities such as water, electricity, telephone and gas are serving the public, work shall be planned and executed so that there shall be no curtailment of the service provided by these utilities, unless the Contractor has first obtained the approval of the authorities responsible for the provision and maintenance of these utilities.

If the Contractor, after receiving approval of the responsible authorities, is to temporarily shut off service of an existing utility, he shall notify individual users of the utility who will be affected by the shut-off at least one hour prior to the time of shut-off.

If the Contractor is going to shut off a watermain, he shall, in addition to

notifying individual users, notify the fire department one hour prior to the time of the shut-off.

If a utility has to be shut off by the Contractor in an emergency, he shall immediately notify the authority responsible for its maintenance.

1.08 Connection to Existing Sewers

The Contractor shall make no connection to existing downstream receiving sewers. No connection to existing downstream receiving sewers will be permitted until all sewers to be constructed by the Contractor have been completed, including testing and flushing. The Contractor shall pay all costs of making connections to downstream receiving sewers.

1.09 Public Access and Safetv

During the progress of the work all streets shall be kept open for public travel, unless prior arrangements have been made by the Contractor with the Engineer.

Barricades, warning lights, traffic signs and all traffic control devices shall be provided and used by the Contractor, in accordance with the "Manual for Uniform Traffic Control Devices for Canada".

At no time shall access be cut off completely from any houses or buildings although private driveways may be cut off temporarily for periods up to twenty-four hours. Before cutting off access to any houses or buildings, the Contractor shall give at least four hours' notice to the owner of the property.

The Contractor shall effectively warn and protect the public from any danger as a result of the work being done.

No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic, or in such a manner that it creates a hazard for the public. At the end of each day's work and at other times when work is suspended, the Contractor shall remove all equipment and other obstructions from that portion of roadway open for use by traffic.

The Contractor shall ensure that fire hydrants, valve boxes, manhole covers, meter boxes, fire or police call boxes, and all other utility controls are accessible at all times.

The Contractor shall provide temporary pedestrian bridges across the trench at all street intersections and at access points to houses and buildings unless alternative convenient pedestrian access is a•tailable.

I.IO Site Clean-up

The Contractor shall maintain the site in a neat and orderly condition free from rubbish and unnecessary hazards during the course of construction. Any accumulation of rubbish shall be promptly removed from the site. Surplus materials shall be cleaned up promptly so as not to cause a nuisance tr obstruction.

STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF SANITARY SEWERS

2. MATERIALS

2.01 General Requirements

Materials incorporated into the work and not specified herein shall be of the best quality available and approved by the Engineer. Otherwise, all materials incorporated into the work shall conform to these specifications.

2.02 Testing and Samples

Testing of materials shall be carried out by an approved testing laboratory and paid for by the Contractor. Certified copies of all test results shall be submitted by the testing laboratory directly to the Engineer.

The method of selecting samples of materials proposed to be incorporated into the work shall be determined by the Engineer.

2.03 Storage and Care

Materials shall be handled and stored so as to ensure the preservation of their quality and fitness for the work. When considered necessary by the Engineer, they shall be placed on wooden sills or platforms or stored under cover. In particular, rubber gaskets shall not be left exposed to the sun.

2.04 Handling

Tools, trucks and other equipment as well as methods of handling and hauling material shall be such that pipes, manhole sections and other materials will not be dropped, roiled, bumped or damaged. The use of hooks on pipe ends will not be permitted, and special care shall be exercised to prevent damage to machined ends.

2.05 Pipe

The following types of pipe will be acceptable for sanitary sewers:

(a) PVC, SDR 35, ASTM D3034 (maximum size 300 mm).

(b) Concrete, minimum Class 3, non-reinforced ASTM Cl!1, maximum size 450 mm.

2.06 Pipe Joints a,d Jointing Material

Pipe joints shall be of the bell and spigot or sleeve coupling type. They shall be supplied with rubber gaskets or other pre-formed, factory manufactured gasket of approved material conforming to an ASTM standard for sewer pipe • jointing material.

Before installing any sanitary sewers, the Contractor shall ensure that the pipe joints have been approved by the Engineer. Any other type of pipe joints proposed by the Contractor shall be subjected to leakage tests at the Contractor's expense to be witnessed by the Engineer as follows:

(a) Pipes in Straight Alignment

Four lengths of pipe shall be selected at random by the Engineer and these shall be connected together in accordance with the pipe supplier's instructions. Suitable bulkheads shall be provided at the ends of the joined sections and the assembly shall be subjected to an internal water pressure of 70 kPa for one hour. No leakage shall be noticeable at the joints.

(b) Pioes in Deflected Position

Upon completion of the test for pipes in straight alignment, the pipes shall be deflected so that there is at least 10 millimetres of deflection per pipe diameter from the straight line position, and then subjected to an internal water pressure of 35 kPa for one hour. Again, no leakage shall be noticable. Beads of water on the surface of the joints will not be considered as leakage.

2.07 Pipe Fittings

(a) Y-Branches

The axis of branches shall be at 45 degrees from the longitudinal axis of the main pipe, measured from the bell end.

(b) Bends

The radius cf curvature of the centre line of pipe bends up to 200 mm diameter shall be at least two-and-a-half (2½) times the nominal pipe diameter.

2.08 Pipe Bedding Material

Pipe bedding material shalt be 19 mm minus crushed gravel, or rock approved by the Engineer, evenly graded from coarse to fire particles. Not more than lO percent by weight shall pass through a No. 40 USBS square mesh sieve.

2.09 Trench Bottom Stabilization Gravel

Material for stabilization cf trench bottom shall be *50* mm minus crushed gravel or rock not more than 10 percent of which by weight shall pass through " No. 40 IJSBS square mesh sieve.

2.10 Imported Backfill

Imported backfill material shall be pit run sand or mixed sand and gravel free from stones larger than 150 mm maximum dimension, and free from organic material of any kind. Not more than 10 percent of the material by weight shall pass through a NO. 100 USBS square mesh sieve.

2.11 Select Backfill for Pipe Zone

Select backfill material used for backfilling in the pipe zone shall be weil graded inorganic trench excavation material placed by hand by the Contractor and carefully selected to exclude any particles larger than 38 mm maximum dimension. Material which, in the opinion of the Engineer, contains too much silt or clay shall not be used as select backfill in the pipe zone.

2.12 Native Backfill Material

Native backfill material shall be material excavated from the trench which has been approved by the Engineer for backfill from which all rocks larger than 200 mm maximum dimension, roots, or other objectionable materials that would impede consolidation of the backfill, have been removed by the Contractor.

2.13 Road Gravel

Road gr ave! shall conform to Highway Standard Specifications.

2.14 Asphalt Concrete

Asphalt concrete shall conform to Highway Standard Specifications for Roads, Streets and Lanes.

2.15 Precast Concrete Manhole Sections

Precast concrete manhole sections shall be 1.07 M inside diameter with 1l 2.5 mm wall thickness, reinforced concrete pipe of at least Class ll in accordance with ASTM Standard C76 with tongue and groove mortar joints. Manhole sections shall be 19 mm galvanized steel steps cast in the concrete as shown on the Standard Drawings.

Cover slabs for manholes and drain wells shall be reinforced to withstand H20 highway loading conditions.

2.16 Cast Iron Manhole Frames and Covers

Covers and frames shall be cast iron of an approved pattern to withstand H20 loading. The clear opening of the frame shall be 500 mm in diameter. The cover shall have a weight of 65.8 kg. The frame shall be of the round base pattern having a weight of 83.9 kg. Bearing faces of the cover to frame shall be machined for a non-rocking fit. Covers shall have 2 only 22 mm diameter lifting holes with bolt plug assembly as shown on the drawings. Frames shall have 3 only 22 mm diameter levelling holes as shown on the drawings. Covers and frames shall be Dobney Foundry Pattern C-20, or as approved. Covers shall

have the following wording as required permanently embossed thereon:

"SUNSHINE COAST REGIONAL DISTRICT SAN!TARY SEWERS"

2.17 Cleanout Frames and Covers

Cleanout frames and covers shall be 200 mm diameter cast iron, Terminal City Drawing D-473, or as approved.

2.18 Manhole Filler Rings

Filler rings below cast iron frames shall be precast 20.7 MPa concrete rings or brick of 600 mm diameter, 750 mm outside diameter and 50 mm thick.

VII

STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF SANITARY SEWERS

3. INSTALLATION

3.01 Preparations for Excavation

(a) Cutting of Pavement

Existing asphaltic concrete pavement shall be cut along neat straight lines along both edges of proposed trenches with an approved cutting tool prior to excavation of the trenches.

(b) Clearing

Where construction is to be performed on private or public property which has been improved as orchard, garden or other cultivated area, the work shall be performed in a manner which will cause minimum damage and which will facilitate restoration. On improved or cultivated property trees shall not be removed or cut without the permission of the owner of the land and the Engineer. When branches or roots must be cut, they shall be sawn neatly and saw cuts on trees shall be painted with an approved tree seal. Shrubs and other cultivated plants which have to be removed shall be preserved if possible for replanting.

On unimproved areas that have not been cleared, the Contractor shall clear sufficient space to complete the work and shall burn or otherwise dispose of the debris before starting the trench excavation. **If** Municipal restrictions do not permit burning of debris on the site, it shall be hauled to an approved location for burning or disposal.

All stumps which are removed in the course of excavating shall be disposed of by the Contractor away from the site in an approved manner.

(c) Removal of Turf

Unless the Contractor proposes to import turf or reseed disturbed lawn areas, turf shall be neatly cut, removed in sections of uniform thickness, and stacked grass to grass for later replacement.

(d) Removal of Topsoil

No topsoil shall be removed from the site; it shall be kept separate from other excavated material and preserved for later restoration of the surface.

3.02 Excavation

Excavation of trenches shall be between 1he minimum and maximum lines shown on the drawings. Excavation for structures shall be sufficient to erect concrete formwork, except that manhole bases may be cast against the wail of the excavation if the soil conditions are suitable.

Trenches shall be excavated only as far in advance of the pipe laying operation as safety, traffic, and weather conditions permit and shall in no case exceed 61.0 M. Caution shall be exercised with respect to structures, piping or other man-made obstacles that may exist within the working area and due consideration given to the protection and support of such properties and structures.

Where excavating machines would cause damage to trees, buildings or other improvements that are close to the trench, or whenever the owners of private property do not permit the use of excavating machines on their property, the excavation shall be done by hand.

Unless the excavated material is declared unsuitable for backfill by the Engineer, sufficient quantity of excavated material for backfilling the trench and structures shall be retained at the site.

Where sewers are installed on public roadways, the length of sewer trench which may be left open shall not exceed 61.0 M. The length of trench left open for inspection shall at no time be less than four (4) pipe lengths. Backfilling of the sewer trench shall be completed within five (5) days from starting the excavation. Backfilling around manholes shall be completed within ten (IQ) days from starting the excavation for the manhole.

The Contractor shall exercise care to avoid spillage on public roadways over which trench spoil or backfill material is hauled, and any such spillage shall be cleaned up promptly by sweeping. Where excavated material has been temporarily olaced on pavement, the pavement shall likewise be cleaned upon its removal.

3.03 Blasting

Should blasting be required for the excavation, the Contractor shall exercise extreme care and shall limit the use of explosives to such charges that will not cause damage to structures, pipelines and other utilities. Blasting shall be done by men qualified for the work under Provincial and Municipal regulations and the blasting shall be done in accordance with such regulations.

3.04 Lines and Grades

All of the work shall be done to the lines and grades shown on the approved contract drawings or as directed by the Engineer. All lines and grades shall be established on the ground before excavation for sewers is commenced. Stakes shall be set at 15.0 M intervals along a line offset from the proposed pipeline nnd it shall be the Contractor's responsibility to preserve and protect them until completion of construction. All costs incurred by the Engineer for replacing

markers prematurely destroyed shall be charged to the Contractor. The Contractor shall erect at least three batter boards, based on the offset stakes, and he shall ascertain that they are in correct alignment before starting to lay pipe on any new grade. Laser assisted line and grade set and will be acceptable.

The locations of service connections shall be staked in the field before excavation for the mains is commenced. The depth of service connections at property line shall be given from offset stakes at property line before excavation for the service connection is commenced.

Sewers shall be laid on line and grade in accordance with the Engineer's stakes.

Where the line and/or grade of pipe laid deviates by more than 30 mm from the true line anti/or grade, as shown on the approved drawings, the pipe shall be taken up and relaid.

3.05 Sheeting and Bracing of Excavations

Trenches shall be sheeted and braced as recommended by the Workmen's Compensation Board or as may be necessary to protect life, property and structures adjacent to the work, the work itself or to maintain trench widths within the specified limits. Trench setting and bracing shall be located not closer than 150 mm to the pipeline being installed.

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; otherwise it shall be left in place.

3.06 Dewatering

Ground and surface water shall be controlled to the extent that excavation and pipe installation can proceed in the specified manner and such that the 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 Engineer.

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 construction do not result from the selected method of dewatering excavations. Discharge from pumps, well points or other dewatering equipment shall be located and controlled in such a manner that loss, damage, nuisance or injury to the public does not result.

3.07 Trench Bottom Conditions

Trenches shall be maintained such that pipe can be installed without water, muck, silt, gravel or other foreign material entering the pipe. Upon completion of machine excavation, material remaining in the trench bottom, which has been disturbed or softened by workmen or by 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 overexcavation 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 unsuitable for pipe support of appurtenant structures, one of the following methods of stabilizing the trench bottom shall be adopted as directed by the Engineer:

(a) The trench shall be overexcavated to the level at which stable material is encountered and the excavation backfilled to the level of normal bedding with 50 mm minu, base gravel material. This material shall be compacted with approved mechanical compactors in lifts having a maximum depth of 0.30 M 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.

(b) If the unstable material extends to a depth at which it is uneconomical to overexcavate as in (a), then piles or other structural supports shall be installed in accordance with the Engineer's instructions.

3.08 Pipe Bedding

The pipe bedding shall extend from at least 100 mm below the bottom of the pipe barrel to at least 25 mm above the pipe springline.

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 and have a minimum depth of 100 mm on completion of compaction. In rock excavations, 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 to grade. After the pipe is in position, bedding material shall be placed and firmly compacted in 150 mm layers using hand tampers on both sides of the pipe.

3.09 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 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 recommendations. 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 ensure 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 during the day, the last pipe shall be blocked to prevent creep

in the pipeline and plugged to prevent entry of foreign material.

3.10 Service Connection Junctions

Service connection junctions to sewer mains shall be made with pre-!abricated 45-degree Y-branch fittings at the locations shown on the drawings or staked in the field. All such fittings shall be provided with watertight plugs or caps.

3.11 Backfilling in the Pipe Zone

The pipe zone is defined as extending from the bottom of the pipe bedding to 300 mm above the top of the installed pipe.

After the pipe has been installed and bedded, select backfill material as defined elsewhere in these Specifications shall be placed by hand and thoroughly compacted in 150 mm layers by hand tamping or with approved mechanical compactors up to a level of 300 mm above the top of the installed pipe.

II the Contractor is unable to find sufficient quantity of suitable select backfill material from the excavated material as determined by the Engineer, he shall import suitable material and backfill the pipe zone as directed by the Engineer.

3.12 Backfilling above the Pipe Zone

Materials and methods employed in backfilling trenches above the pipe zone shall depend on the type of surface in which the trench is excavated.

Travelled· surfaces are defined as gravelled or paved roadways, lanes, driveways, parking areas, road shoulders, walkways or other gravelled or paved surfaces over which vehicular or pedestrian traffic normally travels.

Backfill above the pipe zone and surface restoration of trenches shall be carried out in accordance with the following paragraph:

Where compaction of the backfill is specified, compaction 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% of Modified Proctor Density (ASTM D1557) is obtained. Backfill shall be thoroughly compacted in layers not greater than 300 mm thick.

(a) Untravelled Surfaces

In untr avelled 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 JO% 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 whir:h at least is equivalent to that which existed prior to construction unless the 2pproval of the Engineer is given to leaving trench surfaces in a bermed condition.

(b) Gravel Travelled Surfaces

In travelled surfaces which were originally gravel surfaces, trench backfill above the pipe zone to a level of 300 mm below the original ground surface shall, unless otherwise specified, be native backfill material. The top 300 mm of backfill shall be road base gravel in accordance with Department of Highways standards.

Backfill in trenches located in gravel travelled surfaces need not be compacted except in locations where compaction is considered necessary by the Engineer. Compaction of backfill will not be ordered solely for the purpose of reducing the Contractor's maintenance requirements.

(c) Paved Travelled Surfaces

When trenches have been excavated in existing paved surfaces which are to be repaved, trench backfill shall be mechanicaly compacted native backfill material (unless it is declared unsuitable for backfill by the Engineer) to a level 350 mm below finished surface grade. The remainder of the trench shall be backfilled with 300 mm of compacted 31 mm road base gravel and finished with a minimum thickness of 50 mm of compacted hot-mix asphaltic concrete.

Where pavement adjacent to the excavation is destroyed or subsides as a result of the construction operation, the Contractor shall cut out and remove the destroyed or subsided pavement, compact all backfill beneath, place the 300 mm course of road base gravel and replace the paved surface.

(d) Trench Cuts **Acrosss Existing** Roads

Where trenches have been cut across existing roads, these trenches shall be restored to their original condition as soon as possible. Backfill shall be fully compacted and paved surfaces shall be patched immediately with hot-mix asphaltic concrete. If weather conditions preclude immediate repaving with hot-mix, then a temporary cold-mix patch shall be installed and replaced later with hot-mix.

(e) New Roads in Subdivisions

In subdivisions where roads are to be constructed and paved within one year of backfilling, all trenches under roads or within 1.0 M of the edge of pavement shall be backfilled with native backfill material (unless it is declared unsuitable for backfill by the Engineer) and compacted as specified hereinafter.

Wherever native material is not suitable for backfill, in the opinion of the Engineer it shall be hauled away and disposed cf and imported backfill material shall be provided by the Contractor.

Where compaction of the backfill is specified, compaction shall be obtained by using approved, mechanical, power-driven compactors.

3.13 Suoport for Neighbouring Pipes and Structures

Existing structures shall be protected against damage from settlement by

means o! timber support and compaction of backfill. Where necessary, timber support shall remain in place following backfill of excavations.

Backfill which is placed or adjacent to existing structures, which have been undermined during excavation, shall be compacted in a manner which will prevent damage of the structure from settlement. Such backfill shall be of approved granular material thoroughly compacted in layers not more than 150 mm thick. Under existing piping this material shall horizontally a minimum distance of 0.61 M on both sides of pipe at the top of pipe level and shall slope down from this point at I Y, horizontal to one vertical to meet the bottom of the excavation.

3.14 Disposal of Surplus Excavated Material

Surplus excavated material shall be deposited as fill on or around the site of the work as directed by the Engineer, or, if no fill is required at the site, it shall be disposed of away from the site by the Contractor. No soil shall be removed from the site without the Engineer's written permission. No material shall be deposited on private property unless the Contractor has first obtained the written permission of the owner or on public property unless the Contractor has obtained written permission of the Engineer.

3.15 Service Connections

Service connections from the mains to property Jines shall be installed at the locations and to the elevations shown on the drawings or as directed by the Engineer.

Service connections shall, as far as possible, be installed in a straight line and at uniform grade from the terminus at property line to the Y-branch fitting on the main.

The ends of service connections shall be not more than 300 mm short of property line; otherwise they shall be dug up and extended by the Contractor. The ends of all service connections shall be sealed with watertight plugs or caps and marked with 50 mm x 100 mm stakes placed vertically with one end in the bottom of the trench and in contact w:th the watertight plug or cap and the other end protruding at least 0.61 M above ground level. The depth of the service pipe invert below the top of the 50 mm x JOO mm marker stake shall be marked on the stake.

When the sewer main is 3.65 M or more in depth, service risers may be installed close to the mains as shown on the Standard Drawings.

Service Connections shall be at l-east 100 mm diameter and shall be laid at not less than two (2) percent slope.

The ends of sewer services will in general be located at a point 6.0 M from the downstream corner of each lot.

Inspection chambers shall be pr"1ided as shown in the standard sewer connection drawings.

3.16 Manholes

Precast concrete manholes shall conform to the details shown on the Standard Drawings.

The bottom of excavations for manholes shall be treated as specified for trench bottom conditions elsewhere in these Specifications.

All water shall be removed from the excavation prior to placing manhole base concrete.

Concrete for manhole bases shall be Class A2 in accordance with S.C.R.D. Standard Specifications for Ready-mixed Portland Cement Concrete.

Manhole channelling shall be constructed as shown on the Standard Drawings. Wherever possible, channelling shall be formed using half sections of pipe or fittings. Particular care shall be taken when constructing manhole bases to ensure that the invert levels of pipe entering and leaving the manhole are set at the elevations established by the Engineer. Invert levels or pipe at the manhole shall be checked by the Contractor prior to and following placement of base concrete around the pipe. Pipes which are embedded in concrete manhole bases at one end shall be bedded in concrete to within 150 mm of the other end. Pipes which are embedded in concrete manhole bases shall not be more than 1.2 M long.

Blind stub sections for connection of future sewers a"1d service connections to the manholes shall be installed where shown on the drawings and as directed by the Engineer. The stub shall consist of one short length of the specified size of pipe installed in the manhole and plugged with a removable, watertight plug as shown on the drawings. Where stubs are installed, the bottom of the manhole shall be channelled to the stub entrance.

Manhole drop structures shall be constructed as shown on the drawings, where vertical drop into the manhole exceeds 0.61 M.

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

Frames shall be set on a minimum of one (I) and maximum of four (4) precast concrete filler rings. Rings shall be mortared in an approved manner to exclude any entrance of ground water. Frames shall be firmly embedded in mortar and shall be set accurately to provide a cover surface which is even with and true to the contour of the surface.

Levelling screws shall be applied on the frames where necessary to provide correct adjustment for the :rames and covers under roads.

Manhole steps shall he placed as shown on the drawings or as directed by the Engineer.

Cone manholes shall be constructed as shown on the Standard Drawings wherever the manhole depth is I.2 M or Jess.

3.!7 Cleanouts

Cleanouts shall conform to the details shown on the Standard Drawings. The quality o! construction shall in all respects be equal to that specified for manholes.

3.18 Tunnelling, Jacking and Augering

No tunnelling, jacking or augering shall be done without the written permission of the Engineer. At least seven (7) days before commencing any tunnelling or jacking or augering operations, the Contractor shall submit full details of his proposed operation to the Engineer.

Jacking of the actual sewer pipe will not be permitted. Rather, a conductor pipe sh:ill be jacked and the sewer pipe installed therein. The space between the conductor and the sewer pipe shall be filled with sand or concrete in a manner satisfactory to the Engineer.

3.19 Leakage Testings of Sanitary Sewers

Leakage tests shall be made by the Contractor and witnessed by the Engineer on all installed sewers and appurtenances. Each run of sewer between manholes shall be tested immediately upon completion of the manholes.

Tests for leakage will be either infiltration or exfiltration tests. The type of test employed will be determined by the Engineer. Where the surface !evel of existing ground water in the backfilled trench is I.0 M or more above the top of the pipe over the entire test section, an infiltration test may be used to determine leakage into the pipe. Where the ground water surface level is less than 1.0 M. above the top of the pipe, or where ground water at the time of testing is not apparent, the Contractor shall carry out an exfiltration test.

The Contractor shall provide test water, equipment and all materials necessary to conduct leakage tests as specified herein.

On an exfiltration test, the test section shall be sealed at its lower extremity by means of a watertight plug. The test section shall be filled with water such that a minimum hydrostatic head of 0.61 M is placed on the pipe at its upper extremity. The head of water on the pipe shall be taken as the distance from the top of the pipe to water surface at the point of measurement. The test pressure shall be maintained above the 0.61 M minimum head for a period of not less than one hour, and unless excess exfiltration requires further testing, not greater than eight (8) hours. The rate of exfiltration shall be calculated from the amount of water which must be added to maintain the original water level at the upper end.

3.20 Surface Restoration in Easements

Topsoil, shrubs, small trees, lawn, fences and other items removed prior to or during the construction operations shall be replaced to at least equal the original condition. Items which have been destroyed shall be replaced to the satisfaction of the property owner.

Prior to acceptance of the work, the Contractor shall obtain a written release from each owner of easement property certifying that the owner is satisfied with the restoration of the working area and trench surface. A copy of such releases shall be submitted to the Engineer.

3.21 Surface Maintenance during Construction

The Contractor shall maintain all trench surfaces and working surfaces affected by his operation throughout the construction period and until such time as the project is accepted by the Owner. Maintenance during this period shall be as follows:

(a) Trench Surfaces

Surfaces of backfilled trenches which have been temperarily bermed shall be maintained at, or above, the level of the original ground and shall be finished as specified prior to acceptance. \1aterial shall be provided and placed to fill depressions resulting from settlement of backfill.

Gravelled surfaces of backfilled trenches shall be maintained at the original ground level and free of pot holes and washboard conditions. Additional surfacing gr ave! shall be provided and placed to fill any surface depressions resulting from settlement of the trench backfill and surfaces shall be graded to eliminate depressions, pot holes and washboard conditions as often and as soon as they occur.

Backfilled trenches which, due to weather conditions, cannot immediately be reinstated to the specified standard and which are hazardous to traffic, shall be marked with 300 mm x 300 mm reflectorized hazard markers projecting three 1.0 M above ground, so that traffic is warned of the presence of the traffic hazard.

Bumps or other road hazards shall be adequately marked with lanterns, flashers and suitable signs until such time as road defects are rectified.

(b) Working Surfaces

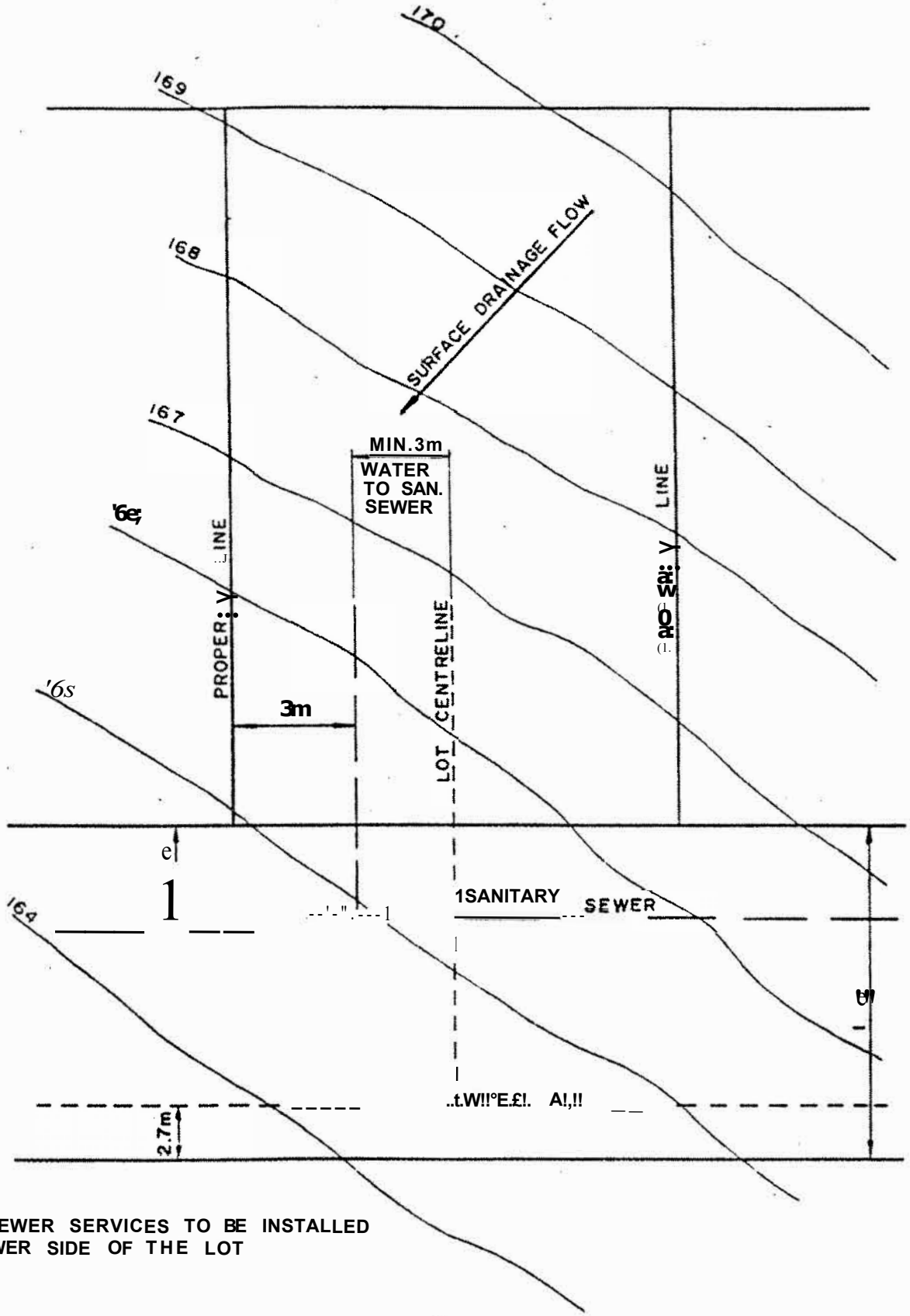
In addition to maintenance of backfilled trench surfaces, working surfaces which have been disturbed during construction shall be maintained until final acceptance of the work.

3.22 Flushing and Final Inspection

Prior to final inspection of sewers, the Contractor shall flush each run between manholes, by use of a high pressure water jet cleaner. The Contractor shall remove all foreign material found in the sewers.

The Engineer will then carry out final inspection of the sewers and appurtenances. Each run of sewers between manholes shall be lamped to check alignment, grade and cleanliness. Manhole construction and invert elevations and the elevation of blind stubs shall be checked. Any deficiencies found during the final inspection or at any time after until the end of the maintenance period shall be promptly rectified by the Contractor.

4. LIST OF SEWER DRAWINGS



SANITARY SEWER SERVICES TO BE INSTALLED ON THE LOWER SIDE OF THE LOT

No.	DATE	REVISIONS	OWG. S-1

TYP.

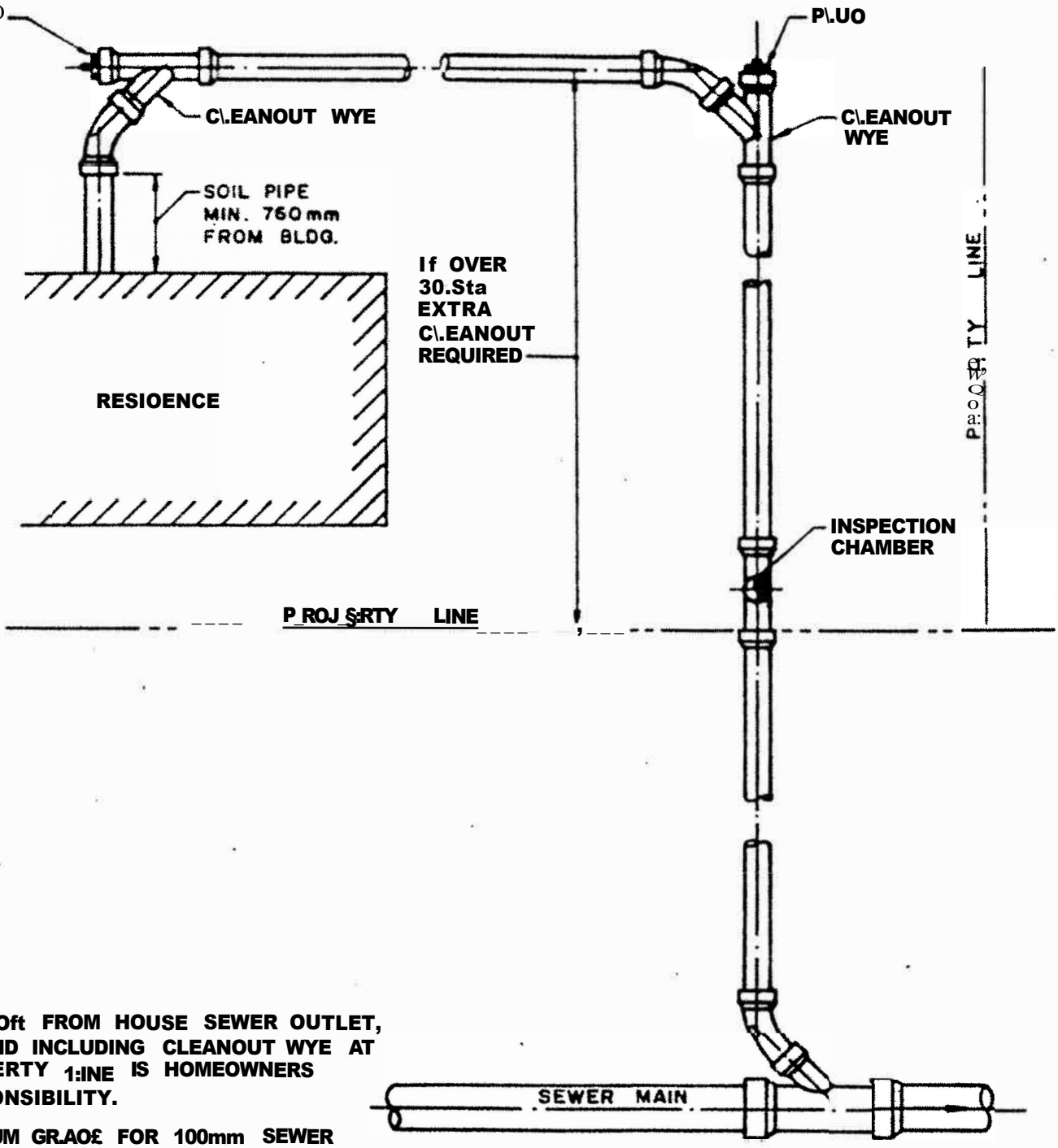
LOCATION OF SERVICE CONNECTIONS TO RESIDENTIAL

SUNSHINE COAST REGIONAL DISTRICT

PREPARED BY

DAYTON a KNIGHT LTD. CONSULTING ENGINEERS

OATE . . . . . .



NOTE:

1. SECTIOft FROM HOUSE SEWER OUTLET, TO AND INCLUDING CLEANOUT WYE AT PROPERTY 1:INE IS HOMEOWNERS RESPONSIBILITY.
2. MINIMUM GR.AO£ FOR 100mm SEWER LINE IS I - PER 50111111.
   IN EXCEPTIONAL CASES A GRADE OF I,n,n PER 100mm MAY BE USED, PROVIDING THIS IS AUTHORIZED ANO APPROVED 8"! THE MUNICIPAL ENGINEER_
3. ANY CHANGE IN DIRECTION TO BE MADE WITH WYES OR 45• SENDS ONLY.
4. PLUGS TO el! REMOVABLE, WATERTIGHT TYPE.

No.	DATE	REVISIONS	DWG. S-2

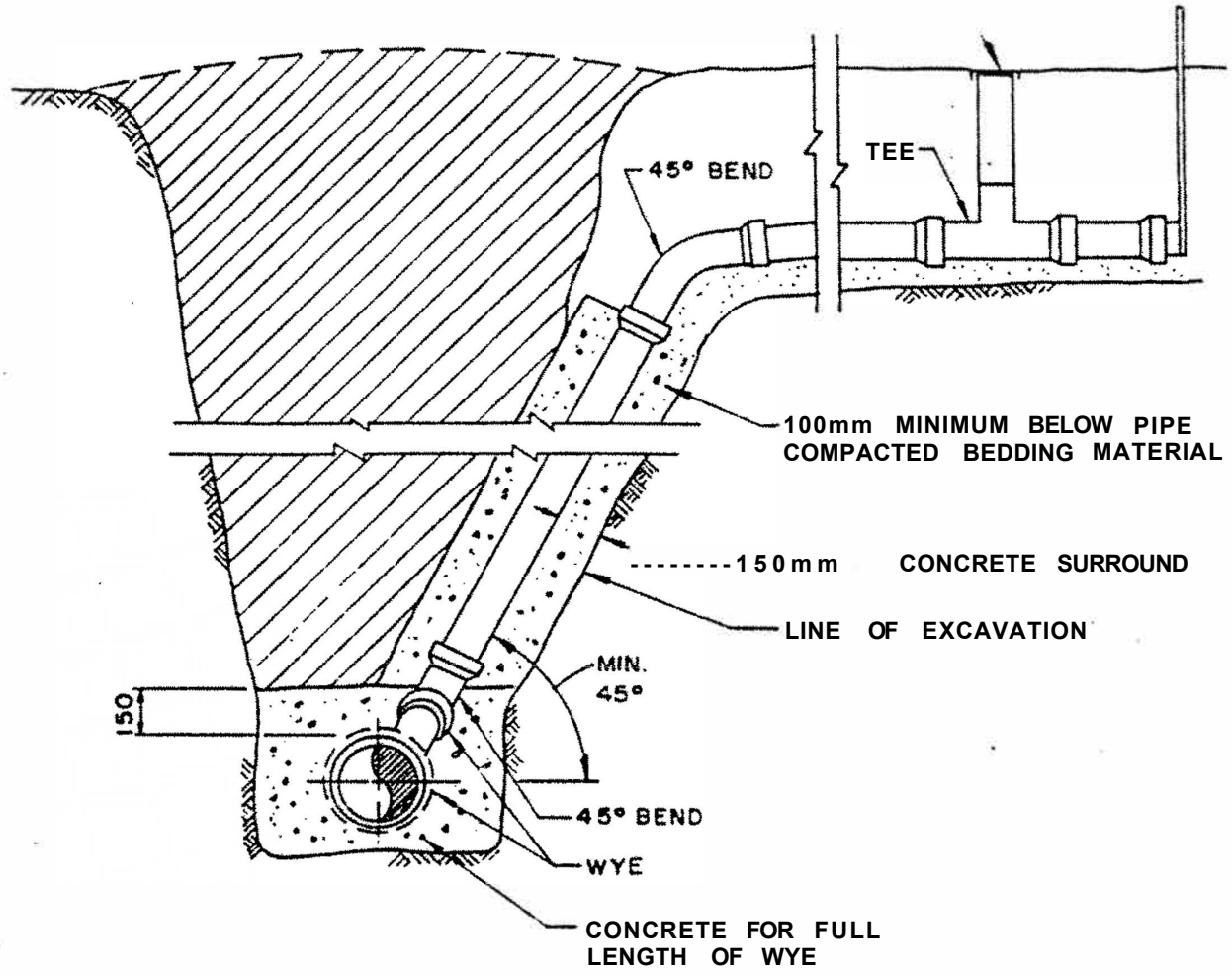
TYP.

RESIDENTIAL SEWER CONNECTION

SUNSHINE COAST REGIONAL DISTRICT

PREPARED 8Y
DAYTON a KNIGHT LTD. CONSULTING ENGINEERS
DATE ..... .

INSPECTION CHAMBER\



No.	DATE	REVISIONS	OWG. S-3

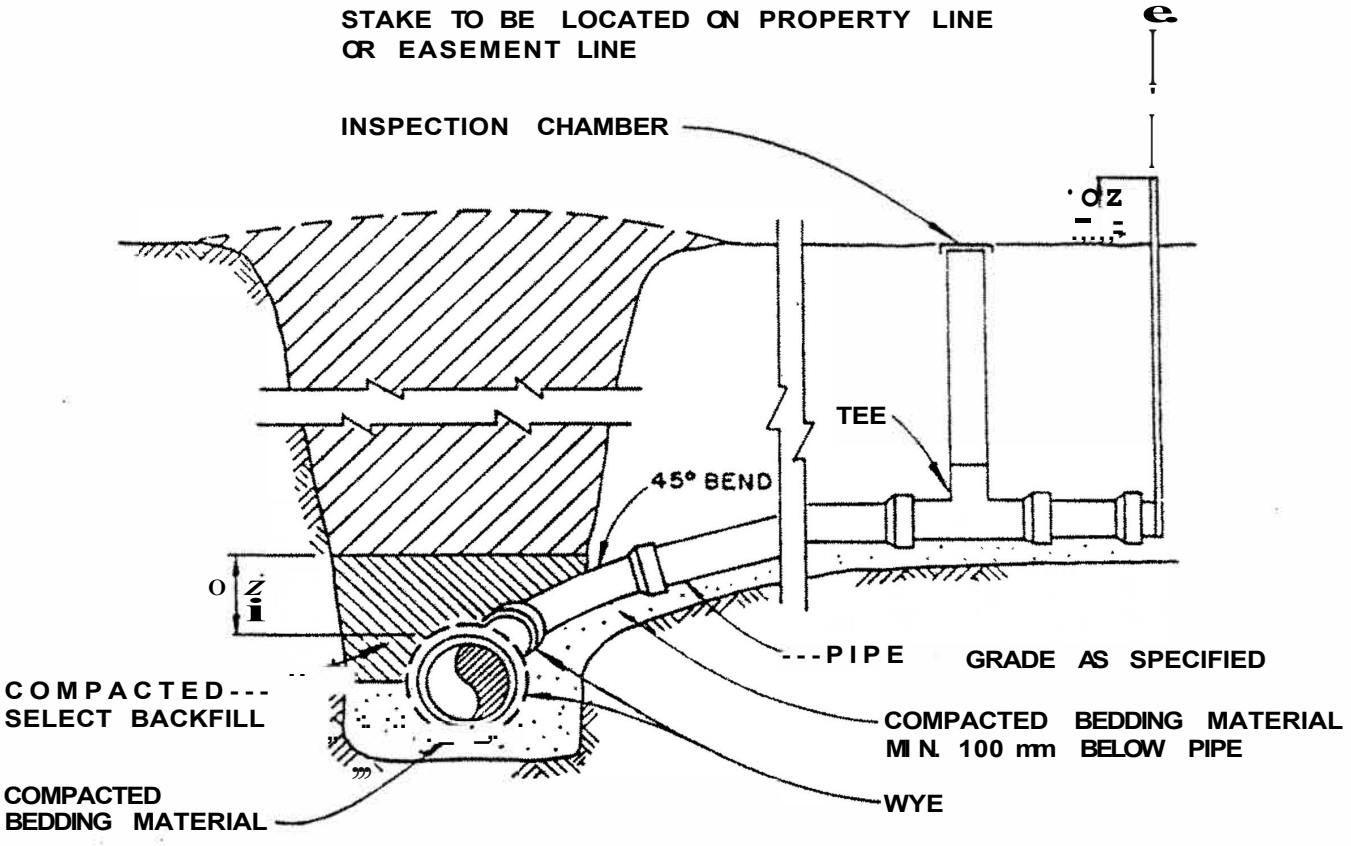
SERVICE CONNECTION
RISER TYPE
FOR SEWERS OVER '3.66m TO INVERT

SUNSHINE COAST REGIONAL DISTRICT

PREPARED BY
DAYTON 8 KNIGHT LTD. CONSULTING ENGINEERS
DATE . ; .. , ...

IF THE SE'<VIC'E IS IN A LOCATION WHERE THE STAKE MAY SE A HAZARD TO PEOESTRAIN OR VEHICULAR TRAFFIC, IT SHALL ONLY BE 8ROUGHT TO GROUND SURFACE

50mm • 100 mm, PAIN TEO YELLOW FOR SANITARY OR GREEN FOR STORM, WITH DEPTH FROM TOP OF STAKE TO INVERT OF SERVICE, PAINTED ON TO THE NEAREST 1110 OF 3 0 0 mm
STAKE TO BE LOCATED ON PROPERTY LINE OR EASEMENT LINE



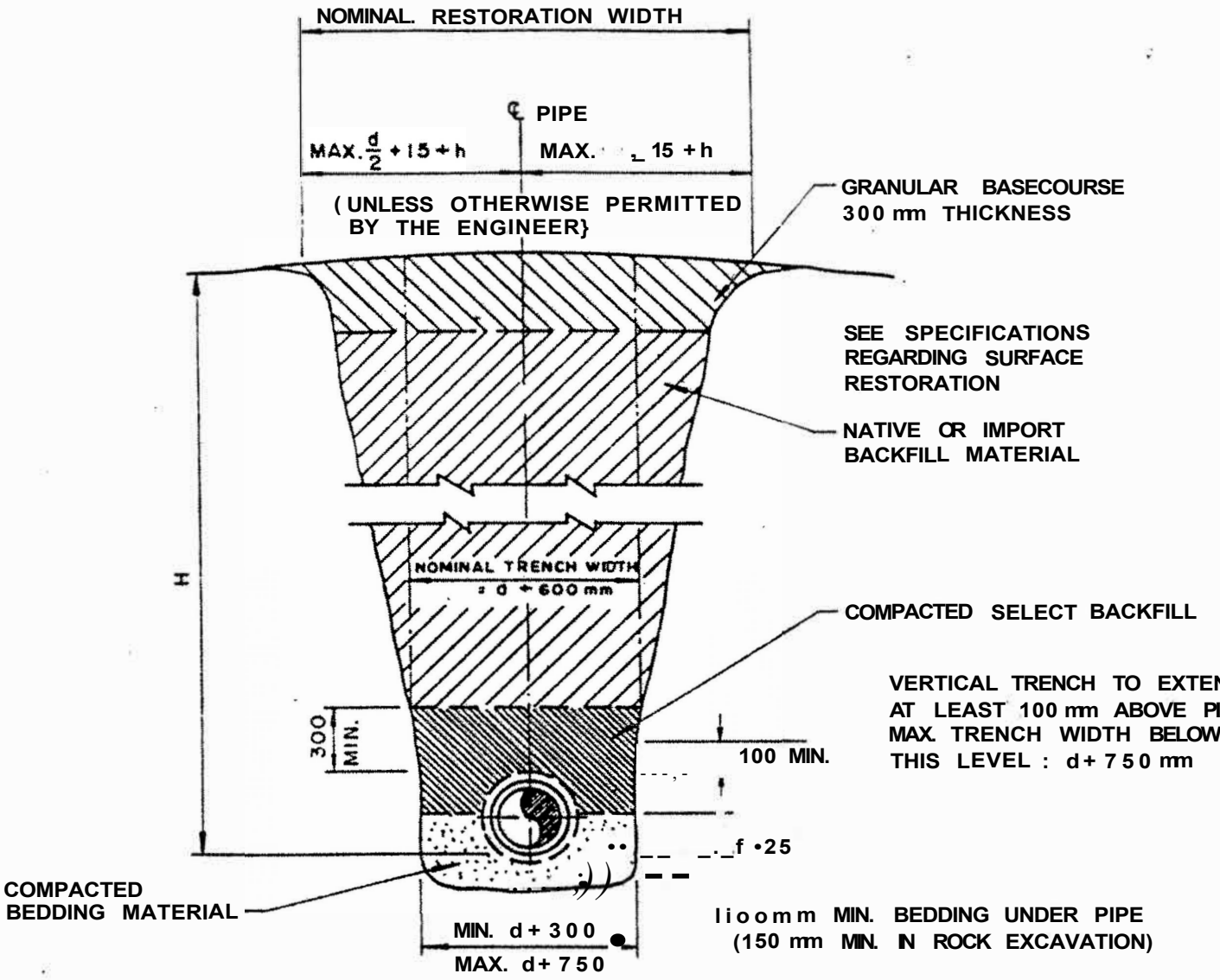
No.	DATE	REVISIONS	OWG. S-4

SERVICE CONNECTION
NON-RISER TYPE
FOR SEWERS LESS THAN 3,66m TO INVERT

SUNSHINE COAST REGIONAL DISTRIC

PREPARED SY
DAYTON II KNIGHT LTD. CONSULTING ENGINEEF
DATE . . . . . .

NOTE: • h" IS NUMERICAL LY EOUAL TO • H" 8 THE ANSWER IS IN MILLIMETRES
d • OUTSIDE DIAMETER OF THE PIPE.
AT ITS LARGEST SECTION

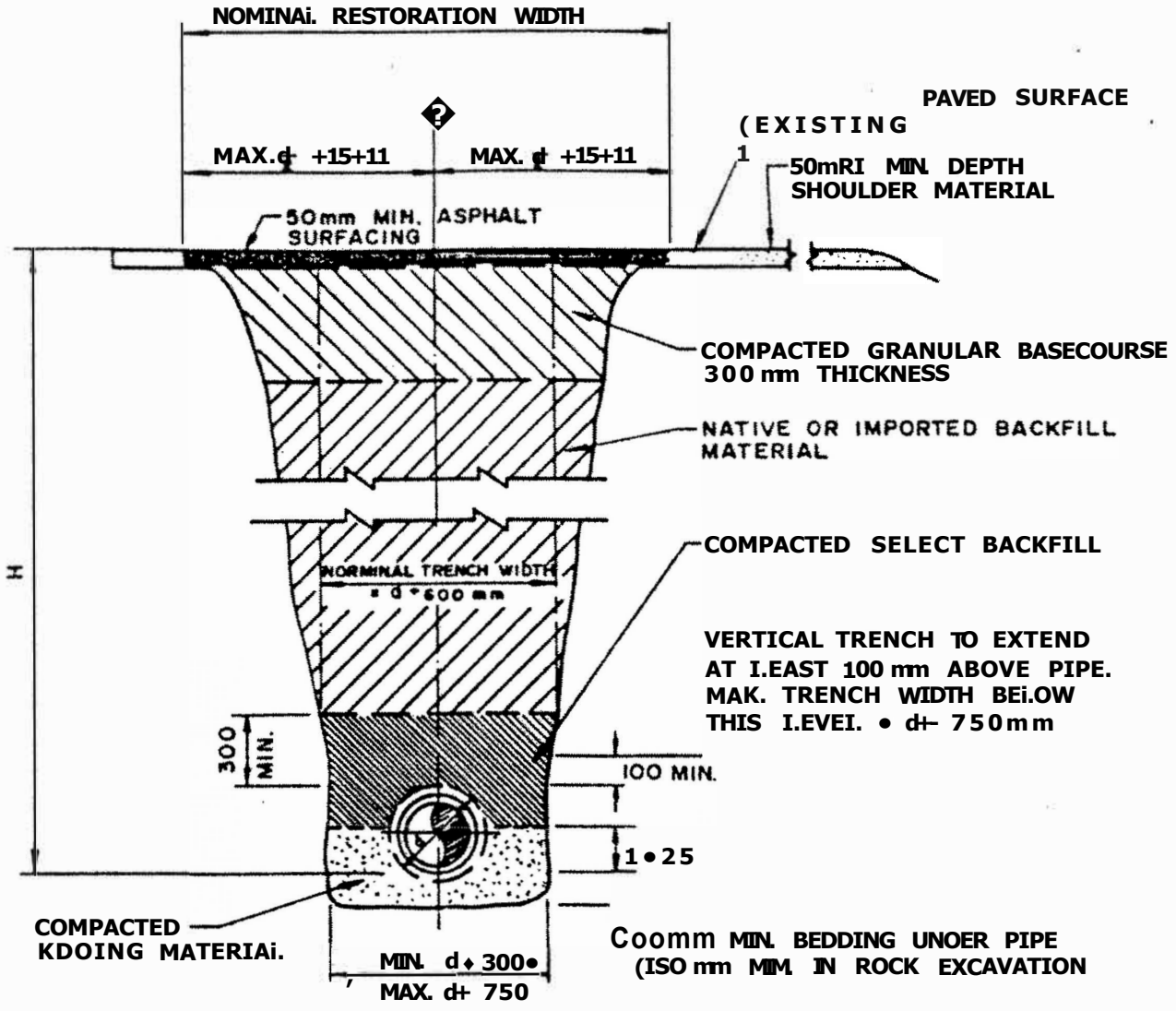


No.	DATE	REVISIONS	OWG. S-5

TRENCH DETAILS
SECTION IN GRAVELLED SURFACE

SUNSHINE COAST REGIONAL DISTRIC.

PREPARED BY
DAYTON 8 KNIGHT LTQ. CONSULTING ENGINEERS
DATE .....



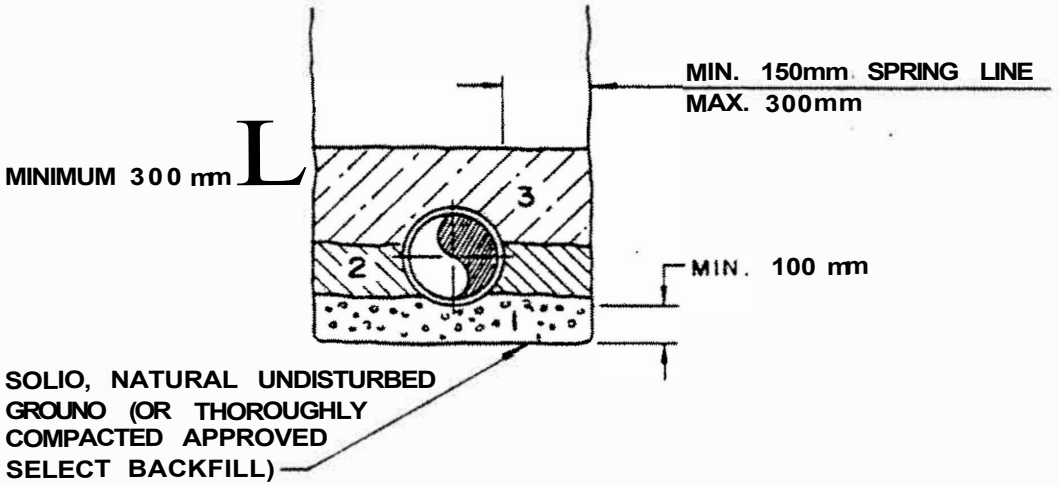
.!!Qll: • 11• IS NUMERICAi.LY EQUAL TO "H" !I THE ANSWER IS IC MILLIMETRES
d • THE OUTSIDE DIAMETER OF" THE PIPE
AT ITS LARGEST SECTION.

No.	DATE	REVISIONS	DWG. S-6
			SUNSHINE COAST REGIONAL DISTRICT
		TRENCH DETAILS SECTION IN PAVED SURFACE	PREPARED BY DAYTON & KNIGHT LTD. CONSULTING ENGINEERS DATE ..... .

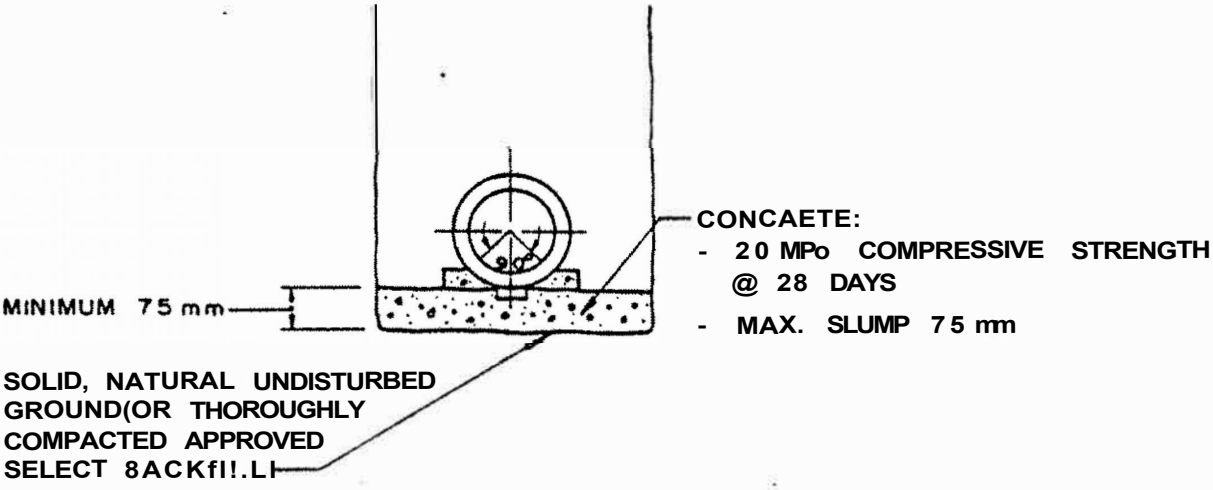
1. THROROUGHLY COMPACTED HANO. PLACED BEOOING GRAVEL OA CRUSHED STONE

2. HANO PLACED MATERIAL AS ABOVE THOAOUGHLY HANO COMPACTED IN 150mm LIFTS PLACEO TO AN ELEVATION 25mm ABOV[THE SPRING LINE Of' THE PIPE AFTER LAYING

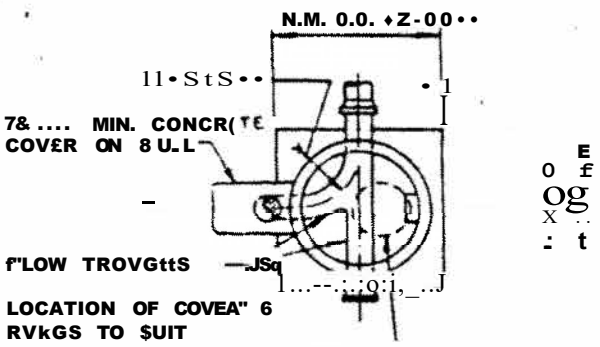
3. HAND PLACED a HAND TAMPED APPROVED BEST OF EXCAVATED MATERIALS IN 150mm LIFTS TO CONTAIN NO STONES OVEA 75 mm IN LARGEST DIMENSION



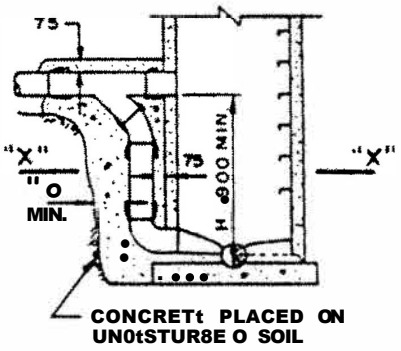
CONCRETE CRADLING FOR ALL TYPES OF PIPE



No.	DATE	REVISIONS	DWG. S-7
			SUNSHINE COAST REGIONAL DISTRICT
		BEDDING BACKFILL AND CRADLING IN PIPE ZONE	PREPARED BY DAYTON a KNIGHT LTD. CONSULTING ENGINEERS DATE . . . . .

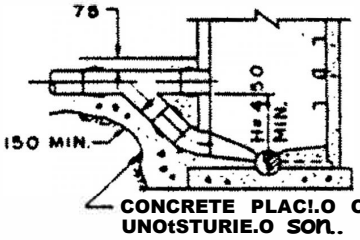


PI.AN AT "X-X" SHOWING DROP



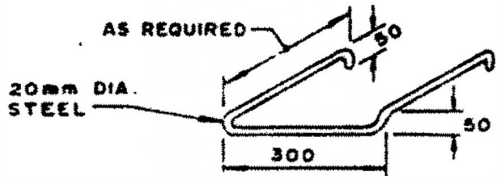
SECTION B-B

DROP MANHOLE TYPE I



SECTION e-e

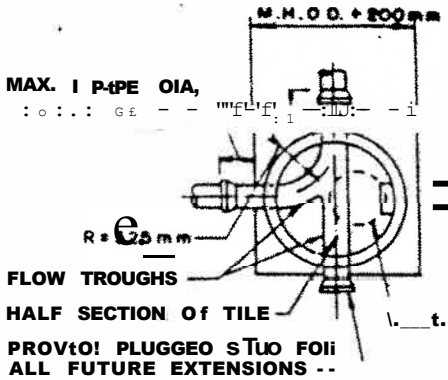
DROP MANHOLE TYPE JI



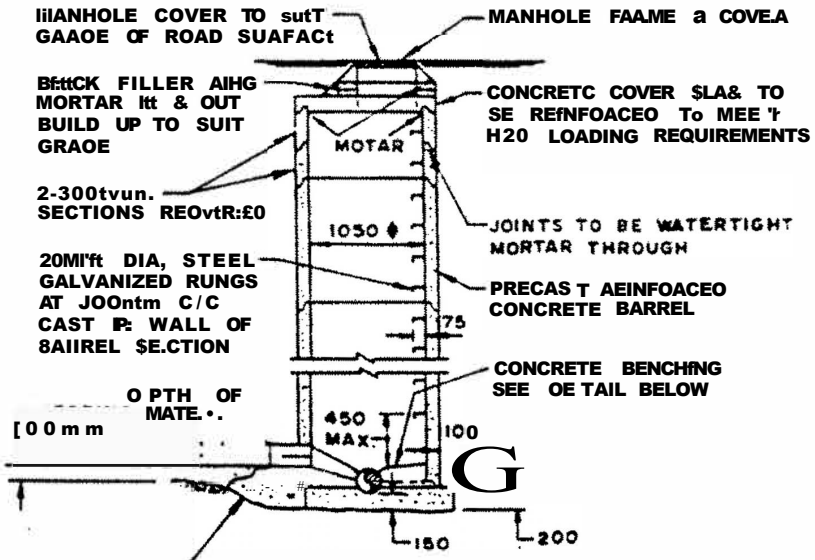
RUNG DETAIL

GALVANIZE AFTER

FABRICATION



t..OCATION OF COVER 6 RHitS:. TO sutT MUHICIPAL STANOAROS

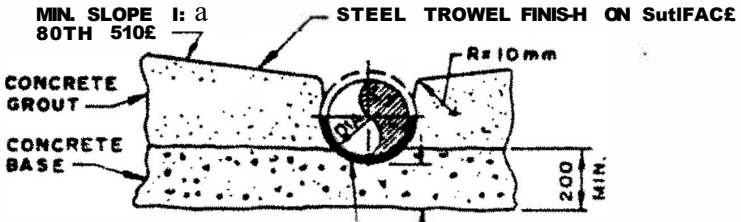


WHERE MANHOLE BASE EXCAVATION EXTENDS 8EYON0 BASE CIMENSION. THE OVER EXCAVATIOh SHALL BE FILLED WITH CONCIUTE TO 100 mm 9£LOW THE BOTTOM OF THE PIPE e FOR THE WIOTH OF THE TRS-NCH

SECTION A - A

TYPICAL MANHOLE

PRECAST REINFORCED CONCRETE BARREL



WHERE POSSf8LI" US£ HALF-S&C:T10N, OR 8AtAK OUT TOI' HALF O, PIP£

INVERT CHANNELLING IN MANHOLE

No.	DATE	REVISIONS	DWG. S-e

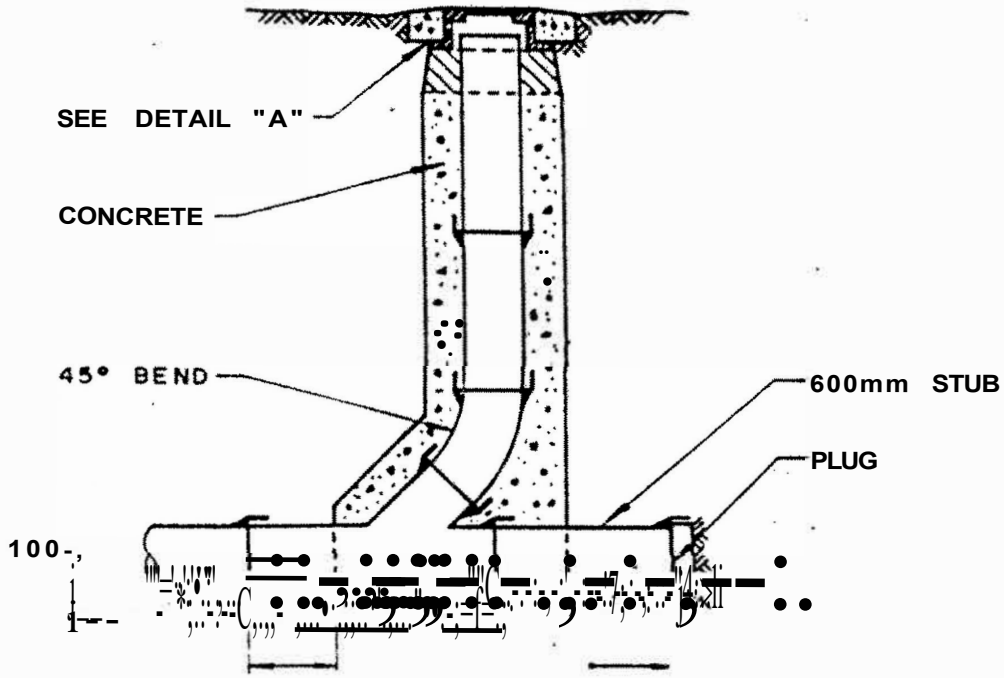
MANHOLE DETAILS
STANDARD PRECAST TYPE
FOR SEWERS 380mm DIA. OR LESS 5 OVER 1.37m IN DEPTH

SUNSHINE COAST REGIONAL DISTRICT

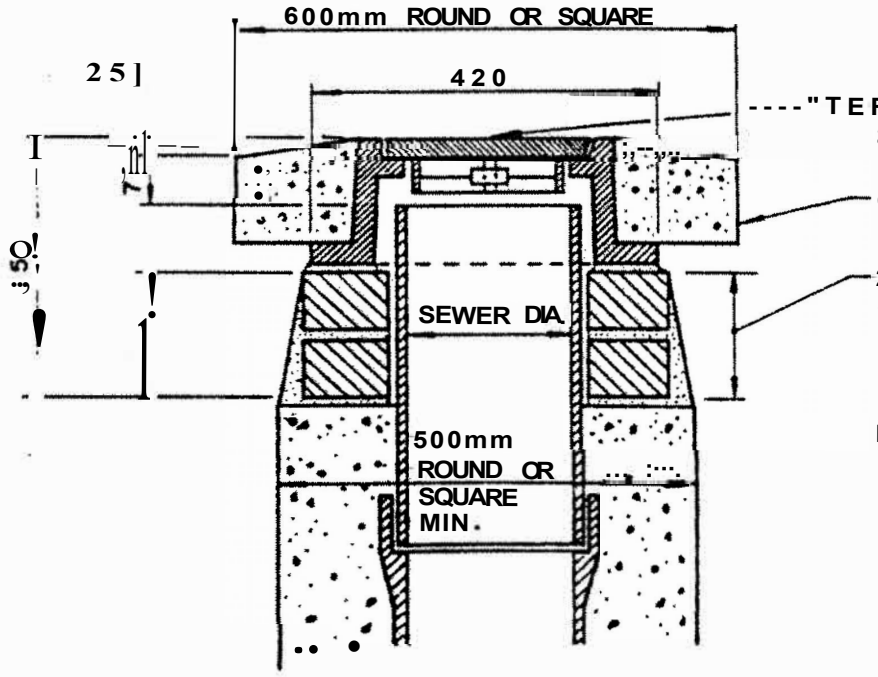
PREPARED BY

DAYTON 6 KNIGHT LTD, CONSULTING ENGINEERS

DATE . . . . . .



NOTE : MAXIMUM PROJECTION NO MORE THAN ONE PIPE DIAMETER



"TERMINAL CITY". CLEANOUT FRAME a COVER (200 mm CLEAR OPENING)

CONCRETE APRON

2 COURSES OF CONCRETE HALF STRETCHERS .80 • 95 • 200 mm

NOTE: TO BE USED IN NON-TRAFF: AREAS ONLY

COVER DETAIL "A"

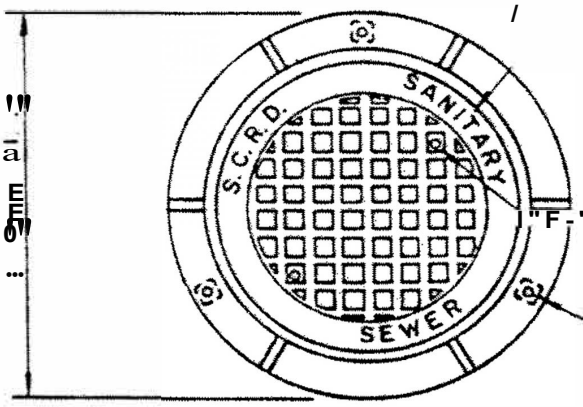
No.	DATE	REVISIONS	DWG. S-9

SANITARY SEWER CLEANOUT STRUCTURE

SUNSHINE COAST REGIONAL DISTRIC1

PREPARED BY
DAYTON 8 KNIGHT LTD. CONSULTING ENGINEERS
DATE .....

STORM - (ALT ERNA TE NOTATION I

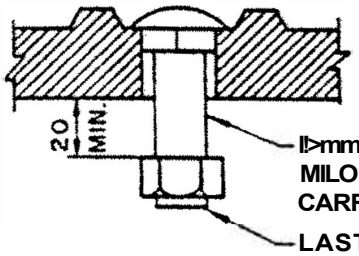


NOTE=
LETTERING SHALL BE 25mm FLATTEN, FACE GOTHIC LETTERING WITH FACE OF LETTERS RAISED TO THE SAME LEI/EL ;.: THE TOP OF' THE RISS

"F-"I--22mm DIA. HOLE FOR CARRIAGE BOLT REQUIRED AS SHOWN

22mm DIA. LEVELLING HOLES WITH POCKET FOR SQUARE NUT

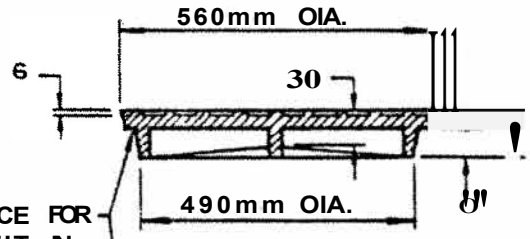
PLAN



I>mm DIA. • 60 mm MILO STEEL CARRIAGE BOLT

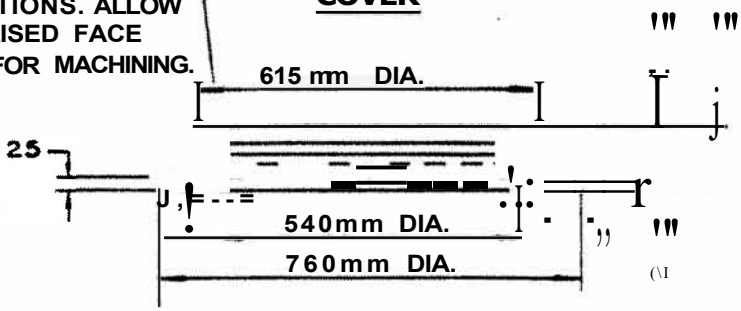
LAST THREAD SURf

CARRIAGE BOLT DETAIL



MACHINE SURFACE FOR NON ROCKING FIT IN ALL POSITIONS. ALLOW I. mm RAISED FACE IN CAST FOR MACHINING.

COVER



FRAME

APPROXIMATE WEIGHTS
COVER- 66 Ko
FRAME-84 Kg

TYPE-DOBNEY FOUNDRY NO. C-20 OR EQUIVALENT

No.	DATE	REVISIONS	OWG. S-10
			SUNSHINE COAST REGIONAL OISTRIC
		MANHOLE COVER 8 FRAME	PREPARED BY DAYTON 8 KNIGHT LT\>. CONSULTING ENGINEER DATE ..... .

APPENDIX 1 TO BYLAW 320.5

PART VIII
SUNSHINE COAST REGIONAL DISTRICT
APPROVAL TO CONSTRUCT A
COMMUNITY SEWAGE TREATMENT SYSTEM

OVERVIEW

No person shall construct a sewerage treatment system serving two or more parcels without first applying for and receiving approval in writing from the Sunshine Coast Regional District.

Approval for construction cannot be issued until final complete drawings and specifications have been submitted to the District and found to be satisfactory.

The application shall be made by the Owner of the system or the authorized agent and shall include but not be limited to the following:

1. **Engineer's Report**
2. **Design Brief**
3. **Operation and Maintenance Manuals and Plans**
4. **Design**
5. **Construction Specifications**
6. **Cost estimates (Capital and Operation and Maintenance)**
7. **Contractor**

1.0 ENGINEER'S PRE-DESIGN REPORT

The engineering pre-design report assembles basic information, presents criteria and assumptions, examines alternate concepts with preliminary layouts and cost estimates, describes financing methods giving anticipated charges for users, reviews organizational and staffing requirements, offers a conclusion with a proposed scheme for client consideration, and outlines official actions and procedures to implement the project. These data form the continuing technical basis for the detail design and preparation of construction plans and specifications.

1.1 Format for Content and Presentation

A) Title

B) Letter of Transmittal

C) Title Page

D) Table of Contents

E) Summary

Discuss very briefly the findings of the study which substantiate the conclusions and recommendations.

a) Findings

b) Conclusions

c) Recommendations

F) Introduction

a) Purpose

- Include the reasons for the report and circumstances leading up to it.

b) Scope

- Include the coordination of the recommended project with the Official Community Plan and guideline(s) for developing the report.

G) Existing Conditions and Projections

a) Planning Period

- Total period of time for which program is to be studied.

b) Land Use

- Boundaries of proposed subdivision and existing development in the vicinity, ultimate planning area.
- Drainage basin, portion covered.
- Land use, zoning and population densities.
- Rate of development and population growth during design life of facility.

c) General

- Topography, general geology area, hydrogeology and their effects on the project.
- Meteorology, precipitation, runoff, flooding, etc. and effect on project.

d} Water Use, Wastewater Flows and Waste Loads

- Relate to existing population projections noted above.
- Estimated future water consumption.
- Estimated future average and maximum daily wastewater flows and peak hourly flows.

- Estimated future infiltration rates including the basis of the values (use flow monitoring data if possible from areas of similar development).

- Physical, chemical and biological characteristics and concentrations of each coDtaminant fraction.

- Identify the role of household water conservation devices (low flush toilets, low water use shower heads, etc.) in the flow estimates.

e) Regulations

- Federal, provincial and regional laws, regulations and bylaws affecting the project.

- Enforcement prOV1s1ons including inspection, sampling, detection, penalties, etc.

H) Basic Project Development

a) Proposed Collection System

- Service area.

- Protection of water supply wells, reservoirs, facilities, etc.

- Unusual construction problems.

- Utility interruption and traffic interference.

- Rights-of-way and easements required through private or public lands.

- Basement flooding prevention during power outage or pump station breakdowns.

b} Design Wastewater Characteristics

- Character of wastewater necessary to ensure appropriateness of process selected.

c) Drain.field Considerations.

- The drainfield shall be designed to the current standards of the Ministry of Environment including 3 m separation between drainfields, seepage trench is to be 1 m above the maximum water table and trench width of 600 mm.

- The absorption field shall be located not less than:

(a) 10 metres from a habitable building or the groundwater mound effect, whichever is greater;
(b) 6.0 metres from a parcel boundary;
(c) 20 metres from a downslope parcel boundary;
(d) 3.0 metres from a curtain drain;
(e) 91.5 metres from a source of domestic water;
(f) the groundwater effect of the absorption field must be contained at least 10 metres from a parcel boundary;
(g) 30.5 metres from the natural boundary of a lake or other body of non-tidal water;
(h) 3.0 metres from a domestic water pipeline.

The above setbacks are minimums that may be increased due to site specific situations such as increased flow volumes and the environmental sensitivity of the receiving and surrounding areas.

All measurements shall be from the nearest trench wall.

- The necessary drainfield area shall be provided in two fields each sized to handle peak day flow plus a third area sized for peak day flow as a standby field.

- The drainfield length shall be determined as follows:

	Subnrface Dlspo88l							
	Nomber o fmetrea o fdrainage pipe for each 10 maid o f deaign effluent ftow for pei'COlaCion ratee shown							
	2	5	10	15	20	25	30	Percolation Rat.; minutea/25 mm
Effluent quality pnor to application (1) • typical aept;c taak effluent • no disinfection	120	215	280	320	360	400	430	m/10 m3/d
Effl.uent qu.ality pnor to application (2) -BOO,=10mgtl. -TSs.1omg1L • DD durinfection	50	75	100	110	120	135	150	m'10 -in3/d

(1) Septic tank treatment requires a hydraulic capacity of at least two times the design maximum daily flow.

(2) The use of a drainfield in this category requires the addition of microstrainers, sand filters intermittently dosed sand filters, or other acceptable filtration facilities following secondary treatment.

- A detailed report of the proposed ground disposal scheme shall be prepared by a qualified professional engineer with demonstrated successful experience in projects of a similar nature. The report shall include but not be restricted to:
- identify boundaries of proposed tile field site
- undertake and identify in enough detail:
    - the characteristics of the site such as soil depth to bedrock, impermeable layer or water table; the water table elevations shall be logged over a one to two week period during a prolonged high precipitation period in the months of November, December and January
    - the percolation rate
    - soil texture
- the hydrogeology of the drainage basin and the projected impact of adding additional water to the soils
- the drainfield layout on drawings at a scale of 1:1000 illustrating the diameter, location and depth of the pipes and the location of the distribution boxes
- projected location of the movement of the effluent from the drainfield
- impact of the effluent on downslope lands

d) Treatment Plant Site Requirements

- Compare advantages and disadvantages relative to cost, hydraulic requirements, flood control, accessibility, enclosure of units, odour control, landscaping, etc, and isolation with respect to potential nuisances and protection of water supply facilities.

- Provide a summary of qualifications of the wastewater system operator(s) required for operation of the treatment plant.

£) Soil, Groundwater Conditions and Foundation Problems

- Describe the character of the soil through which wastewater mains are to be laid.

- Describe the foundation conditions prevailing at sites of proposed structures.

- Describe the approximate elevation of groundwater m relation to subsurface works (consider seasonal fluctuations).

g) Proposed Water Systems

- Describe the proposed water system.

h) Proposed Wastewater Treatment Processes

- Summarize and establish the adequacy of proposed processes and unit parameters for the treatment of the specific wastewater under consideration.

- 1f a pack.age treatment plant is proposed, provide operatiolllli data to demonstrate the treatment efficiency.

- I f a wide variation in flows is anticipated, provide flow equalization.

i) Wastewater Disposal

- Discuss final discharge points and treatment requirements and potential impacts. Highlight any and all required investigations necessary to determine acceptability of proposed treatment and disposal method(s).

j) Sludge

- Discuss the various sludges from the wastewater treatment facilities, their volume, proposed treatment(s) and method(s) of disposal.

- I f sludge disposal is to be at the District of Seehelt Sewage Treatment Plant then written permission must be received.

k) Federal, Provincial and Municipal Permits

- List federal, provincial and municipal permits which are applicable. Note recommendations concerning application for permits and reasons for the recommendations.

l) Financing

- Include detailed capital cost estimate of the system. Include a detailed estimated annual cost of operation and maintenance. (Operation costs should include estimates for heat, lighting, electricity and chemicals. Maintenance cost information should include cost estimates for labour, materials, equipment, spare parts, specialized tools and the identification of contract requirements including costs.)

m) Legal and Other Considerations

- Recommended enabling legislation, bylaws, rules and regulations.

- Contractual considerations with the District and intercommunity cooperation.

- Public information and education.

D Appendices: Technical Information and Design Criteria (if available at the pTAliminary design stage)

a) Collection System

- Design tabulations: actual design flow and roaxiro•un flow capacity, size, velocities, etc.

- Overflow design: pump station calculations, including energy requirements.

- Special appurtenances

- Stream crossings.

- System map (fold out, report size), capacities of collectors and pumps.

b) Process Facilities

- Criteria selection and basis.

- Hydraulic and organic loadings - ro'1mmum, average, maxiro'llll, and effect (wastewater and sludge processes).

- Unit dimensions.

- Rates and velocities.

- Detentions.

- Concentrations.

- Chemical additive control.

- Physical control and flow metering.

- Removals, effluent concentrations, etc.

- Energy requirements.

- Flexibility.

e) Disposal Facilities for Effluent and Sludge

d) Process Diagrams and Hydraulic Profile

e) Monitoring and Surv„iUance

- Physical and biochemical testa with frequencies to contra! process.
- Physical and chemical testa and frequency required for diPcharg„; compliance.
- Time requirementa for testing.
- Space and equipment requirements.
- Personnel requirements - number, qualifications, training, salaries, benefita (tabulate).

f) Operation and Maintenance

- Routine and special maintenance duties.
- Time requirementa.
- Tools, spare parts, equipment, vehicles, safety, etc.
- Maintenance workspace and storage.
- Personnel requirementa - number, qualifications, training, salaries, benefits (tabulate).

g) Collection System Control

- Cleaning and maintenance.
- Regulator and overflow inspection and repair.
- Flow gauging.
- Equipment requirements.
- Trouble-ca.11 investigation.
- Personnel requirements - number, type, qualifications, salaries, benefits, training (tabulate).

h) Control Summary

- Personnel.
- Equipment.

- Chemicals.
- Utilities and power requirements.
- Summation.

i) Support Data

- Outline unusual specifications, construction materials, and construction methods.
- Maps, photographs, diagrams.

2. DR§TGNDRAWINGS

2.1 General

The drawings shall be clear and legible. They shall be drawn to a scale which will permit all necessary information to be legible and clearly shown and shall be suitable for reduction and microfilming. They shall be signed and sealed by a Registered Professional Engineer(s) licensed to practice in the Province of British Columbia with the appropriate experience for a project of this nature (civil, electrical, hydrogeological, process design)

Where pertinent, the following shall apply to drawings for new wastewater systems and/or their expansion or improvements.

a) Suitable title.

b) The legal land description and subdivision name.

c) Scale in metres.

d) Datum used.

e) North arrow.

0 Date.

g) Name and address of the design engineer.

h) Imprint of engineer's registration seal with the engineer's signature and date of signature.

i) Locations, elevations and logs of test borings.

2.2 Genern.l Layout Drawing

Comprehensive design drawings of proposed wastewater facilities shall be submitted for projects. The drawing(s) shall show the following:

Location and Flow Diarnm'I

a) The location and extent of the tributary area feeding the pump stations and treatment works.

b) Ground elevations (including contours where appropriate).

e) The location, size, design flow, rnaxirn•un capacities and direction of flow of all existing and proposed sanitary sewers.

d) The location of existing and proposed wastewater pumping station(s), forcemain(s), trsatment and disposal facilities with pertinent elevations.

e) Dimensions and relative elevations of structures.

f) The location and outline form of equipment.

g) Water levels.

Geographical Features

a) Topography and elevation - proposed streets, all streams or water surfaces, pumping station sites, and treatment facilities sites shall be clearly shown. Contour lines at suitable intervals should be included.

b) Strsams - the direction of flow in all streams, and high and low water elevations of all water surfaces at sewer outlets and overflows shall be shown.

c) Boundaries - the boundary lines of the community and the service area shall be shown.

2.a Detailed Drawipp

Detail drawings shall consist of: plan views, elevations, sections and supplementary views which, together with the specifications and general layout drawings, provide the working information for the contract and construction of the works. They shall also include:

Plan and Profile of Sewers

a) Profiles should have a horizontal scale of 1:500 and a vertical scale of not more than 1:100, with both scales clearly indicated.

b) Plan views should be drawn to a corresponding horizontal scale and shall be shown on the same sheet as the vertical profile.

c) Location of streets and sewers.

d) Ground profile; diameter, material and type of pipe; length between manholes; invert and surface elevation at each manhole; and grade of sewer between each two adjacent manholes (all manholes shall be numbered on the profile).

e) The elevation and location of the propoeed basement floor shall be plotted on the profile of the sewer which is to serve the house in question. The engineer shall state that all sewers are sufficiently deep to serve adjacent basements except where otherwise noted on the drawings.

f) Locations of all special features such as inverted siphons, concrete encasements, elevated sewers, etc.

g) All propoeed structures and utilities, both above and below ground, such as watermains, gas mains, storm drains, and telephone and power conduits shall be identified.

Sewer Details

a) All stream crossings and sewer outlets, with elevations of the stream bed and of normal and extreme high and low water levels.

b) All special sewer joints and cross-sections.

c) All sewer appurtenances such as manholes, lampholes, inspection chambers, cleanouts, inverted siphons, regulators, tide gates, elevated sewers, etc.

Sewage Pumping Stations

a) Proposed pumping stations, including provisions for installation of overflows and future pumps (refer to the Pump Station section for additional details).

b) Size and location of structures.

c) Schematic flow diagram(s) showing the flow through various plant units, and showing utility systeme serving the plant processes.

d) Piping, including any ammgements for bypassing individual units (materials handled and direction of flow through pipes should be shown).

e) Hydraulic profiles showing the flow of sewage, supernatant liquor, and sludge.

f) Test borings and groundwater elevations.

g) The location and nature of water treatment, storage, pumping, and distribution works with pertinent elevations.

h) Elevation of high water at the site, and maximum elevation of sewage in the collection system upon power failure.

i) Maximum hydraulic gradient in downstream gravity sewers when all installed pumps are in operation.

j) Systems and pump curves.

k) Provisions for standby power.

Sewage Treatment Facilities and Disposal Facilities

a) Location, dimensions, and elevations of all existing and proposed plant facilities.

b) Location and size of the property to be used for the wastewater and sludge treatment and disposal development with respect to known references such as roads, streams, section lines, or streets.

c) Topography with contour intervals not greater than 1.0 metre.

d) Elevations of high and low water levels of the body of water to which the plant effluent is to be discharged.

e) Elevations of the highest known flood level, the 1/20, 1/100 and 1/200 year flood levels, floor of any structure, outside surrounding grads, important adjacent features such as lake and river water levels.

0 Size, length, and identity of sewers, drains and watermains, and their locations relative to plant structures.

g) Stream crossing, providing profiles with elevations of the stream beds and the normal, extreme high, and extreme low water levels.

h) Schematic flow diagrams and hydraulic profiles showing the flow through various units at minimum, average and maximum flow.

i) Type, size, pertinent features, and operating capacity of all pumps, blowers, motors, and other mechanical devices.

j) Piping in sufficient detail to show flow through the plant, including sludge and chemical lines.

k) All appurtenances, specific structures, equipment, wastewater treatment plant sludge disposal units and points of discharge for wastewater facilities having any relationship to the plans for the water system.

1) Locations of all existing and potential sources of drinking water, both surface water and groundwater sources, which could be within the zone of influence of the wastewater facilities.

m) Locations of all sampling taps and monitoring facilities.

n) Adequate description of any features not otherwise covered by the specifications or the engineer's design brief.

2.4 Bmrnlatm:v Permit

All applicable regulatory permit.a shall be secured including the Ministry of Environment Waste Management permit or Ministry of Health permit.

3.0 CONTRACT SPECIFICATIONS

Complete technical specifications prepared by the design professional engineer for the construction of sewers, sewage pumping stations, sewage treatment plants, and drainfield collection, and all other appurtenances, shall accompany the drawings.

The specifications accompanying construction drawings shall include, but not be limited to:

- All construction information not shown on the drawings which is necessary to inform the builder in detail of the design requirements for the quality of materials, workmanship and fabrication of the project.
- The type, size, strength, operating characteristics and rating of equipment.
- Allowable infiltration.
- The complete requirement.a for all mechanical and electrical equipment including machinery, valves, piping and jointing of pipe.
- Electrical apparatus, wiring, instrumentation and meters, laboratory frx:tures and equipment.
- Operating tools, construction materials, miscellaneous appurtenances.
- Instructions for testing materials and equipment as necessary to meet design standarde, and performance tests for the complete works and component units. It is suggested that these performance testa be conducted at design load conditions wherever practical.

The contract specifications shall be reviewed and approved by the District prior to any work bAginning. This approval will only occur after the contractor hes signed a legal contract agreeing to the conditions of the contract specifications.

The Canadian National Master Construction Specification shall be used to the fullest extent poaaible, subject to the Consultants' discretion with respect to their professional responsibility for the contents of the project specifications.

4.0 DEfilQ'.N RRifiF

A summary of rationale and complete design criteria and calculations shall be submitted, along with ths final design drawings and specifications for the proposed project, containing but not limited to the following:

4.1 Geper>d

a) **Population served (projected development schedule).**

b) **Area served.**

c) **Per capita wastewater flows (average dally, dally peak seasonal minimum and maximum).**

d) **Infiltration flows (seasonal minimum anrl maxirn,un).**

e) **Design flows used for the various components of the wastewater system.**

f) **Method of handling power outages.**

g) **Design considerations.**

h) **Monitoring requirements.**

i) **Monitoring facilities and equipment.**

j) **Hydraulic profile of treatment and disposal facilities and of the adjacent collection pressure system.**

k) **Permits for construction, waste discharges or disposal, stream crossings, construction in navigable waters, etc.**

I) **Rights-of-way and easements.**

4.2 Collection

a) **Capacity and velocity of each sewer line segment.**

b) **Capacity of pumps, complete with pump(s) and system(s) curve(s) for high water and low water levels in wet well.**

c) **Pump stations operating details (controls, alarms, emergency overflows, etc.)**

4.3 Treatinent

a) **Substantiation or rationale for proposed treatment facilities.**

b) Raw wutewater characteristics and final effluent characteristics (compared to acceptable environmental standards and regulations or requirements by agencies).

c) Waste loadings on treatment systems.

d) Efficiencies of treatment works.

e) Reserve capacity available for future requirements and proposed method of accommodating future requirements.

f) Design life of components, including subsurface ground disposal systems.

g) Description of each significant unit process.

h) Proposed method and pertinent details of final sludge disposal.

4.4 Disposal

a) Details on parameters for wastewater effluent to ground, as outlined in Section 1.1, Part H, to substantiate design.

5.0 RRVTSIONS TO Ar-fiEPTIID PLANS

Any deviations from the accepted drawings or specifications affecting capacity, hydraulic conditions, operating units, the functioning of the wastewater to be discharged, must be accepted by the District before such changes are made. Revised drawings or specifications should be submitted in time to permit the review and acceptance of such drawings or specifications before any construction work, which will be affected by such changes, is started.

6.0 ADDffIONAL INFORMATION REQUIRED

The District may require additional information which is not part of the construction drawings, such as head loss calculations, proprietary technical data, copies of deeds, copies of contracts, etc.

7.0 OPRR,ATION AND MAINTENANCE INFORMATION AND CONSIDEQA.TIONS

7.1 Scope

Thorough consideration of the operation and maintenance aspects and of reducing the complexity of operation and maintenance requirements for the proposed facilities must be given during the pre-design and design stages of the project.

These documents shall include an Operation and Maintenance Manual herein referred to as the Manual, and a System Operation and Maintenance Plan herein referred to as the Plan.

All material should be bound in a booklet that will allow for removal of pages with originals on white bond paper, and drawings and charts folded to fit within the booklet. The general format should follow a typical outline that includes:

- Letter of Transmittal
- Index
- Introduction
- ContenS
- Appendices

7.2 Contents of Mmwg1

The contenS of the Manual should include the items listed below if applicable:

a) A description of wastewater treatment proce8888, including the treatment goals and methodology.

b) A description of the general operation of the equipment or system as a whole during normal flow conditions and monitoring requirements.

c) A simplified schematic plan or flowchart, clearly identifying all componenS of the system.

d) Procedures for inspecting, maintaining and servicing of all elements of the wastewater system including the collection, treatment, storage and disposal.

e) Detailed operating procedures such as start-up and shut-down, seasonal operations, normal valve positions, switches and control settings.

0 A description of the monitoring and surveillance requirements, noting features and equipment included to accomplish these tasks.

gJ Emergency procedures in the event of line breaks or fallure of pumping stations.

h) Schematic drawings for electrical controls including pump circuits, lighting, alarm system and heaters.

i) Trouble-shooting instructions for facllities including pump stations, treatment facilities, and disposal facilities.

j) Necessary safety practices and measures, including cleanliness and suggested wearing apparel.

k) Provision of maintenance checklisiS to facllitate recording of maintenance done, expenses incurred and materials used for each component of the system.

l) A list of spare equipment and parts which should be on hand for routine or emergency maintenance repairs and suggested locations for storage of

parts and tools.

m) An estimate of annual operation and maintenance costs including labour, equipment, materials and service contracts. Operation costs shall include an emmaui for heat (fuel) and electricity.

ll) Provincial and/or federal permits.

o)• Inclusion of site construction photographs or sketchss which supplement or simplify the explanation of various operation and maintenance procedures.

p)• An assembly of manufacturers' literature:
- material and equipment information (names, model numbers, types, sizes, warranties)
- instructions and schedules for recommended O&M practices
- exploded views and partS lists
- suppliers' names, addresses and telephone numbers.

q)• Record drawings of the system.

•

These items are to be added after construction.

7.3 Contents of Plan

The contents includes an Operation Budget, Annual Work Plan, and Task Statements (see description below).

a) The contents should be divided into separate tasks depending on the nature of the activities involved. Each Task Statement and Work Order should describe:

- The location of components of the system to be maintained.
- The assist quantity and/or number of inventory units to be maintained.
- Step by step, simple instructions of the actual work to be done.
- The safe number of persons required and the equipment, tools and materials needed.
- The frequency or level of service.
- The performance stander≤¼ or estimated number of person-hours involved in each task.
- Contracted services if required.

b) An Annual Maintenance Calendar should be provided listing all of the inspection and preventive maintenance tasks including:

- Activities with work orders numbered and grouped to indicate the work required of individual people or of contractors.

- Person-hours for each activity shown weekly with a summary of total hours for the year.

c) A Maintenance Budget should be provided to show operation and maintenance costs including:

- For each of the maintenance tasks an estimate of the annual cost of labour, material, equipment and contracts.

- An estimate of operating costs for heat, light, fuel and/or electricity.

9.0 CONTRACTOR

The selection of a contractor shall be heavily influenced by demonstration of detail knowledge and successful experience in work of a similar nature. The District shall be provided with a written summary of work of a similar nature, especially in construction of community drainfields. If the work history is not applicable or satisfactory the District reserves the right to request another Contractor.

10 CONSTRUCTION INSPECTION

During construction continuous onsite inspection must be provided by the Design Professional Engineer to ensure the work is undertaken as detailed on the design drawings and contract specifications.

The Design Professional Engineer is expected to indicate in writing at the completion of the project that the work was satisfactorily undertaken to the contract drawings and specifications.

The District will also conduct onsite inspection during the construction stages.

The installed system shall not be backfilled or put into operation until authorized by the permitting agency and the District.