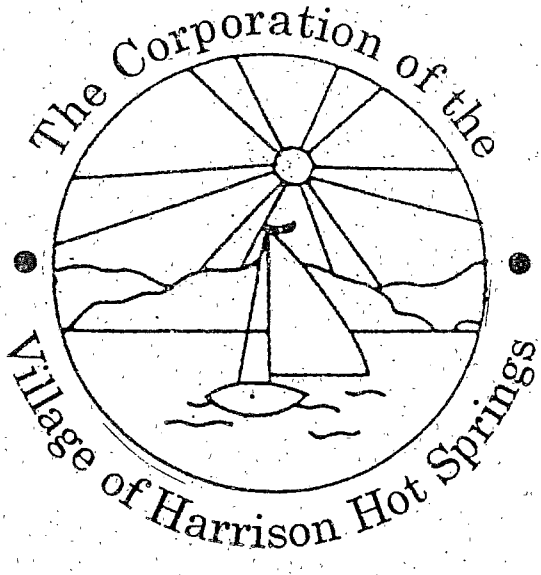

SUBDIVISION AND DEVELOPMENT SERVICING BYLAW 578

VILLAGE OF HARRISON HOT SPRINGS

SUBDIVISION AND DEVELOPMENT SERVICING BYLAW NO. 578, 1993

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THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS
BYLAW NO. 578, 1993

Being a bylaw of the Corporation of the Village of Harrison Hot Springs to regulate and require the provision of works and services in respect of the subdivision of land and to require connection thereto, and to prescribe standards for the provision of works and services for the subdivision and development of land.

WHEREAS: Pursuant to the Municipal Act R.S.B.C. 1979, C. 290 the Council of the Corporation of the Village of Harrison Hot Springs may by bylaw regulate and require the provision of works and services in respect of the subdivision of land, and may prescribe standards for the provision of works and services for the subdivision and development of land;

AND WHEREAS: Council may require that the owner provide works and services in accordance with the standards prescribed in a bylaw;

AND WHEREAS: Council deems it expedient and necessary to regulate and require the provision of works and services to the standards prescribed in a bylaw;

NOW THEREFORE: The Council of the Corporation of the Village of Harrison Hot Springs in open meeting assembled HEREBY ENACTS AS FOLLOWS:

SECTION 1 - TITLE

TITLE

1 This Bylaw may be cited for all purposes as "Subdivision and Development Servicing Bylaw No. 578, 1993".

SECTION 2 - INTERPRETATION

Definitions

2 (1) In this Bylaw:

"APPROVAL" means written approval of a subdivision by the Approving Officer or issuance of a building permit by the Building Inspector;

"APPROVING OFFICER" means a person appointed as an Approving Officer for the Corporation of the Village of Harrison Hot Springs;

"BUILDING INSPECTOR" means a person appointed as a Building Inspector for the Corporation of the Village of Harrison Hot Springs;

"COMMUNITY DRAINAGE SYSTEM" means a system of works owned, operated and maintained by the Municipality, designed and constructed to control the collection, conveyance and disposal of surface and other waters;

"COMMUNITY SANITARY SEWAGE SYSTEM" means a system owned, operated and maintained by the Municipality for the collection, treatment and disposal of sanitary sewage;

"COMMUNITY WATER SYSTEM" means a system of waterworks, within the meaning of the Health Act, which is owned, operated and maintained by the Municipality;

"COUNCIL" means the Municipal Council of the Corporation of the Village of Harrison Hot Springs;

"CUL-DE-SAC" means a length of local street made for vehicular use, the end of which is permanently closed either by subdivision design or by a natural feature such as inaccessible terrain;

"DEVELOPMENT" means an activity that requires a Building Permit under the Building Bylaw of the Village of Harrison Hot Springs;

"FRONTAGE" means that length of a parcel boundary which immediately adjoins a highway (other than a lane or a walkway) or a waterbody (where access is via water) In the case of a parcel fronting on more than one highway, the narrower side of the parcel abutting a highway shall be its frontage.

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

"LANE" means a narrow highway which provides secondary vehicular access to any abutting parcel, so that the parcel may be serviced or reached by vehicles using that highway, but a lane is not a half-road;

"MUNICIPALITY" or "VILLAGE" means the Corporation of the Village of Harrison Hot Springs, or the geographic area within its boundaries as the context requires;

"OWNER" in respect of real property means the registered owner of an estate in fee simple, and includes;

- the tenant for life under a registered life estate;
- the registered holder of the last registered agreement for sale;
- the holder or occupier of land held in the manner mentioned in Sections 409 and 410 of the Municipal Act;
- an Indian who is an owner under the letters patent of a municipality, incorporated under Section 10 of the Municipal Act;

"PARCEL" means any lot, block or other area in which land is held or into which land is subdivided, but does not include a highway;

"PARCEL AREA" means the total land area of a parcel contained within all of the parcel lines measured on a horizontal plane and expressed in units of square metres;

"PARCEL DEPTH" means the average distance from the front parcel line to the rear parcel line;

"PARCEL LINE" means a line marking the boundary of a parcel;

"PARCEL - FRONT LINE" means the parcel line which immediately adjoins a highway other than a lane or walkway;

"PARCEL - REAR LINE" means the parcel line furthest from and opposite to the front parcel line, except that there shall not be more than one rear parcel line;

"PARCEL - SIDE LINE" means a parcel line marking the boundary between two parcels or between a parcel and a lane or between a parcel and a highway in the case of a corner parcel of which one or both ends intersect a front parcel line;

"PARCEL WIDTH" means the horizontal distance between the side parcel lines measured at right angles to the parcel depth;

"POTABLE WATER" means water which is approved for drinking purposes by the Medical Health Officer in accordance with the *Health Act*;

"PROFESSIONAL ENGINEER" means a person who is registered or duly licensed as such under the provisions of the *Engineers Act* of the Province of British Columbia;

"SUBDIVISION" means

(a) a subdivision as defined in the *Land Title Act*; and

(b) a subdivision under the *Condominium Act*;

"SUPERINTENDENT OF WORKS" means the Village's Works Superintendent or other persons appointed by Council to perform the duties of the Superintendent of Works as required under this Bylaw.

"WALKWAY" means a narrow highway for the predominant use of pedestrian traffic;

"WORKS AND SERVICES" means any public service, facility or utility which is required or regulated by this Bylaw and without restricting the generality of the foregoing includes: the supply and distribution of water; collection and disposal of sanitary sewage and drainage water; street lighting; highways, access roadways, curbs, gutters, and sidewalks; and natural gas, power, telephone and cablevision services;

"ZONE" means a zone as provided for in the Village of Harrison Hot Springs Zoning Bylaw in effect at the date of an application for subdivision or building permit.

2 (2) All words or expressions used in the Bylaw shall have the same meaning assigned to them as like words or expressions contained in the Interpretation Act and the Municipal Act.

Italics

2 (3) Items noted in italics are provided for information purposes only.

SECTION 3 - GENERAL PROVISIONS

GENERAL PROVISIONS

Severability

3 (1) The provisions of this Bylaw are severable. If any provision is for any reason held to be invalid by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining provisions of this Bylaw.

Administration

3 (2) This Bylaw may be administered by:

(a) The Approving Officer of the Corporation of the Village of Harrison Hot Springs where works and services are to be provided because of subdivision of land; or

(b) The Building Inspector of the Corporation of the Village of Harrison Hot Springs where works and services are to be provided because of an application for a building permit; or

(c) Some other employee of the Village appointed by Council; or

(d) A person who is under contract with the Village.

Authorization of Entry

3 (3) The Approving Officer, Building Inspector, some other employee of the Village appointed by Council, or a person who is under contract with the Village is hereby authorized to enter at all reasonable times upon any property or premises to inspect the same in connection with their duties under this Bylaw and to ascertain whether the provisions of this Bylaw are being complied with.

Level of Service

3 (4) All subdivisions shall be provided with service to the levels prescribed in Schedule A of this Bylaw unless Council has approved and issued a Development Variance Permit that varies the requirements of this bylaw.

Subdivisions Where Servicing Is Not Required

3 (5) Notwithstanding Subsection 4 of this Section, the servicing requirements prescribed in Schedule A of this Bylaw are not required where the lot created is to be used solely for the unattended equipment necessary for the operation of:

.1 a community water system;

.2 a community sewer system;

.3 a community gas distribution system;

.4 a community radio or television receiving antennas;

.5 a radio or television broadcasting antenna;

.6 a telecommunications relay station;

.7 an automatic telephone exchange;

.8 an air or marine navigational aid;

.9 electrical substations or generating stations; or

.10 any other similar public service or quasi public service facility or utility.

Connection to the Community Water System

3 (6) All water or fire hydrant systems provided in accordance with this Bylaw shall be connected to the community water system.

Connection to the Community Sanitary Sewage System

3 (7) All sanitary sewage systems provided in accordance with this Bylaw shall be connected to the community sanitary sewage system.

Connection to the Community Drainage System

3 (8) All drainage systems provided in accordance with this Bylaw shall be connected to the community drainage system.

Compliance with Bylaw

3 (9) No person shall subdivide land or provide works and services in the Village except in compliance with the provisions of this Bylaw.

Cost of Services

3 (10) Unless otherwise provided in this Bylaw, all works and services required in this Bylaw shall be constructed and installed at the expense of the owner of the land being subdivided or developed.

Right-of-Way Agreement

3 (11) Where an owner is required to grant a right-of-way to the Village, the owner shall provide a statutory right of way plan and agreement in a form acceptable to the Village and shall bear all costs associated with the preparation and registration of the plan and agreement.

Violation

3 (12) Every person who:

(a) violates any of the provisions of the Bylaw;

(b) causes or permits any act or thing to be done in contravention or violation of any of the provisions of this Bylaw;

(c) neglects or omits to do anything required under this Bylaw;

(d) carries out, causes or permits to be carried out any subdivision or development in a manner prohibited by or contrary to any of the provisions of this Bylaw;

(e) fails to comply with an order, direction or notice given under this Bylaw; or

(f) prevents or obstructs or attempts to prevent or obstruct the authorized entry upon any premises or property of a person authorized by Section 3(3);

shall be deemed to be guilty upon summary conviction of an offence under this Bylaw.

Offence

3 (13) Each day's continuance of an offence under Section 3(12) constitutes a new and distinct offence.

Penalty

3 (14) Every person who commits an offence under this Bylaw is liable on summary conviction to a fine not exceeding $2,000 plus the cost of prosecution for each offence.

SECTION 4 - SERVICING REQUIREMENTS

REQUIREMENTS

4 (1) As a condition of the approval of a subdivision, the Council requires that the owner of the land being subdivided provide works and services in respect of the subdivision of land, including:

(a) clearing, grading and surfacing of highways in accordance with the level of service set out in Schedule A of this Bylaw, and designed and constructed to the standards set out in Schedule B of this Bylaw;

(b) construction of curbs, gutters and sidewalks in accordance with the level of service set out in Schedule A of this Bylaw, and designed and constructed to the standards set out in Schedule B of this Bylaw;

(c) construction of water distribution systems components in accordance with the level of service set out in Schedule A of this Bylaw, and designed and constructed to the standards set out in Schedule B of this Bylaw;

(d) construction of sanitary sewer system components in accordance with the level of service set out in Schedule A of this Bylaw, and designed and constructed to the standards set out in Schedule B of this Bylaw;

(e) provision of storm drainage facilities in accordance with the level of service set out in Schedule A of this Bylaw, and designed and constructed to the standards set out in Schedule B of this Bylaw;

(f) provision of wiring and street lighting in accordance with the level of service set out in Schedule A of this Bylaw, and designed and constructed to the standards set out in Schedule B of this Bylaw.

[Note: If the subdivision is located within a Development Permit Area as set out in the Official Community Plan (see the OCP for a map of the area), then the Village may require additional works and services.]

4 (2) The standards and specifications set out in Schedule B are the minimum standards and shall be supplemented by the design engineer in accordance with generally accepted engineering practice in particular circumstances that warrant a higher standard.

SECTION 5 - PERFORMANCE AGREEMENT AND MAINTENANCE BOND

PERFORMANCE AGREEMENT

5 (1) 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 in accordance with the provisions of this Bylaw before the Approving Officer approves of the subdivision, or the Building Inspector issues the building permit, unless the Owner of the land:

(1) deposits with the Village a security in the amount of 125% of the Approving Officer's or Building Inspector's estimate of construction cost and in the form contained in Schedule C of the Bylaw; and

(2) enters into a Performance Agreement with the Village, in the form contained in Schedule C of the Bylaw, to construct and install the required works and services by the date specified in the agreement or forfeit to the Village the amount secured by the security.

MAINTENANCE BOND

5 (2) The Owner is obliged to maintain works and services for a period of one year after satisfactory completion inspection by the Village.

5 (3) Where works and services are constructed before subdivision approval, and the Owner does not enter into a Performance Agreement with the Village, the Owner of land being subdivided or developed shall deposit a Maintenance Bond with the Village for a 1 year term at the satisfactory completion inspection by the Village. The value of the Maintenance Bond shall be a minimum of:

(1) ten percent of the construction value or $2000, whichever is greater;

(2) except in the case where the construction value is $5000 or less, then the maintenance bond shall be a minimum of $1000.

SECTION 6 - FEES

FEES

Application Fees

6 (1) A fee of Three Hundred ($300.00) Dollars for the first parcel proposed to be created by subdivision and Fifty ($50.00) Dollars for each additional parcel is payable to the Municipality.

SECTION 7 - SCHEDULES

SCHEDULES

7 (1) The following is a list of schedules attached hereto and forming part of this Bylaw:

Schedule A - Level of Works and Services to be Provided in Subdivisions and Developments

Schedule B - Subdivision and Development Servicing, Design and Construction Specifications

Schedule C - Performance Agreement

SECTION 8 - REPEAL AND ADOPTION

REPEAL

8 (1) "The Village of Harrison Hot Springs Subdivision Control Bylaw No. 289, 1975" and amendments thereto, are hereby repealed.

ADOPTION

READ A FIRST TIME THIS 22ND DAY OF MARCH, 1994

READ A SECOND TIME THIS 22ND DAY OF MARCH, 1994

READ A THIRD TIME THIS 22ND DAY OF MARCH, 1994

ADOPTED THIS 12TH DAY OF APRIL, 1994

CLERK

MAYOR

Certified a true and correct copy of Bylaw as Adopted. 578

CLERK

A true copy of By-Law No. 578
registered in the office of the Inspector of Municipalities this 21st *day of* JUNE 1994.

Deputy Inspector of Municipalities

VILLAGE OF HARRISON HOT SPRINGS

SCHEDULE "A" TO

SUBDIVISION AND DEVELOPMENT CONTROL

BYLAW NO. 578, 1993

Level of Works and Services to be provided in Subdivisions and Developments

1. The following level of service shall be provided in all subdivisions and developments within the Village of Harrison Hot Springs.

    1. Highways Including

        - asphaltic concrete paving on roadways; walkways and lanes;
        - curb and gutter;
        - sidewalks;
        - boulevards.

    2. Ornamental street lighting where underground power, telephone and cablevision wiring is installed.

    3. Underground power, telephone and cablevision wiring is required for the following subdivisons:

        - subdivisions requiring dedication of a new highway right-of-way and construction of a new highway;

        - subdivisions where the lots created will front onto an existing highway with underground power, telephone and cablevision wiring;

        - subdivisions where the lots created will front onto an existing highway with no power, telephone or cablevision wiring.

    4. Overhead power, telephone and cablevision wiring is permitted for subidivisions where lots created will front onto an existing highway which has existing overhead wiring.

    5. Water distribution system and connection to the community water system is required.

    6. Sanitary sewer collection system and connection to the community sanitary sewage system is required.

    7. Storm drainage collection system including underground sewers.

Certified a true and correct copy of Schedule A to Bylaw No. 578

CLERK

VILLAGE OF HARRISON HOT SPRINGS

SUBDIVISION AND DEVELOPMENT SERVICING,

DESIGN AND CONSTRUCTION SPECIFICATIONS

SCHEDULE "B" TO

SUBDIVISION AND DEVELOPMENT CONTROL

BYLAW NO. 578, 1993

Certified a true and correct copy of Schedule B to Bylaw No. 578

CLERK

PART ONE

DESIGN SPECIFICATIONS

SECTION 1 - DESIGN SPECIFICATIONS

1.0 General

1.1 Engineering Drawing Standards and Requirements

All engineering drawings shall be prepared under the supervision of and sealed by a Professional Engineer registered in the Province of British Columbia. Drawings shall be submitted on standard size drawing sheets not exceeding 22" in width and 40" in length.

Each set of drawings shall include:

(a) Key plan at a scale of 1" = 100', showing work to be constructed, contours at an appropriate contour interval for the area considered, and an inset site location plan;

(b) Site drainage plan showing drainage pattern of each parcel within the subdivision and any parcel affected by the subdivision;

(c) Plan-profile drawings of roads, storm sewers, and sanitary sewers at a scale of 1" = 40";

(d) Plan drawing of water, electrical, telephone and gas distribution systems and ornamental street lighting.

1.2 By-laws, Permits and Certificates

The owner shall comply with all by-laws of the Corporation and Provincial Statutes, and shall prior to the plans being approved for construction by the Approving Officer, obtain any permits or certificates required thereunder.

2.0 HIGHWAYS

2.1 General

Engineering drawings showing detailed design of the roads shall be submitted to the Approving Officer for approval prior to commencement of construction. These drawings shall show alignment and grade of the road, horizontal and vertical curve information, and all such other details as may be required.

2.2 Street Paving Widths

The minimum width of paved surface shall be:

Arterial Streets	44 Feet
Collector Streets	26 Feet
Local Residential Streets	30 Feet
Cul de sac Streets	30 Feet
Cul de sac	70 Feet in diameter
Lanes	20 Feet
Industrial Streets	As specified by the Approving Officer
Emergency Access Roads	8 Feet
Minor Walkways	4 Feet

2.3 Vertical Alignment

The minimum longitudinal gradient at the gutter line shall be 0.30% for all classification of streets unless specified otherwise by the Approving Officer. The maximum gradient shall be 8.0% for arterial and collector streets and 12.0% for local residential streets, cul de sac streets, and lanes unless specified otherwise by the Approving Officer.

All changes in gradient over 2% shall be connected by vertical curves. The minimum length of vertical curve shall be determined by the formula L = KA where:

L = length of vertical curve
K = distance required to effect a 1 % change in gradient on a vertical curve.
A = algebraic difference in grades in percent.

For arterial streets use K - 50 for crest and sag vertical curves. For all other classifications use K = 28 for crest vertical curves and 35 for sag vertical curves or as approved by the Approving Officer. In no case will the length of vertical curve be less than 200 feet for arterial streets or 150 for all other classifications.

2.4 Horizontal Alignment

The maximum degree of curvature shall be 21° for arterial and collector streets. Cul de sacs shall have a minimum turning radius of 35 feet. The minimum radius of curb return at intersections shall be 25 feet.

2.5 Street Cross Section

The street cross section shall be as shown on Standard Drawing No. R-1.

3. Sanitary Sewers

3.1 General

Sanitary sewer facilities including gravity sewer mains, pump stations and force mains if required, manholes, service connections, and all related appurtenances shall be provided. Engineering drawings showing detailed design of the necessary works shall be submitted to the Approving Officer for approval prior to commencement of construction. These drawings shall show alignment and size of pipes, proposed grades, distances between manholes, manhole invert elevations, existing ground line and proposed final ground line over the pipe, location and grade of all service connections to the property line, all easements, and all such other details as may be required.

3.2 Sizing of System

The subdivision sewers shall provide sufficient capacity to handle the full contributing area as defined by the Approving Officer.

The system shall be designed on the basis of a contributing population of 20 persons per acre unless higher densities are indicated. The daily per capita flow shall be 100 Imperial gallons. The peaking factors shall be 2.5 for trunk sewers, and 4.0 for lateral sewers.

The minimum pipe sizes shall be 8 inches in diameter for sewer mains and 4 inches in diameter for service connections.

3.3 Design Grade

The system shall be designed to provide a minimum velocity of 2 feet per second in the pipe when flowing full, based on Kutter's formula using an "n" value of 0.013.

3.4 Depth of Cover

The minimum depth of cover over the pipe shall be 3.5 feet, or as required by the Approving Officer.

3.5 Manhole Spacing

Manholes shall be located at all changes in horizontal or vertical alignment and at a maximum spacing of every 400 feet.

4. Water Distribution

4.1 General

Water distribution facilities including water mains, valves, hydrants, and service connecitons shall be provided. Engineering drawings showing detailed design of the necessary work shall be submitted to the Approving Officer prior to commencement of construction. These drawings shall show alignment and size of pipes, location and details of all fittings, valves and hydrants, service connections, and all such other details as may be required.

4.2 Sizing of Pipe

The minimum pipe size for all mains shall be 6 inch diameter, except for short cul de sac streets where hydrants are not required the minimum size may be 4 inches. The Village may require that certain pipes be larger than 6 inches in diameter if on main feeder lines.

Service connections shall be 3/4 inch diameter for single family residential use and sized to suit the size of development for apartments or other multiple use development.

4.3 Spacing of Fire Hydrants

Fire hydrants shall be located in general at street intersections and at a maximum spacing of 500 feet. Hydrants will not be located at the end of dead end streets, unless the street is to be ultimately extended, or at the end of cul de sac.

4.4 Blow-offs

Blow-offs shall be installed at the ends of all dead end mains.

4.5 Spacing of Valves

In general, gate valves shall be located on at least two legs of intersecting mains and at a maximum spacing of 800 feet in a continuous line.

4.6 Depth of Cover

The minimum depth of cover over the water main shall be 3.5 feet or as specified by the Approving Officer.

5. Storm Sewers

5.1 General

Storm sewer facilities including gravity sewer mains, manholes, catch basins, inlet and outlet structures, flap gates as required, service connections and all related appurtenances shall be provided. Engineering drawings showing detailed design of the necessary works shall be submitted to the Approving Officer for approval prior to the commencement of construction. These drawings shall show alignment and size of pipes, proposed grades, distances between manholes, manhole invert elevations,

existing ground line and proposed final ground line over the pipe, location and grade of all service connections, all easements, and all such other details as may be required.

The owner shall maintain existing drainage system or provide acceptable alternatives.

5.2 Sizing of System

The system shall be of sufficient capacity to accommodate all tributary areas as defined by the Approving Officer.

The Rational Method of Storm Sewer Design with the formula $Q = AIC$

Q = flow in CFS
A = tributary area in acres
I = rainfall intensity equal to 2 inches per hour.
C = run-off coefficient

The minimum pipe sizes shall be, for mains - 10 inches, for catch basin leads - 8 inches, and for service connections - 4 inches.

5.3 Manhole and Catch Basin Spacing

Manholes shall be located at all changes in horizontal or vertical alignment and at a maximum spacing of 400 feet. Catch basins shall be located at a maximum spacing of 250 feet in the drainage path.

5.4 Depth of Cover

The minimum depth of cover over the pipe shall be 3.0 feet.

6.0 Curb and Gutter

6.1 General

Roll-over curb and gutter as shown on Standard Drawing No. R-2 shall be used in undeveloped areas. Where driveway access points are known, vertical-face curbs according to Standard Drawing R-3 or R-4 may be required.

6.2 Design Gradient

The design gradient shall be as specified for roads under Section 2 Highways except that the minimum gradient around curb returns shall be 1.0% and around cul de sac shall be 0.5%.

6.3 Curb Return

The minimum curb return radius shall be 25 feet. Elevations shall be shown on the drawings for the beginning and end of curb return and at the 1/4 points, and every 25' around cul de sacs.

7.0 Ornamental Street Lighting

7.1 General

Ornamental street lighting including all service wiring, bases, poles, luminaires, lamps, photo cells, control equipment, and all related appurtenances shall be provided. Engineering drawings showing detailed layout and design of the necessary works shall be submitted to the Approving Officer for approval prior to commencement of construction.

7.2 Levels of Illumination

The minimum levels of illumination in average foot candles shall be as follows:

		Residential Areas	Commercial Areas
a)	Arterial Streets	0.9	2.0
b)	Collector Streets	0.6	1.2
c)	Local Residential Streets	0.4	0.9

The maximum uniformity ratio for local residential streets shall be 6:1, all other streets shall be 3:1.

7.3 Pole Locations

In general poles shall be installed as follows:

(a) Arterial Streets - opposite or staggered spacing

(b) Collector Streets - staggered spacing

(c) Local Residential Streets - spaced one side of street.

Poles shall be located within 2 feet of the property corners and shall be checked for conflict with driveway and underground services.

PART TWO

CONSTRUCTION SPECIFICATIONS

DEFINITIONS

In the Specifications hereinafter defined the following words and expressions shall have the meaning hereby assigned to them:

"Owner" shall mean the Village of Harrison Hot Springs and assigns. — Owner

"Contractor" means Subdivider, Owner of subdivided land or the Sub-divider's Contractor. — Contractor

"Engineer" means the Engineer appointed by the Village of Harrison Hot Springs to act on their behalf.

"Drawings" shall mean the drawings referred to in the Standard Specifications together with any modification of such drawings approved in writing by the Approving Officer. — Drawings

"Approved" means approval in writing by the Approving Officer including subsequent written confirmation of previous verbal approval. — Approved

"Approving Officer" shall mean the Approving Officer for the Village of Harrison Hot Springs. — Approving Officer

"Works" means the whole of the works, materials, matters and things to be done, furnished and performed by the Contractor. — Works

"Plant" shall mean all equipment and materials of every kind whatsoever brought onto the site by the Contractor, incidental to, or to assist him in the performance of the Works, but does not include materials or equipment intended to form or forming an integral part of the works. — Plant

"Materials Supplier" means any person, firm or corporation furnishing materials to the Contractor for incorporation into the Works, such material not being worked to a special design. — Material Supplier

STANDARD SPECIFICATIONS

SECTION 5 - ROAD CONSTRUCTION

5.1 ROAD WIDTHS

Type of Thoroughfare	Minimum Widths of Right-of-way
Main Roads	66 feet
No Through Roads	50 feet

5.2 ROAD CLEARING

1. General

The purpose of the specification is to provide for the clearing and grubbing of those areas dedicated by the Contractor to the Municipality as right-of-way for roads and easements. All such areas shall hereinafter be called "The Area". General

2. Scope of the Work

Except for trees and shrubs to be preserved as indicated on the plans or designated by the Approving Officer, "Clearing" shall mean the complete removal and disposal of all standing and fallen trees, stumps, logs, upturned roots, rotten wood and all other organic material and accumulation of rubbish of whatsoever nature and any other objectionable material likely to cause settlement from the area. Descript

It shall also include the removal of existing cribwork, guardrail, fences, siphon structures, culvert pipes of all types, box culverts and all other buildings and structures within the limits of the area.

ROAD CLEARING (cont'd)

3. Disposal of Material

All material, slash and debris resulting from Clearing operations must be disposed of by burning, unless there are specific provisions for otherwise disposing of same. All trees shall be felled within the area but in the event of any trees falling outside the area such trees shall be cut up and together with all debris and slash therefrom, brought back to the area and there burned.

The Approving Officer may designate certain trees or shrubbery in felling adjacent timber, burning, or any other clearing operations to be preserved. Such trees or shrubbery are to be limbed, or thinned to such height and extent as may be ordered by the Approving Officer.

Waste Material

Except as hereinafter provided, all slash and debris shall be piled and burned at points located centrally in the area. The number of fires to be started at any one time shall be limited to the capacity of the Owner's equipment and organization to provide adequate protection against the spreading of the fires to adjacent timber or property.

4. Burning

The burning of rubbish and debris must comply with all Municipal and Provincial regulations applying to the burning of materials in the areas where burning is proposed.

Burning

5.3 GRADING

1. General

This item shall apply to all grading work required on the streets to bring them to the grade and cross-section as shown on the drawings to be included in the Application for Sub-division, or Contract Documents.

2. Scope of the Work

The street grading shall include the removal of topsoil, excavation of materials, ditching, embankment, compaction, and shaping of the complete street prior to placing of the base gravel.

Description

GRADING (cont'd)

3. Sub-Grade

The sub-grade shall be excavated as necessary or filled with approved material to bring it to the required sub-grade elevation. Sub-Grade

4. Removal of Topsoil

All topsoil shall be removed from the street to such widths as will be affected by the street grading and construction of sidewalks, curb and gutter. After the cut and fill slopes have been graded (as shown on Typical Road Cross-section) a layer of topsoil shall be spread thereon and rolled. Surplus topsoil shall be disposed of outside of the road rights-of-way. Topsoil

5. Unsuitable Material

Where unsuitable material is found in the street, it shall be removed and disposed of by the Contractor. Refilling shall be carried out in accordance with the provisions of Section 9 hereof to the satisfaction of the Approving Officer or his representative. Loam, topsoil, peat, muskeg, sawdust, wood, or other organic materials are all unsuitable materials. Under certain circumstances, clays and silts may be unsuitable material and these should be checked with the Approving Officer or his representative. Unsuitable Material

6. Rock Cuts

Rock cuts shall be excavated and mucked out fully to one foot below grade to a firm and reasonably smooth and uniform surface. No pinnacles of rock shall be left protruding from the surface of the cut and all broken rock shall be removed. Back-filling to bring the street to proper grade shall be done in accordance with the provisions of Section 9 hereof. Rock Cuts

In solid rock cuts where pockets which will not drain are formed below the subgrade elevations, the Contractor shall provide drainage by ditching to a free outlet, and shall backfill both the pockets and the trench to an elevation eleven inches below profile grade with material in accordance with the provisions of Section 9 hereof.

GRADING (cont'd)

7. Finishing of the Street Section

Prior to the placing of base material, the street shall be neatly finished, trimmed and compacted to the lines, grades and cross-section shown on the standard drawings and approved plans to produce a smooth and a uniform cross-section.

Finishing

Where curb and gutter or sidewalks are to be constructed by the Contractor, the width of cuts and fills shall be sufficient to permit laying of pit run gravel to at least one foot behind the back of the curb and sidewalk. After the curb and gutter or sidewalk has been backfilled, the slopes will be dressed at a slope of 2%, from the top of the curb or the sidewalk, to the property line with topsoil removed from the street, 4" thick and adequately dressed.

All loose rock and boulders within the right-of-way shall be gathered up and buried or disposed of, off the site.

All shoulders, slopes, ditches, street intersections shall be neatly and uniformly trimmed to the proper section.

8. Sub-Base

Sub-Base

The sub-base shall be an integral part of the base for the curb and gutter. It shall be laid in two layers to a consolidated thickness of twelve (12) inches and shall consist of twelve (12) inches of pit run gravel. After each course is laid it shall be watered and rolled or tamped to ensure proper consolidation.

9. Base

The base shall consist of a four (4) inch lift of 3/4" minus crushed gravel, placed after the curb and gutter has cured.

5.4 PIT RUN GRAVEL

1. Scope of Work

Description

The work shall consist of the supply, placing, watering and compacting of pit run gravel, in place, on the prepared subgrade.

PIT RUN GRAVEL (cont'd)

2. Material

(a) Pit run gravel shall consist of one or more courses of material compacted in place on the prepared sub-grade.

(b) The pit run gravel shall be granular material from an approved source and shall be composed of sound, durable particles free from lumps of clay, silt, decomposed rock, organic or other deleterious matter, and shall only contain such amounts of natural fines or binder as approved by the Approving Officer. The pit run gravel shall be produced to yield a reasonably uniform product and any sand seams in the pit shall be so blended with the natural gravel to achieve this uniformity. The pit run gravel shall not contain any stones greater than 3 inches in diameter. Pit Run Gravel

3. Development of the Pit

The location, development and restoration of a suitable gravel pit shall be approved by the Approving Officer. Restoration shall be in accordance with Section II of the Mines Regulation Act, or the requirements of any Municipality or Regional District having jurisdiction. Pit

4. Equipment

(a) A blade grader shall be required in conjunction with compacting equipment to maintain an even and uniform compacted surface, shaped to the required cross-section. Grader

(b) Compaction equipment shall be of an approved type and of sufficient capacity to efficiently handle the required production and construction of the base. At least one compaction unit shall be of the vibratory type.

5. Placing

(a) The pit run gravel shall be spread uniformly on the sub-grade, in layers not over 6 inches in depth, or as directed by the Approving Officer, watered and compacted to 100% of the maximum density obtained in a laboratory following A.S.T.M. Test Procedure D698-66T, Method D or the latest revision thereof. No pit run gravel shall be placed until the sub-base has been approved by the Approving Officer.

PIT RUN GRAVEL (cont'd)

(b) Maintenance of the pit run gravel shall be the full responsibility of the Contractor and any additional water, compacting, or shaping required to keep the pit run gravel in the specified condition shall be included.

(c) Where, in the opinion of the Approving Officer, the pit run gravel does not contain sufficient moisture to ensure maximum compaction, the Approving Officer may order water to be applied in the quantity and manner as he may direct. No layer or course shall be placed until the previous course has been fully compacted in place.

6. Weather

Weather

When, in the opinion of the Approving Officer, the weather is such that satisfactory results cannot be secured, the Contractor shall suspend operations until the weather is favourable. No material shall be placed in the snow or on a soft, muddy or frozen sub-base.

5.5 3/4 INCH MINUS CRUSHED GRAVEL - PLACING

1. General

This Specification covers the funishing and placing of approved 3/4" minus crushed gravel, watered and compacted in place, in the area defined. Descriptic

2. Material

(a) The 3/4" minus crushed gravel shall consist of crushed granular material from an approved source free from clay, silt and deleterious matter and shall meet the following requirements and shall be uniformly graded within the limits given below when tested by means of laboratory sieves.

Passing 3/4" U.S.S. Sieve - 100%
Passing #4 U.S.S. Sieve - 45 - 65
Passing #10 U.S.S. Sieve - 25 - 50
Passing #40 U.S.S. Sieve - 10 - 30
Passing #200 U.S.S. Sieve - 0 - 10

Grading Limits

(b) Any rejection of any size or sizes required to produce a uniform grading within the above limits shall be the full responsibility of the Contractor.

3. Development of the Pit

Before any material for aggregate is excavated from the pit, the site shall be cleared and grubbed and all debris burned or disposed of. The entire area from which material is to be taken shall be stripped of all undesirable overburden to prevent future contamination of the granular aggregate. Pit

The pit shall be restored in accordance with Section II of the Mines Regulation Act, or the requirements of any Municipality or Regional District having jurisdiction. Restorat

3/4 INCH MINUS CRUSHED GRAVEL - PLACING (cont'd)

4. Equipment

Equipment

The Contractor shall install or have available a plant of sufficient capacity to produce the quality and quantity of crushed gravel required for the proper and continuous construction of the base. A blade grader shall be required to be used with the compaction equipment to maintain an even and uniform compacted surface. Compaction equipment shall be of an approved design and at least one unit shall be of the vibratory type.

5. Spreading

Spreading

(a) The material shall be spread in one or more layers, and compacted to 100% of the maximum density obtained in a laboratory following A.S.T.M. Test Procedure D698-66T Method D or the latest revision thereof. Compacted in place, the material shall conform to the required cross-section and elevation. No layer may be spread until the previous course has been approved by the Approving Officer.

(b) Where, in the opinion of the Approving Officer, the crushed gravel does not contain sufficient moisture to ensure maximum compaction, the Approving Officer may order water to be applied in the quantity and manner as he may direct.

(c) The maintenance of the 3/4" crushed gravel shall be the full responsibility of the Contractor and any additional watering, compacting or shaping required to keep the material in the specified condition shall be included.

6. Weather Conditions

Weather Conditions

When, in the opinion of the Approving Officer, the weather is such that satisfactory results cannot be secured, the Contractor shall suspend operations until the weather is favourable.

No material shall be placed in the snow or on a soft, muddy or frozen sub-grade or lower course.

5.6 DRAINAGE

1. General

A complete set of construction drawings shall be included in the Application of Subdivision. These drawings shall show proposed culvert, storm drain, catch basin and manhole locations, grades, invert elevations and all pipe sizes.

All storm drains will be sized to accommodate run-off from land adjacent to and above the subdivided property. The extent of the drainage area to be used for calculation of size of pipe will be approved by the Approving Officer.

General

Pipe culverts and storm sewers shall be constructed where shown on the approved plans and in accordance with the drawings and pertinent specifications covering the various types. The trench and other preparatory work shall be approved by the Approving Officer before actual placing starts.

All culvert and storm sewer pipe to be furnished for this work shall be of approved material and quality, sound, true in form and free from defects of all kinds.

2. Trenching

A trench shall be excavated to the depth and grade as shown on the plans. If in the opinion of the Approving Officer or his representative, the material in the bottom of the excavation is of such a character as to cause unequal settlement along the length of the pipe, the trench shall be dug below the grade to such depth as ordered and backfilled with gravel or other suitable material and thoroughly tamped or otherwise compacted to ensure a firm and uniform foundation.

Trenchin

Where rock, in either ledge or boulder formation, occurs in the bottom of the trench, the rock shall be excavated below grade and backfilled with sand or fine gravel so that there will be at least a six inch cushion between the rock and all portions of the pipe.

The bottom of the trench upon which the pipe is to be laid shall be shaped so that at least one-quarter of the circumference of the pipe is in contact with the prepared foundation for the whole of its length.

DRAINAGE (cont'd)

3. Placing

Placing

Bell and spigot pipe shall be laid beginning at the lower end with the bell end of the pipe section up-grade. Suitable excavation or bedding must be provided to accommodate the bell so that the pipe is supported along its full length and not at the ends alone.

Tongue and groove concrete pipe shall be laid beginning at the lower end with the groove end pointing up-grade. Pipe with elliptical reinforcement shall be laid with the minor axis of the reinforcement as marked by the manufacturer in a vertical position.

When jointing concrete pipes, the trench shall be in a dry condition and the joints shall be cleaned and wetted before sealing with mortar. The mortar shall consist of one part of Portland Cement to two parts of fine sand, mixed to the proper consistency. Sealing shall be neatly and thoroughly done and the interior of the pipe cleaned of all surplus mortar. Joints shall be kept damp with burlap or earth for at least three days after sealing.

Corrugated metal pipe shall be laid beginning at the lower end with the outside laps pointing up-grade and the longitudinal joint on the side. The separate sections shall be firmly jointed together and any metal in joints which is not thoroughly protected by galvanizing shall be coated with a suitable asphaltum paint.

4. End Walls

End Walls

Where ordered, end walls shall be built around the ends of pipe. The construction of these end walls shall meet the requirements governing the construction with Class "A" concrete.

5. Inlet and Outlet Ditches

Ditches

Inlet and outlet ditches shall be constructed to approved lines and levels which will permit free entrance and exit to quantities of water equal to the capacity of the pipe without scour or ponding.

DRAINAGE (cont'd)

6. Connections to Storm Sewers

The minimum allowable size for connections from catch basins to storm sewers is 8 inches diameter. The minimum allowable size for connections from property lines to storm sewers is 6 inches diameter. Connectic

Connections laid from sewer to property line which are not immediately connected shall be capped and located on the ground with a 2" x 4" - 8' long stake set to the invert and marked with green paint. Their location shall be referenced accurately and shown on the As Constructed plans.

7. Backfilling

Selected material, preferably fine gravel, shall be used in backfilling the trench to a point level with the top of the pipe. This backfilling material shall be deposited equally on both sides of the pipe in layers not exceeding six (6) inches in depth, and shall be thoroughly compacted by means of mechanical tampers to a height equal to three-quarters the outside diameter of the pipe. Backfill

Fill material directly over the pipe shall be free from large stones and shall be placed by hand, in as loose a condition as possible, for a height of at least one foot.

Care shall be used to give the pipe a firm and uniform bearing. Any pipe which has settled after it is laid and before final acceptance, or which is not in true alignment shall, upon orders from the Approving Officer be taken up and relaid.

8. Concrete Pipe

Concrete pipe may have joints of the tongue and groove or bell and spigot type and shall meet the requirement of the current specifications for Reinforced Concrete Culvert Pipe of the A.S.T.M. Designation C:76. Concrete Pipe

Plain concrete pipe shall conform to the current specification for concrete sewer pipe, A.S.T.M. Design C14

Pipe shall be legibly marked with the date of manufacture, the name or trademark of the manufacturer and by marks denoting the class of nonreinforced concrete pipe, or reinforced concrete

DRAINAGE (cont'd)

8. Concrete Pipe (cont'd)

pipe as the case may be. Pipe containing elliptically placed reinforcement shall be marked on the inside of the pipe with the words "Top" or "Bottom", at the correct place to indicate the proper position when laid.

Concrete Pipe

Upon request, the Contractor shall furnish at his own expense, such tests and other information as may be required regarding the concrete pipe proposed to be used.

9. Corrugated Metal Pipe

Corrugated Metal Pipe

Corrugated metal culvert pipe shall conform to the requirements of the current American Association of State Highway Officials Standard Specifications for Corrugated Metal Pipe Culverts.

10. Vitrified Clay Pipe

Vitrified Clay Pipe

Vitrified clay pipe shall conform to the Canadian Standards Association Specification A60-1953.

11. Asbestos Cement Pipe

A.C. Pipe

Asbestos Cement Pipe shall be of the class approved on the plans. Upon request, the Contractor shall furnish, at his own expense, such tests and other information as may be required regarding the proposed pipe.

Asbestos Cement Building Sewer Pipe or equivalent, may be used for connections from storm sewer to property line.

12. "As Built" Drawings

"As Built" Drawings

A complete set of "As Built" drawings showing any revisions of, or departure from, the construction drawings, shall be deposited with the Approving Officer before final approval shall be given to the work.

5.7 STREET SURFACING

1. Priming General

Priming is the application of a liquid bituminous binder to a compacted granular base course. If required, a sand aggregate cover coat is applied to the primed surface. General

2. Scope of Work

The work involved shall consist of furnishing and applying bituminous materials to a prepared base or road surface in accordance with the specifications and to the width shown on the typical cross-section shown on the plans, if required by the Approving Officer. Scope

3. Materials

(a) Bituminous Primer

The bituminous primer selected shall conform to the Specifications for Bituminous Materials as set forth under the Bituminous Materials Specification. Bituminou Primer

(b) Sand Aggregates

Sand aggregate shall be clean, granular material of which 100% passes the #4 sieve. Aggregates must be approved prior to their use. Aggregate

4. Construction

(a) Pressure Distributor

The pressure distributor used for applying asphaltic materials shall be designed and operated to distribute the asphaltic material in a uniform spray without atomization, in the amount and between the temperature limits specified. It shall be equipped with a fifth wheel speed tachometer registering feet per minute and so located as to be visible to the truck driver to enable him to maintain the constant speed required for application at the specified rate. The pump shall be operated by a separate power unit, and shall be equipped with a tachometer registering gallons per minute passing Pressure Distribu

4. Construction (cont'd)

(a) Pressure Distributor (cont'd)

through the nozzles, and readily visible to the operator. Suitable means for accurately indicating at all times the temperature of the asphaltic material shall be provided.

Pressure Distributor

The thermometer well shall be so placed as not to be in contact with a heating tube. If the distributor is provided with a heating attachment, suitable means shall be provided to agitate or circulate the bituminous material throughout the entire heating process.

(b) Application of Asphaltic Primer

Application of Asphaltic Primer

Bituminous primer shall be uniformly applied at such a rate and temperature that it will be completely absorbed by the surface (approximately 1/3 gal. per sq. yard.) It shall be applied only when the surface is dry and when the air temperature in the shade is not less than 50 degrees F. The asphaltic primer shall be applied curb to curb or, where curbs are not being installed, to a width two feet wider than the finished pavement, by means of the approved pressure distributor.

The surface of curbs and other structures adjacent to the area being treated shall be protected with building paper, suitably anchored, or by such other method as will prevent them being spattered or marred. If after a reasonable length of time, the primer has not been completely absorbed, or more material has been applied than can be absorbed, then just sufficient sand shall be spread over the surface to blot up the excess primer and prevent it from picking up under traffic. Any loose or excess sand shall be swept from the base prior to the laying of any subsequent surface.

4. Construction (cont'd)

(c) Maintenance of the Prime

If the prime coat is to be subjected to traffic before the pavement is laid it shall be maintained intact until it has been covered by the specified pavement. Any spots where the prime coat may have failed shall be cleaned out and the exposed areas so produced shall be filled with approved paving mixture, as designed for the surface course. The patches thus constructed shall be raked and thoroughly compacted to conform to the general crown and surface of the road. If the approved paving material is not available, then the failures in the prime coat shall be cleaned out, and the exposed areas so produced shall be filled with selected material similar to that used in the adjacent portion of the road. The material shall be compacted to conform to the general crown and surface of the road. The specified bituminous primer shall then be applied with a hand spray or pouring pot. When required the primed surface shall be thoroughly swept before the paving course is laid.

5.8 BITUMINOUS SURFACING - PLANT MIX

1. Scope of the Work

This Specification shall cover the wearing course of aggregate and bituminous material mixed in a central plant and constructed on a prepared base in accordance with the typical details and cross sections shown on the Standard Drawings. Scope

2. Description

The bituminous plant mix surface course shall consist of mineral aggregate and bituminous binder combined as hereinafter specified, and laid to the required thickness. Descript

BITUMINOUS SURFACING - PLANT MIX (cont'd)

3. Materials

(a) Bituminous Binder

Bituminous Binder

The bituminous binder as selected by the Approving Officer shall, unless otherwise specified conform to the Specification for Asphalt Cement - Paving Grades as set forth under Section 6 of the Standard Specifications, Bituminous Material.

(b) Mineral Aggregate

Aggregates

The mineral aggregate shall consist of a mixture of approved materials containing any or all of the following constituents: broken stone, crushed or uncrushed gravel, sand, stone screenings and mineral dust. Mineral filler to be added if required.

Testing

When tested by means of laboratory sieves, the prepared aggregate shall meet the following requirements and be uniformly graded within the limits.

Sieve Size	% Passing
3/4"	100
1/2"	80 - 100
3/8"	68 - 86
No. 4	46 - 68
No. 8	32 - 50
No. 16	20 - 40
No. 30	12 - 30
No. 50	7 - 22
No. 100	4 - 12
No. 200	2 - 8

Method of testing mineral aggregate shall be the following: Sieve test of mineral aggregate, A.S.T.M. Method of Test C136, or the latest revision thereof.

BITUMINOUS SURFACING - PLANT MIX (cont'd)

3. Materials (cont'd)

(c) Approval of Materials

Prior to use, samples of all materials proposed to be used under these Specifications shall be submitted to the District Superintendent for examination and no material shall be used until it has been approved by the Approving Officer. Approval

(d) Pavement Types and Design Criteria

There shall be three strength classifications for bituminous concrete paving.

Pavement Types

Class A - General highways and normal trafficked city streets
Class B - For heavy duty highway
Class C - For heavily trafficked arterial streets

Mixes for each class of pavement shall meet the following modified Marshall Test Design Criteria:

Property of laboratory compacted paving mixture	Pavement Class A	B	C
Number of blows each face of test specimen	75	75	75
Minimum % of voids in mineral aggregate	15	13	15
Percentage of air voids in compacted mixture	3-5	3-5	4-6
Minimum bearing capacity* in p.s.i.	80	110	150
Minimum modified Marshall load, lbs. at 140°F.	600	800	1200
Flow index, units of 0.01 inch	8-18	8-16	8-14

Design Criteria

* The Bearing capacity shall be computed as follows:

$$\text{Bearing Capacity (p.s.i.)} = \frac{\text{Stability}}{\text{Flow}} \times \frac{(120-\text{Flow})}{100}$$

4. Construction

(a) Paving Plant Essentials

Paving Plant Essentials

All plans used by the Contractor for the preparation of plant mix shall conform to all of the requirements under Subsection a)i. except that scale requirements shall apply only where weight proportioning is used, and in addition, any batch mixing plants shall conform to the special requirements under Subsection a)ii. and continuous mixing plants shall conform to the special requirements under Subsection a)iii.

i) Requirements for all Paving Plants

Uniformity

Uniformity

The paving plants shall be so designed, co-ordinated, and operated as to produce a uniform mixture within the specifications.

Plant Scales

Plant Scales

Scales for any weigh box or hopper may be either of the beam or springless dial type and shall be of a standard make and design, sensitive to one-half of one per cent of the maximum load that may be required. When of the beam type, there shall be a separate beam with telltale indicator for each size aggregate, and a tare beam for balancing the hopper.

Equipment for Preparation of Asphalt

Asphalt Equipment

Tanks for storage of asphalt or other bituminous materials shall be equipped for heating the material, under effective and positive control at all times, to temperature requirements set forth in the Specifications. Heating shall be accomplished by steam or oil coils, electricity or other means satisfactory to the Approving Officer. A circulating system for the asphalt shall be provided, of adequate size to ensure the proper and continuous circulation between storage tank and mixer during

4. Construction (cont'd)

i. Requirements for all Paving Plants (cont'd)

Equipment for Preparation of Asphalt (cont'd)

the entire operating period. All pipe lines and fittings shall be steam jacketed or otherwise properly insulated to prevent heat loss. Storage tank capacity shall be sufficient for at least one day's run. — Asphalt Equipmen

Feeder for Dryer

The plant shall be provided with an accurate mechanical means for uniformly feeding the mineral aggregate into the dryer so that a uniform production and uniform temperature may be secured. — Feeder

Dryer

A rotary dryer of any satisfactory design for drying and heating the mineral aggregate shall be provided. The dryer shall be capable of drying and heating the mineral aggregate to the temperature requirements set forth in the Specifications. — Dryer

Screens

Plant screens, capable of screening all aggregates to the sizes required for proportioning, and having normal capacities slightly in excess of the full capacity of the mixer shall be provided. — Screens

Bins

The plant shall include storage bins with total capacity of not less than three times the dead load capacity of the mixer. Bins shall be divided into compartments arranged to ensure separate and adequate storage of appropriate fractions of the aggregate. Each compartment shall be provided with an overflow pipe that shall be of such size and at such locations as to prevent any backing up of material into other bins. — Bins

4. Construction (cont'd)

i. Requirements for all Paving Plants (cont'd)

Asphalt Control Unit

Asphalt Control Unit

Satisfactory means, either by weighing, metering or volumetric measurement, shall be provided to obtain the proper amount of asphalt or other bituminous material, all measuring devices to be sensitive to a two (2) per cent variation above or below the amount required. Suitable means shall be provided either by steam jacketing or other insulation, for maintaining the specified temperature of the bitumen in the pipe lines, meters, weigh buckets, spray bars and other containers or flow lines.

Thermometric Equipment

Thermometric Equipment

An armoured thermometer reading from 100°F. to 400°F. shall be fixed in the asphalt feed line at a suitable location near the discharge valve at the mixer unit. The plant shall be further equipped with an approved dial scale mercury actuated thermometric instrument so placed at the discharge chute of the dryer as to register automatically or indicate the temperature of the heated aggregate.

Control of Mixing Time

Mixing Time

The plant shall be equipped with positive means to govern the time of mixing and to maintain it constant, unless changed by order of the Approving Officer. The time of mixing shall be considered as the interval between the time the asphalt or bituminous material is spread on the aggregate and the time the same aggregate leaves the mixing plant.

4. Construction (cont'd)

ii Special Requirements for Batching Plants

Weigh Box or Hopper

The equipment shall include a means for accurately weighing each bin size of aggregate in a weigh box or hopper, suspended on scales, ample in size to hold a full batch without hand raking or running over. The weigh box or hopper shall be supported on fulcrums and knife edges so constructed that they will not be easily thrown out of alignment or adjustment. Gates on both bins and hopper shall be so constructed as to prevent leakage when they are closed.

Batch Plants

Weigh Box

Asphalt Bucket

If an asphalt bucket is used for weighing the asphalt it shall have sufficient capacity to hold not less than twenty (20) per cent of the weight of aggregate required for one (1) batch. It shall be steam jacketed or equipped with properly insulated electric heating units and shall be suspended on dial scales or on beam scales equipped with a telltale indicator so that the tare weight of the bucket will be shown for each weighing. The asphalt shall be weighed accurately to within two (2) per cent above or below the weight required. The bucket shall be so arranged that it will deliver the heated asphalt in a thin uniform sheet or in multiple streams the full width of the mixer.

Asphalt Bucket

Mixer Unit for Batch Method

The plant shall include a batch mixer of an approved twin pugmill type, and shall be capable of producing a uniform mixture within the job mix tolerances fixed by the Approving Officer. It shall have a batch capacity of not less than fifteen hundred

4. Construction (cont'd)

ii Special Requirements for Batching Plants (cont'd)

Mixer Unit for Batch Method (cont'd)

Mixer Unit

(1,500) pounds. The pugmill clearance of the blades from all fixed and moving parts shall not exceed three-quarters (3/4) inch. The mixer shall be so constructed as to prevent leakage of contents until the batch is to be discharged.

Continuous Plants

iii. Special Requirements for Continuous Mixing Plants

Gradation Control Unit

Gradation Control

The plant shall include a means of accurately proportioning each bin size of aggregate either by weighing or by volumetric measurement. When gradation control is by volume, the unit shall include a feeder mounted under the compartment or bins. Each bin shall have an accurately controlled individual gate to form an orifice for volumetrically measuring the material drawn from each respective bin or compartment. The orifice shall be rectangular; of dimensions about eight (8) by nine (9) inches, with one dimension adjustable by positive mechanical means provided with a lock. Indicators shall be provided on each gate to show the gate opening in inches.

Weight Calibration of Aggregate Feed

Weight Calibration

The plant shall include a means for calibration of gate openings by means of weight test samples. The materials fed out of the bins through individual orifices shall be by-passed to a suitable test box, each compartment material confined in a separate box section. The plant shall be equipped to handle conveniently such test samples weighing up to five hundred (500) pounds and to weight them on accurate scales.

4. Construction (cont'd)

iii Special Requirements for Continuous Mixing Plants (cont'd)

Synchronization of Aggregate and Asphalt Feed

Satisfactory means shall be provided to afford positive interlocking control between the flow of aggregate from the bins and the flow of asphalt or other bituminous material from the meter or other proportioning source. This control shall be accomplished by interlocking mechanical means or any positive method under the control of the Approving Officer.

Synchro-
nization

Mixer Unit for Continuous Method

The plant shall include a continuous mixer of an approved twin pugmill type, and shall be capable of producing a uniform mixture within the job mix tolerance fixed by the Approving Officer. The paddles shall be of a type adjustable for angular position on the shafts and reversible to retard the flow of the mix. The mixer shall carry a manufacturer's plate giving the net volumetric contents of the mixer at the several heights inscribed on a permanent gauge and also giving the rate of feed of aggregate per minute, at plant operating speed.

Mixer Uni

Unless otherwise required, determination of mixing time shall be by weight method under the following formula. The weights shall be determined for the job by tests made by the Approving Officer.

Mixing Time in seconds -

$$\frac{\text{Pugmill dead load capacity in pounds}}{\text{Pugmill output in pounds per second}}$$

BITUMINOUS SURFACING - PLANT MIX (cont'd)

4. Construction (cont'd)

(b) Preparation and Composition of Mixture

i. Preparation of Asphalt

Asphalt Preparation

The asphalt shall be carefully heated by suitable means designed to secure uniform heating of the entire contents of the storage tank within the temperature range designated in the Bituminous Materials Specifications, and in the case of continuous mixing, means shall be provided for delivery of the bituminous material to the metering pump at the constant temperature designated by the Approving Officer.

ii. Preparation of Mineral Aggregate

Aggregate Preparation

The mineral aggregates shall be dried and stored at the paving plant so that when delivered to the mixer they shall be at a temperature designated by the Approving Officer as suitable for mixing. They may be fed simultaneously into the same dryer but in such a case, prior to mixing, they shall be screened into at least two separate bins with one separation on the No. 4 sieve.

iii. Composition of Mixture

Mixture

The specified mineral aggregate and asphalt binder shall be measured separately and accurately and shall be combined in the proportions directed by the Approving Officer. When the mixture is prepared in a twin pugmill, the volume of mineral aggregate shall not be so great as to extend above the tips of the mixer blades when these blades are in a vertical position. After the aggregate has been charged into the mixer, the asphalt shall be introduced and mixing continued until all particles of mineral aggregate are uniformly coated.

4. Construction (cont'd)

iii. Composition of Mixture (cont'd)

The mineral aggregate shall be separated and recombined in such proportions that will produce a mixture to the approval of the Approving Officer within the limit of the Specifications, and any rejection of any size or sizes by reason of not being uniformly graded shall be the full responsibility of the Contractor, whether the mineral aggregate is supplied by the paving Contractor or made available to the paving Contractor in stockpile.

iv. Paving Plant Inspection

For the verifications of weights or proportions and character of materials, and determination of temperature used in the preparation of the mixture, the Approving Officer or his authorized representatives shall have access at any time to all parts of the paving plant. Inspection

(c) Transportation of Mixture

The mixture shall be transported to the work in tight vehicles with metal bottoms previously cleaned of all foreign materials. When directed by the District Superintendent, each load shall be covered with canvas or other suitable material of sufficient size to protect it from weather conditions. The inside surface of all vehicles used for hauling mixtures may be lightly lubricated with a thin oil or soap solution just before loading, but excess of lubricant or use of gasoline, kerosene, or similar products, will not be permitted. No loads shall be sent out so late in the day as to interfere with spreading and compacting the mixture during daylight unless artificial light, satisfactory to the Approving Officer, is provided. Transportation

4. Construction (cont'd)

(d) General Conditions

General Conditions

The mixtures shall only be laid upon a base, and under weather conditions, approved by the Approving Officer; the surface of the base must be dry. Prior to the delivery of mixture on the work, the prepared base shall be cleaned of all loose or foreign material. Except by permission of the Approving Officer no mixture shall be laid when the air temperature is below 45°F.

(e) Spreading and Compacting the Mixture

Compacting

The asphalt mixture shall be spread for compaction by, either a mechanical spreader of an approved type, or such other means necessary to satisfy the job requirements to the line and thickness as specified or as directed by the Approving Officer. If a mechanical spreader is used the spreading speed shall not exceed 33 feet per minute unless otherwise authorized by the District Superintendent.

Spreading

Unless authorized by the Approving Officer, the Contractor shall furnish a minimum of two (2) self-propelled rollers on each project to roll and compact the pavement mixture. Additional rollers shall be furnished if, in the opinion of the Approving Officer, they are necessary to compact the pavement mixture satisfactorily. There must be at least one self-propelled smooth steel-wheeled roller weighing not less than 8 tons and one self-propelled pneumatic tired roller weighing not less than 10 tons. The wheels of the pneumatic tired roller shall be so constructed that the contact pressure can be made uniform for all wheels and the tire pressure of the several tires shall not vary by more than 5 lbs. per square inch.

The rolling operation shall be conducted in the following sequence:

4. Construction (cont'd)

(e) Spreading and Compacting the Mixture (cont'd)

Transverse joints
Longitudinal joints
Breakdown rolling as close behind the spreader as possible
Intermediate rolling
Finish Rolling

After the transverse joints and longitudinal joints have been compacted, rolling shall begin at the edge of the course and progress toward the centre parallel to the centre line of the roadway, overlapping in successive passes by at least one half the width of the roller. The length of each travel of the roller must be varied so that the roller does not stop in the same place twice. Should unsatisfactory areas develop during compacting, they shall be corrected as directed by the Approving Officer. The surface of the finished pavement shall be free from depressions exceeding one quarter (1/4) inch as measured by a ten (10) foot straight edge paralleling the centre line of the roadway.

(f) Shouldering (When Applicable)

Immediately following the final rolling of the bituminous surface the shoulders for the surface shall be formed to the required cross section - see plan of typical cross section - using, to the fullest extent possible, the material spread alongside the road prior to the application of the primer, or to the spreading of the mixture. The shoulders thus formed, shall be thoroughly compacted by rolling. Shouldering

If the quantity of the material spread alongside the road prior to the application of the primer or prior to the spreading of the mixture is found to be insufficient for the correct shaping of the shoulder, then the extra quantity of new material required shall be supplied, as may be directed by the Approving Officer. New material supplied shall be of such quality and grading as directed by the Approving Officer.

5. Asphalt Cement - Paving Grades

Characteristics					
Penetration, 77°F., 100 g., 5 sec.	40-50	60-70	85-100	120-150	200-300
Viscosity at 275°F.					
Kinematic, centistokes	240+	200+	170+	140+	100+
Saybolt Furol, SSF	120+	100+	85+	70+	50+
Flash point (cleveland open cup) °F.	450+	450+	450+	425+	350+
Thin film oven test					
Penetration after test, 77°F., 100 g., 5 sec., % of original	55+	52+	47+	42+	37+
Ductility -					
- at 77°F., cms.	100+	100+	100+	60+	
- at 60°F., cms.					60+
Solubility in Carbon Tetrachloride, %	99.5+	99.5+	99.5+	99.5+	99.5+
General Requirements	The asphalt shall be prepared by the refining of petroleum. It shall be uniform in character and shall not foam when heated to 350°F.				

Asphalt Cements shall:

1. be prepared by the refining of petroleum unless otherwise specially permitted.

2. be homogeneous, free from water and shall not foam when heated to 350°F.

3. be supplied in such grades as may be ordered.

4. unless otherwise directed, Asphalt Cement shall be 85 - 100 Penetration.

STANDARD SPECIFICATIONS

BITUMINOUS MATERIALS

1. Medium Curing Asphaltic Road Materials

Characteristics	MC-30	MC-70	MC-250	MC-800	MC-3000	Special Primer
Kinematic viscosity at 140°F.	30-60	70-140	250-500	800-1600	3000 - 6000	100-160
Flash point, minimum °F. Tag open cup.	100+	100+	150+	150+	150+	
Distillation - (percent of total distillate to 680°F.)						
- to 374°F						60 max
- to 437°F	25-	20-	0 - 10			40 min
- to 500°F	40-70	20-60	15-55	35-	15-	70 min
- to 600°F	75-93	65-90	60-87	45-80	15-75	85 min
Residue from distillation to 680°F, percent by volume	50+	55+	67+	75+	80+	50
Tests on residue from distillation: Penetration 77°F. 100 g. 5 Sec.	120-250	120-250	120-250	120-250	120-250	80-200
Ductility at 77°F. c.m.	100+	100+	100+	100+	100+	100+*
Solubility in Carbon Tetrachloride %	99.5+	99.5+	99.5+	99.5+	99.5+	99.5+
Water %	0.2-	0.2-	0.2-	0.2-	0.2-	

* If the ductility of the distillation residue at 77°F. is less than 100, the material will be acceptable if its ductility at 60°F. is more than 100.

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2. Rapid-Curing Asphaltic Road Materials

Characteristics	RC-70	RC-250	RC-800	RC-3000
Kinematic viscosity at 140°F., cs.	70-140	250-500	800-1600	3000-6000
Flash point (open tag.), °F		80+	80+	80+
Distillation - Distillate (percent of total distillate to 680°F.)				
- to 374°F	10+			
- to 437°F	50+	35+	15+	
- to 500°F	70+	60+	45+	25+
- to 600°F	85+	80+	75+	70+
Residue from distillation to 680°F percent by volume	55+	65+	75+	80+
Tests on residue from distillation -				
Penetration, 77°F., 100g., 5 sec.	80-120	80-120	80-120	80-120
Ductility, 77°F., cms.	100+	100+	100+	100+
Solubility in Carbon Tetrachloride, %	99.5+	99.5+	99.5+	99.5+
Water, %	0.2-	0.2-	0.2-	0.2-

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3. Slow-Curing Asphaltic Road Materials

Characteristics	SC-70	SC-250	SC-800	SC-3000
Kinematic viscosity at 140°F., cs.	70-140	250-500	800-1600	3000-6000
Flash point (Cleveland Open Cup), °F.	150+	175+	200+	225+
Distillation - Total distillate to 680°F., % by volume	10-30	4-20	2-12	5-
Float test on distillation residue at 122°F., sec.	20-100	25-100	50-140	75-200
Asphalt residue of 100 penetration, %	50+	60+	70+	80+
Ductility of 100 penetration asphalt residue at 77°F., cms.	100+	100+	100+	100+
Solubility in Carbon Tetrachloride, %	99.5+	99.5+	99.5+	99.5+
Water, %	0.5-	0.5-	0.5-	0.5-

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4. Anionic Emulsified Asphaltic Road Material

Characteristics	Rapid Setting RS- 1	Rapid Setting RS- 2	Medium Setting MS- 2	Slow Setting SS- 1	Slow Setting SS-
Tests on Emulsion-					
Furol Viscosity at 77°F., sec.	20-100		100+	20-100	20-10(
Furol Viscosity at 122°F., sec.		75-400			
Residue from distillation, % by weight	57+	62+	62+	57+	57+
Settlement, 5 days, % difference	3-	3-	3-	3-	3-
Demulsibility:					
35 ml. of 0.02 N $CaCl_2$ %	60+	50+			
50 ml. of 0.10 N $CaCl_2$, %			30-		
Sieve test (retained on No. 20), %	0.10-	0.10-	0.10-	0.10-	0.10
Cement mixing test, %				2.0-	2.0-
Tests on Residue -					
Penetration, 77°F., 100 g., 5 sec.	100-200	100-200	100-200	100-200	40-9
Solubility in Carbon Tetrachloride, %	97.5+	97.5+	97.5+	97.5+	97.5
Ductility, 77°F., cms.	40+	40+	40+	40+	40+

5. Cationic Emulsified Asphaltic Road Material

Characteristics	Rapid Setting		Medium Setting		Slow Setting	
	RS-2K	RS-3K	SM-K	CM-K	SS-K	SS-Kh
Tests on Emulsion -						
Furol Viscosity at 77°F., sec.					20-100	20-100
Furol Viscosity at 122°F., sec.	20-100	100-400	50-500	50-500		
Residue from distillation:						
Residue, % by weight	60+	65+	60+	65+	57+	57+
Oil distillate, % by volume of emulsion	5-	5-	20-	12-		
Settlement, 7 days, % difference	3-	3-	3-	3-	3-	3-
Sieve Test (retained on No. 20), %	0.10-	0.10-	0.10-	0.10-	0.10-	0.10-
Aggregate coating - Water resistance test:						
Dry aggregate (job), % coated			80+	80+		
Wet aggregate (job), % coated			60+	60+		
Cement mixing test, %		pos.	pos.	pos.	2- 6.7-	2- 6.7-
Particle charge test		100-250	100-250	100-250	100-200	40-90
Coating ability and water resistance		97.0+	97.0+	97.0+	97.0+	97.0-
Storage stability test, 1 day, %		40+	40+	40+	40+	40+

STANDARD SPECIFICATIONS

SECTION 6 - CURB AND GUTTER

6.1 GRADING

1. Scope of Work

Descripti

The work shall consist of the construction of Portland Cement Concrete Curb and Gutter on a prepared base in accordance with the Drawings and Specifications, including the preparation of the sub-grade and gravel base.

2. Preparation of the Curb and Gutter Base

The Concrete Curb and Gutter shall be placed on the sub-base as provided for in Section 5.3 (8), Sub-base

Curb & Gutter Ba

3. Forms

Forms shall be of steel, plywood or surfaced lumber, and approved by the Approving Officer. They shall be equal in depth to the full depth of the curb and gutter section.

All forms shall be well staked and rigidly held to true line and grade.

Forms

At intersections or where ordered, circular forms shall be used and set to the radius shown on the plans. After the forms are set accurately to line and grade, the base shall be brought to the exact level required and well setted before placing concrete in the forms.

Curb Returns

4. Aggregates for Concrete

Aggregates for concrete must be clean, sound, well graded and must be proportioned as directed by the Approving Officer. Coarse and fine aggregates must be measured separately and the use of pit run aggregate will not be permitted. The maximum size of coarse aggregate for use in concrete curb and gutter shall be one and one-half inches (1-1/2).

Concrete Aggregate

CURB AND GUTTER (cont'd)

5. Portland Cement

Cement

Portland Cement shall conform to the Standard Specifications for Portland Cement No. A5-1961 of the Canadian Standards Association or the latest revision thereof.

6. Concrete

Concrete

Concrete shall be proportioned to secure a minimum compressive strength at 28 days of 3,000 lbs. per sq. inch. Concrete shall contain from three (3) to six (6) percent of entrained air by volume at the time of deposit in the forms and the slump shall be between 1-1/2 inches and 3 inches. Unless otherwise specified, concrete shall be in accordance with C.S.A. Standard A23.1 or the latest revision thereof.

7. Mixing Concrete

Mixing

Concrete shall be thoroughly mixed in a batch mixer of approved capacity and type which will ensure a uniform distribution of all materials throughout the mass.

All concrete shall be mixed for a period of not less than 1-1/2 minutes after all the materials are in the drum.

The use of ready mix concrete for this work is permitted but if used must conform to C.S.A. A23.1 or the latest revision thereof.

8. Placing Concrete

Placing Concrete

Concrete curb and gutter shall be placed in one course, to line and grade as staked on the ground and to the full cross-section as shown on the drawings. The concrete shall be spread upon the prepared base, thoroughly tamped, rodded and screeded flush with the top of the forms.

Finish

After the concrete is in place, it shall be floated with wooden floats, trowelled and finished in a workmanlike manner with the proper edging to conform to the drawings.

Edging

Edging and jointing tools shall be of approved design to ensure the specified radii.

CURB AND GUTTER (cont'd)

9. Expansion Joints and Crack Control

At all curb returns and at such other points as may be directed by the Approving Officer, expansion joints shall be formed by placing approved pre-cast expansion joint materials, one-half (1/2) inch in thickness for the full width and depth of the section. Expansion joints shall be required at each end of the drop curbs and where the work abuts existing buildings or other structures including existing sidewalks. Proper care shall be used to keep the expansion joint straight and at right angles to the line or the curb and gutter and completely through the full curb and gutter section. Crack control lines (contraction joints) shall be provided by cutting grooves one inch in depth at 10 foot intervals between the expansion joints.

Expansion Joints

10. Crossings and Driveways

Drop crubs, where applicable, shall be constructed at all private and public vehicle crossings and as directed by the Approving Officer.

Crossings

11. Curing

Concrete curb and gutter shall be cured by means of the application of an approved type of membrane curing compound, applied in accordance with the manufacturer's recommendation. After the face form is stripped, curing compound shall be applied to the exposed curb face.

Curing

12. Protection

The Contractor shall erect and maintain suitable barriers to protect the curb and gutter from traffic, and any portion of the work damaged before final acceptance shall be replaced or repaired.

Protectic

13. Clean-Up

The roadway adjacent to the line of the work shall be kept in a clean and presentable condition by the Contractor at all times. Upon completion of the work, all surplus concrete, lumber, trash or debris shall be removed by the Contractor.

Clean-up

CURB AND GUTTER (cont'd)

14. Catch Basins

Catch Basins

Catch basins shall be installed at curb returns where required.

Location of additional catch basin requirements shall be approved by the Approving Officer.

6.3 BOULEVARD GRADING

Boulevards from the back of curb and gutter to the property line shall be filled with good quality soil, well consolidated by rolling and graded off to a slope of 1/4 inch to one foot. The remainder of the area shall be well consolidated by rolling, and graded with an even slope, to the property line. Boulevard Grading

A minimum of three inches of topsoil, shall be placed on the boulevard, and graded or raked to conform to the top of the curb and gutter. All roots, sticks and rocks shall be removed from the topsoil and disposed of off the site, at a place acceptable to the Approving Officer. Topsoil

6.4 STANDARDS

The standard road width from curb to curb shall be as follows:

Subdivision streets -	30 ft.
Minor arterial roads -	40 ft.
Major arterial roads -	44 ft.

or any other greater width as required by the Approving Officer. Standards

The Contractor shall be responsible for all of the costs of the construction of the streets. Additional costs for a higher standard of street shall be borne by the District.

6.3 1/1
6.4 1/1

STANDARD SPECIFICATIONS

SECTION 7 - PROPERTY DRAINAGE STANDARDS

7.1

1. Flooding

Where the whole or any portion of the lands being subdivided are wet, or subject to intermittent or periodic flooding, the Contractor shall drain the land, or otherwise remedy such wet or flooding conditions to the satisfaction of the Approving Officer.

2. Water Course

No Contractor shall interfere with the storm water flow of natural water courses within a subdivision, provided however, where the water course crosses a proposed new highway, the Contractor shall make adequate provisions to permit the flow of water to cross the said highway without diversion of the water courses. Such provision shall be made by the use of culverts to the satisfaction of the Approving Officer.

3. Alterations

The Contractor may make minor alterations to water-courses within the subdivision, but all such alterations must have prior approval of the Approving Officer.

4. Storm Sewers

The Contractor shall be required to install storm sewers and provide easements for same where it is not possible to hook up perimeter drains and roof drains to houses because of topography.

STANDARD SPECIFICATIONS

SECTION 8 - UNDERGROUND UTILITIES

8.1 PIPE LAYING, TESTING & DISINFECTION

1. General

A complete set of construction drawings shall be included with the Application for Subdivision or Contract Documents. These drawings shall show proposed grades, cover over the pipe, and the invert elevations of all manholes. In the case of water mains, details of valve installations, hydrants, cock boxes, pipe sizes, pipe material, etc., and in both cases the true line and location of all installations including service lines to the property boundaries, all easements and such other details as may be required, at a scale of 200 feet to 1 inch. General

Sewer installations and water mains shall be constructed where shown on the approved plans and in accordance with the drawings and specifications covering the various types. The trench and other preparatory work shall be approved by the Approving Officer or his representative before actual placing starts and before backfilling.

All sewer pipe, water pipe, hydrants, valves and other fittings to be furnished for this work shall be of first quality, sound, true in form and free from defects of all kinds.

2. Scope of the Work

This specification will cover the installation of sanitary sewer, storm sewer, water mains and all service connections, catch basin connections, valves, hydrants and all other appurtenances associated with the installation of the above. Scope

3. Trenching

A trench shall be excavated to the depth and grade as shown on the plans. In no case will the depth be less than 3 feet from the final road grade to the top of the pipe.

UNDERGROUND UTILITIES (cont'd)

3. Trenching (cont'd)

Trenching

Trenches shall be excavated 4 inches below the grade of the bottom of the barrel of the asbestos cement pipe and 3 inches below the grade of the bottom of the concrete sewer pipe to allow for proper bedding and to a sufficient width to enable the pipes to be properly laid, jointed and inspected and the bottom width of the trench shall be of at least 1 foot 9 inches greater than the internal diameter of the pipe involved.

Where rock, in either ledge or boulder formation occurs in the bottom of the trench, the rock shall be excavated below grade and backfilled between the rock and all portions of the pipe.

4. Bedding and Laying of Pipes

Bedding

Sewer Pipe - Prior to lowering pipes into the trench, all pipes and fittings shall be inspected for defects and any damaged or unsound pipe shall be replaced at the Contractor's expense. Coupling holes shall be dug, of sufficient size and depth to allow the assembly of the couplings and prevent the coupling from resting on the bottom of the coupling hole. The pipes will be laid in correct alignment and to the correct grade on two mounds of earth each placed one-fifth of the pipe length from each end. Approved backfilling material will then be carefully placed under the full length of the pipe to ensure adequate support for the pipe, during the backfilling operation.

5. Laying & Jointing Concrete Pipes & Vitrified Clay Pipes

Pipe Laying

a. Pipe laying shall begin at the lower end of the sewer with the bell or groove end of the first pipe section upgrade. Where the bell and spigot pipes are used, bell holes shall be dug in the pipe subgrade to accommodate the bells.

Jointing & Cleaning

b. When jointing concrete and vitrified clay pipes, the trench shall be in a dry condition and the joints shall be cleaned and wetted before sealing with mortar. The mortar shall consist of one part of Portland Cement to two parts of fine sand, mixed to the proper consistency. Sealing shall be neatly and thoroughly done and the interior of the pipe cleaned of all surplus mortar. Joints shall be kept damp with burlap or earth for at least three days after sealing.

6. Laying and Jointing Asbestos Cement Pipes

Machined ends of pipes and the insides of sleeves, and all rubber rings shall be wiped clean immediately before the pipes are jointed. The coupling shall be assembled with a proper tool as recommended by the manufacturer. The pipe ends shall be separated at lease 1/4" to allow for expansion on completion of the jointing operation. No joints shall be laid in open trench in water or on frozen trench bottom, and no pipes shall be deflected either vertically or horizontally in excess of the amount recommended by the manufacturer of the coupling.

A.C. Pipe

7. Laying & Jointing Cast-Iron Pipes

a. Pipe laying shall be in accordance with the bedding and other requirements previously outlined. With bell and spigot pipes, bell holes shall be dug in the sub-grade to accommodate the bells.

Cast Iror Pipes

b. Where poured joints are used, they shall be made in a workmanlike manner using pig lead and yarn and in accordance with the manufacturer's specifications.

c. Cast-Iron pipes may also be jointed by an approved self adjusting rubber ring type of joint used in conformance with the manufacturer's specifications.

8. Concrete

All concrete and reinforced concrete used on the works shall conform to the C.S.A. Standard Specification for Concrete and Reinforced Concrete No. A23 as currently in force.

Concrete

9. Formwork

The Contractor shall be responsible for the provision, design, erection and removal of formwork. All formwork shall be inspected and approved by the Approving Officer or his representative before concrete is placed within it. Forms shall be removed in such a manner as will not injure the concrete and no formwork shall be removed before the concrete has sufficiently set and hardened.

Formwork

UNDERGROUND UTILITIES (cont'd)

10. Service Connections

Wyes or Tees

Wyes or tees shall be provided on the mains of such size and material as is shown on the drawings and shall be installed where shown on the plan. If the house connection is not to be made immediately, the end of the pipe shall be closed with an approved stopper and sealed to form a watertight closure. The end of the pipe shall be marked with a 2" x 4" stake, 8 feet long, marked with green paint for storm connections and red paint for sanitary connections. The extension shall be installed to the property line for future connection, and shall be properly stopped to form a watertight closure, and the location shall be marked as stated.

Water services shall be provided as shown in the standard drawings to the centre of each lot, and the curb stop shall be staked by a 2" x 4" stake, 8 feet long marked with blue paint.

11. Manholes

Manholes

Manholes shall be constructed in accordance with the standard specifications and drawings and in the position shown on the plans and shall be of the in-situ concrete type or precast and shall be completed concurrently with their adjoining lengths of pipe lines.

12. Testing

Testing

All sewers, manholes, pressure pipes, water mains, fittings, hydrant assemblies and service connections shall be tested as specified hereunder.

Initial Air Test

Gravity sewers, pressure mains, sewer service connections, water mains, complete with line fittings, line valves and hydrant assemblies shall be air tested on the installed and bedded pipe, before backfilling. The system to be tested shall be filled with compressed air to a pressure of 4 inches water gauge. A pressure drop of 1 inch or less in five minutes will constitute an approved quality of installation, suitable for completion of backfilling.

12. Testing (cont'd)

All gravity sewers, service connections and fittings shall be subjected to a formal acceptance test on completion of backfilling operations. This test shall also be made with compressed air to 4 inches water gauge. A pressure loss of 1 inch or less in five minutes will constitute an acceptance test unless visual inspection shows that an infiltration test is required. The maximum allowable infiltration shall be at the rate of 100 Imperial gallons per inch of pipe diameter, per mile of pipe per 24 hours.

Infiltra Rate

Notwithstanding that the infiltration in a particular test section falls below the maximum permissible, if it is evident that all or most of the infiltration is occurring at one or more localized areas, the Contractor shall be required to effect repairs, in an approved manner, to the infiltrating areas.

Manholes Chambers

All manholes and chambers for air valves, meters and other appurtenances shall be tested for water tightness by filling the structure with water to 6 feet above the invert of the pipe (or to 6 inches below the ground level, if the pipe invert is less than 6 feet). No measurable drop in one hour will constitute an acceptance test.

All pressure mains, connections, fittings and appurtenances shall be subjected to an acceptable water test on completion of backfilling. This test shall be made at a pressure 50% above normal operating pressure for 30 minutes, with the maximum allowable loss calculated in accordance with the formula:

Loss in gallons (imperial) per hour = $\frac{ND\sqrt{P}}{4,800}$ where:

Permissi Pressure Loss

N = number of pipe joints in length tested
D = inside diameter of pipe in inches
P = average pressure during test (p.s.i.)

During the 30 minutes pressure test the test pressure shall be maintained with 10 p.s.i. of the designated test pressure.

12. Testing (cont'd)

Pressure piping systems in such assemblies as pump-houses and valve chambers shall be subjected to the same pressure testing procedures as the main water lines.

Should any test section disclose a leakage in excess of the rates specified above for each type of test, the Contract shall locate and repair or replace defective joints, pipes, fittings, or other items, until the test requirements are met. The method of effecting any particular repair and the completion of the repair shall be strictly to the approval of the Approving Officer.

Costs Included

The testing procedure shall be considered to be a normal part of the pipe laying or other installation work, and the Contractor shall furnish all necessary labour, air, water, materials and appliances, necessary to carry out the tests and repairs.

Mechanical Testing

Mechanical testing, adjustment of controls, and start-up procedures of pumps, control systems or other mechanical devices are not within the scope of this section, and shall be as specified elsewhere by the Approving Officer.

13. Fire Hydrants

Fire Hydrants

Hydrants shall be tied to the main with W.I. rods and shall be set on a drainage bed of broken rock and/or coarse gravel.

14. Cleaning and Disinfection of Completed Water Main

Cleaning & Disinfection

Before being brought into service, and before certification of completion, all new water mains shall be disinfected in accordance with the requirements of A.W.W.A. C601-54.

15. Reaction or Thrust Backing

Thrust Backing

Reaction or thrust backing shall be placed at bends and tees as shown on the drawings to the sizes and shapes called for. The concrete shall be placed between the fittings to be supported and solid ground, with an adequate area of concrete in contact with both the ground and the fitting. The placing of the concrete shall not interfere with the accessibility of joints for repair work.

UNDERGROUND UTILITIES (cont'd)

16. Backfilling Trenches

(a) Trenches shall be refilled with approved excavated materials, but not before the pipe work has been approved, measured, and tested. The first layers of approved filling material shall be free from large lumps and stones and shall not be thrown directly on to the pipes but shall be placed and packed by hand in 6 inch layers to at least 6 inches above the top of the pipe. — Backfilling

(b) All filling more than 6 inches above the top of the pipe shall be deposited and compacted in layers not exceeding 9 inches in depth and, where necessary, the moisture content shall be adjusted to facilitate compaction. Compaction will be by hand tamping to a point at least 3 feet above the top of the barrel of the pipe. Consolidation may be assisted by flooding of the trench only with written approval and this will not be forthcoming where steep gradients are involved. — Filling

(c) Where excavation is on an existing roadway, the backfill must be entirely of tamped gravel and any pavement removed in the excavation must be restored.

17. Pipes

(a) Concrete pipes and specials shall be plain concrete Packerhead pipe and shall conform to the A.S.T.M. Specification C14-57. — Concrete Pipes

(b) Asbestos Cement pressure pipes shall conform to A.W.W.A. Specifications for asbestos cement water pipe. — A.C. Pipe (water)

(c) Asbestos Cement building sewer pipes intended for use as connections to storm sewer shall be subject to the approval of the Approving Officer. — A.C. Sewer Pipe

(d) Cast-iron pipes shall be centrifugally cast and shall conform to A.W.W.A. Specification C106-53. — Cast Iron

(e) Vitrified Clay Pipe shall conform to C.S.A. Specification A60-1953. — Vitrified Clay

UNDERGROUND UTILITIES (cont'd)

18. Specials

Fittings

(a) Fittings shall conform to A.W.W.A. Specifications and must be of a type and material approved by the Approving Officer before installation.

Valves

(b) Valves shall be standard, iron body, bronze mounted wedge gate type, N.R.S., with 1-1/4" square operating nut, provided with a heavy duty hinged cast iron valve box, set on new concrete blocks to grade.

Hydrants

(c) All hydrants shall be Terminal City Iron Works type No. P20 or approved equal.

Hydrants shall be of the post type with two 2-1/2" hose outlets and in the case of type No. 1 a 4-1/2" steamer outlet locked and leaded or screwed in place. Each outlet shall be safeguarded against blowing out, turning or backing out.

The main operating stem, hose and steamer outlet threads shall be manufactured to the British Columbia Fire Hose Thread Specifications.

All working parts shall be arranged so that they may be removed without disturbing the barrel or base of the hydrant and without excavation. The main operating stem shall be non-rising.

The hydrant 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 300 pounds per square inch, and the pressure test shall be certified by the manufacturer.

19. Metal Protection

Metal Protection

All metal work which is to be buried underground or underwater shall be protected inside and outside, with one coat each of Coal Tar Primer and Coal Tar Enamel prior to placement, all in accordance with A.W.W.A. C203-57, or an approved epoxy resin.

UNDERGROUND UTILITIES (cont'd)

20. "As Built" Drawings

A complete set of "As Built" drawings showing any revisions of or departure from the Construction Drawings shall be deposited with the Approving Officer before the final approval shall be given to the work.

"As Built" Drawings

21. Termination of Mains

All underground utilities shall be extended to the limit of the subdivision or contract work. The termination of the mains shall be marked with a painted 4 x 4 post at the end of the main and extending three feet above the ground with the words "water main", "sanitary sewer main" or "storm sewer" as the case may be.

Terminatio of Mains

8.2 MANHOLES AND CATCH BASINS

1. General

The purpose of this specification is to provide for the construction of either precast or cast, in place basins and manholes. The structure will conform to the standard drawings and will be located in line and grade and connected as shown on the construction drawings in the application for subdivision. General

2. Scope of the Work

The work shall include construction and placing of the catch basins and manholes complete with frames and gratings and frames and covers together with the necessary connections. Scope

3. Forms

Forms shall be of surfaced lumber or plywood free from warp.

All forms shall be well staked and rigidly held to true line and elevation and in the required location. Forms

4. Aggregates for Concrete

Coarse and fine aggregates for concrete must be well graded and must be measured separately and the use of pit run aggregate will not be permitted. The maximum size of coarse aggregate for use in concrete catch basins and manholes shall be one and one-half (1-1/2) inches. Aggregate

5. Portland Cement

Portland Cement shall conform to the Standard Specifications for Portland Cement No. A5-1951 of the Canadian Standard Association or subsequent revisions thereof. Portland Cement

6. Concrete

An 87-1/2 lb. sack of cement shall be considered as the equivalent of 0.93 cu.ft. and all volume proportioning of fine and coarse aggregate shall be calculated on this basis. Wherever possible, weight proportioning shall be used. Concrete

MANHOLES AND CATCH BASINS (cont'd)

6. Concrete (cont'd)

Concrete shall be proportioned to secure a minimum compressive strength at 28 days of 3000 lbs. per square inch. Concrete shall contain from three (3) to six (6) per cent of entrained air by volume at the time of deposit in the forms and the slump shall be between 1-1/2 inches and 3 inches.

7. Mixing Concrete

Mixing Concrete

Concrete shall be thoroughly mixed in a catch basin mixer of approved capacity and type which will ensure uniform distribution of all materials throughout the mass.

All concrete shall be mixed for a period not less than 1-1/2 minutes after all materials are in the drum.

The use of ready mix concrete is permitted but if used, must conform to A.S.T.M. C94-61 Specification and subsequent revisions thereof.

8. Placing Concrete

Placing Concrete

Concrete shall be placed in one continuous pour for any one catch basin or manhole.

After the concrete is in place, it shall be floated with wooden floats, trowelled and finished.

9. Curing

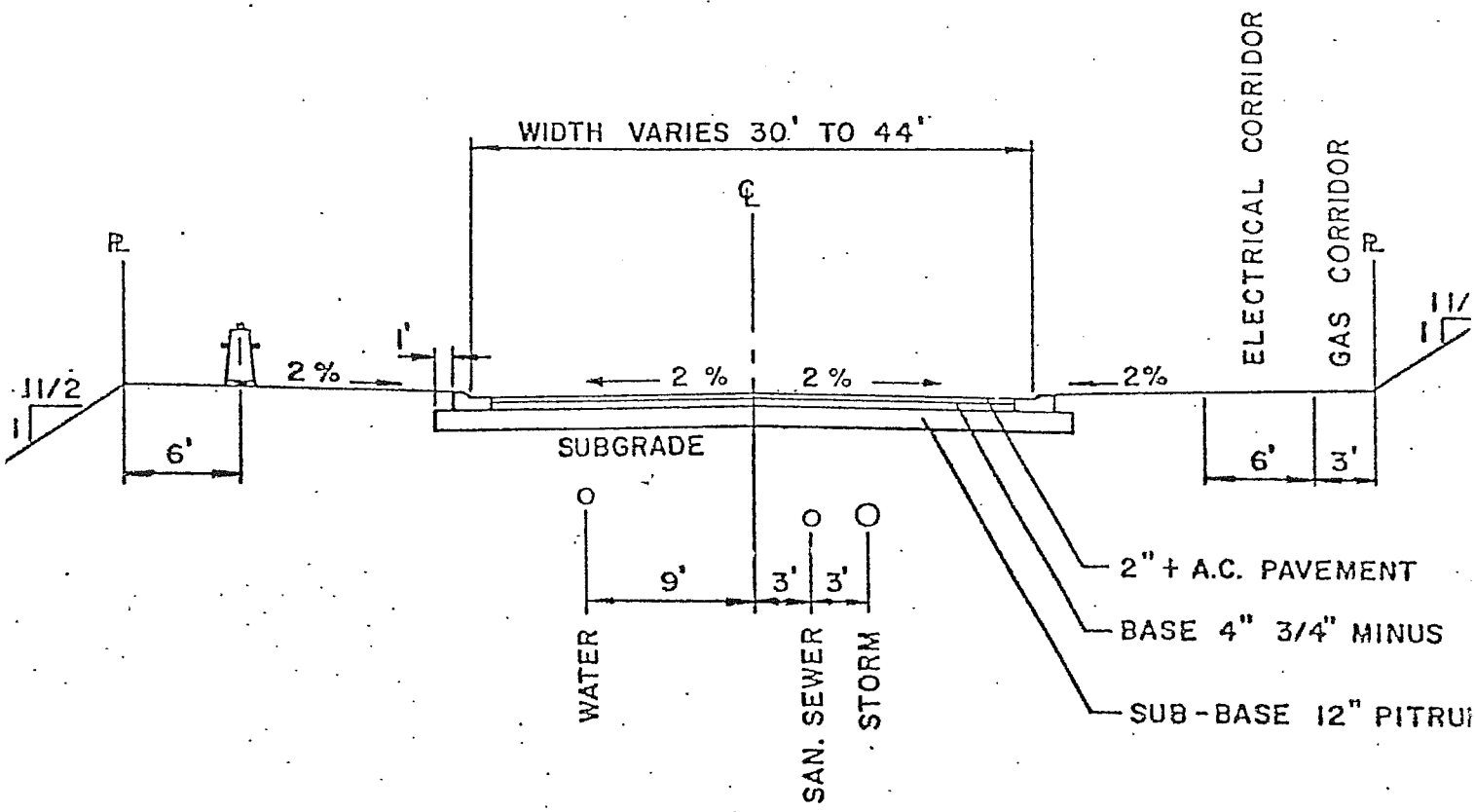
Curing

Concrete shall be cured by means of the application of an approved type of membrane curing compound, applied in accordance with the manufacturer's recommendation.

10. Clean-Up

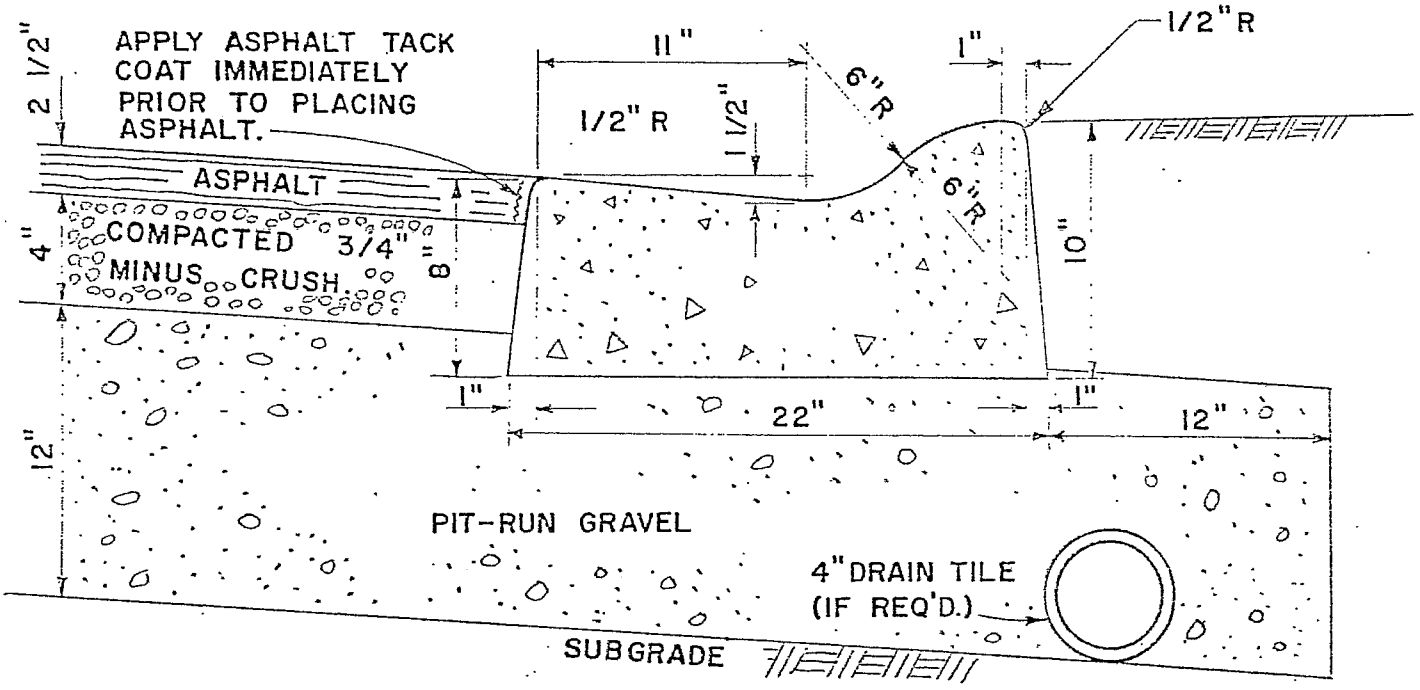
Clean-Up

Upon completion of the work, all surplus concrete, lumber, trash or debris shall be removed by the owner immediately and the finished structure shall be protected until the final frame and grating or cover is installed.

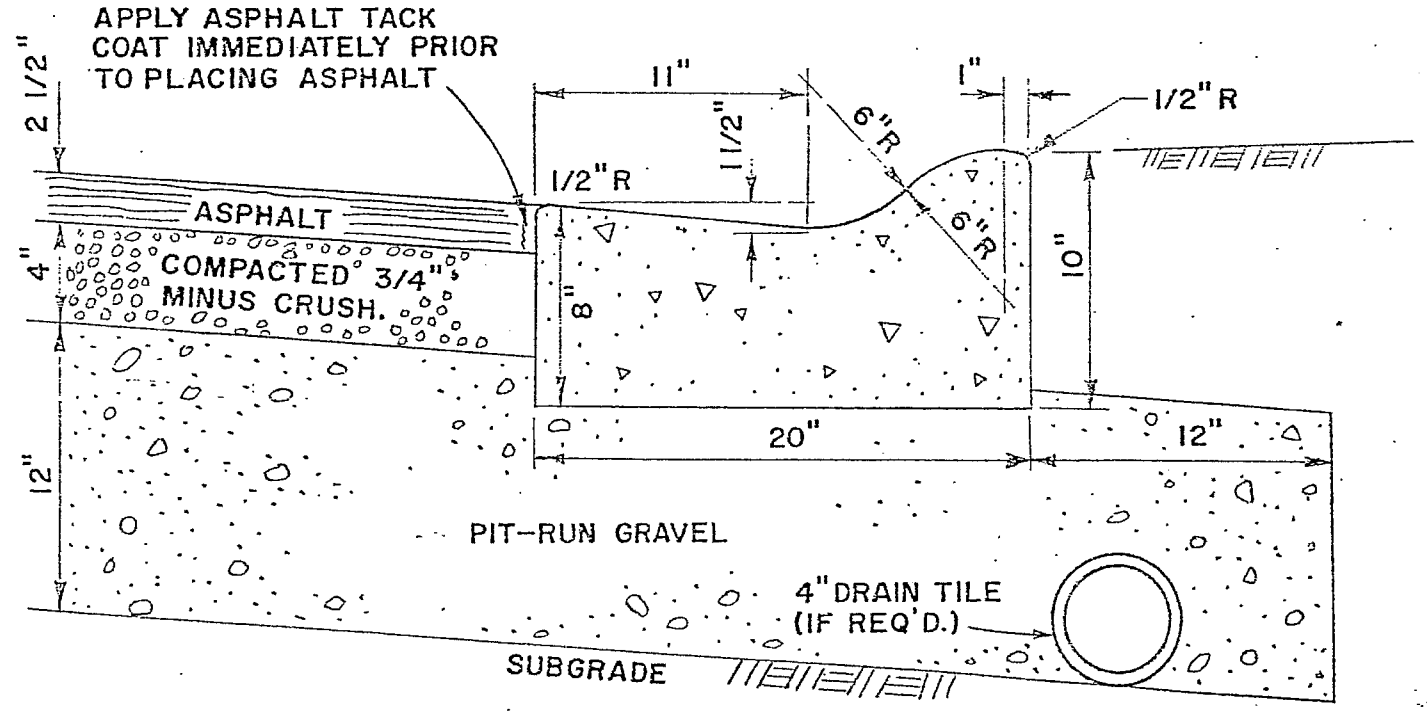


TYPICAL STREET SECTION N.T.S.

				THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS	DSN:	DRW:	DWG. No.
					CHKD:	APVD:	R1
					SCALE:		
DATE	REVISION	NO.	BY.		DATE:	REV.	79

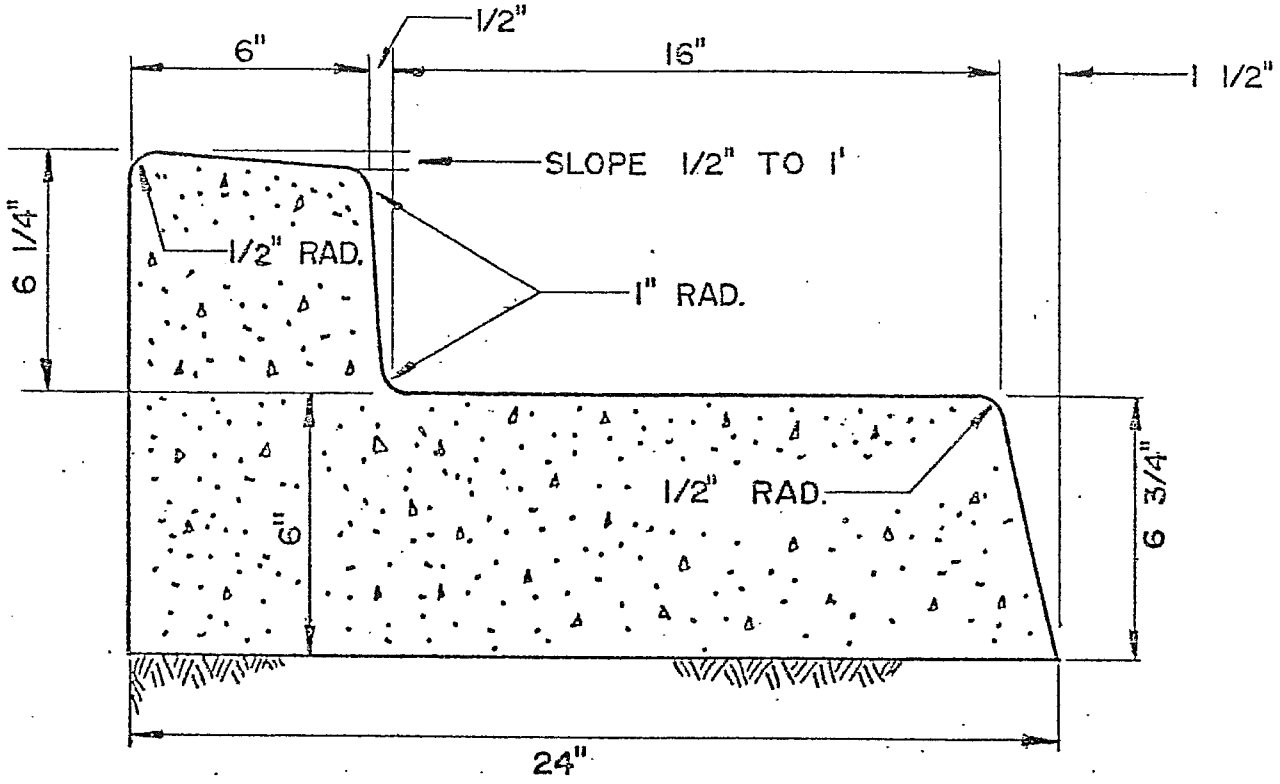


TYPE A EXTRUDED CURB N.T.S.



TYPE B HAND FORMED CURB N.T.S.

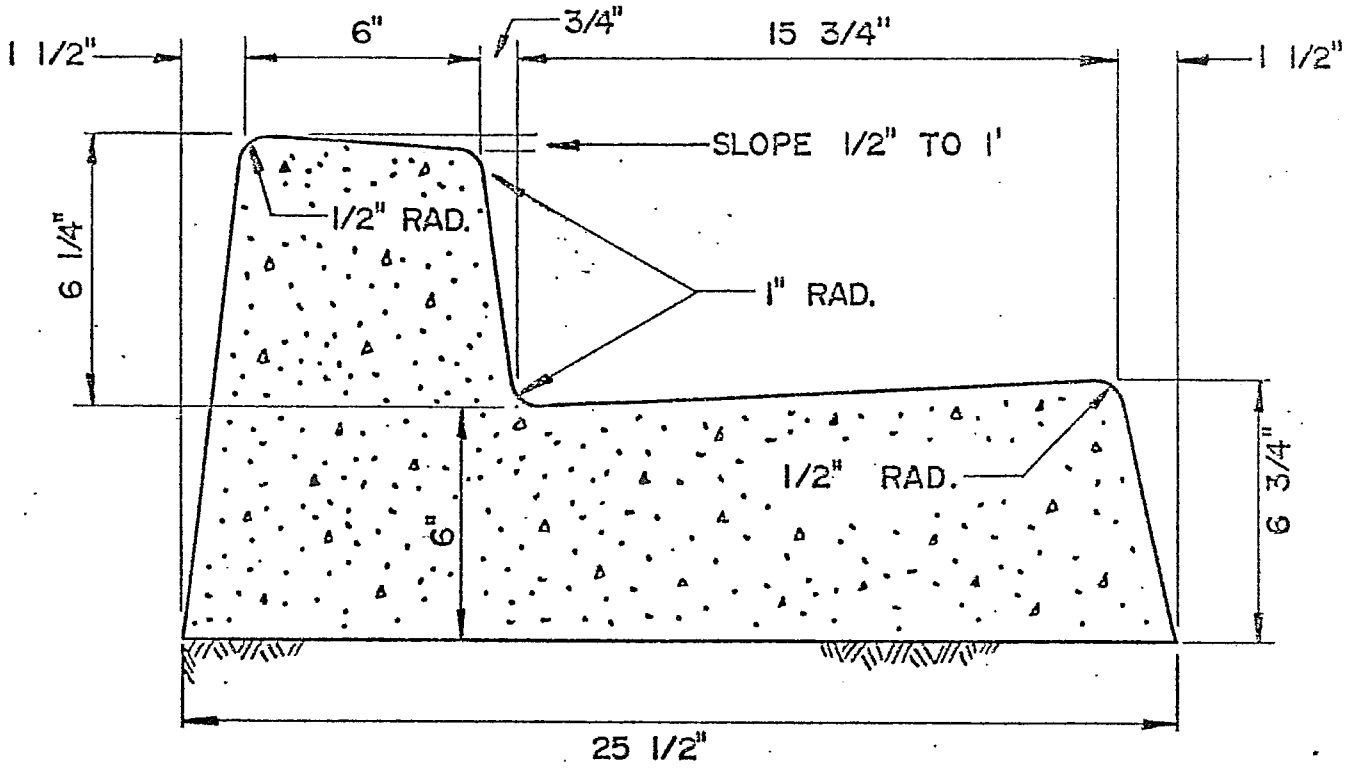
				THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS	DSN:	DRW:	DWG. No.
					CHKD:	APVD:	R 2
					SCALE:		
DATE	REVISION	NO.	BY.		DATE:		REV.



HAND FORMED CURB

RESIDENTIAL CURB & GUTTER N.T.S.

				THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS	DSN:	DRW:	DWG. No.
					CHKD:	APVD:	R3
					SCALE:		
DATE	REVISION	NO.	BY.		DATE:		REV. 81



EXTRUDED CURB

RESIDENTIAL CURB & GUTTER N.T.S.

				THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS	DSN:	DRW:	DWG. No.
					CHKD:	APVD:	R 4
					SCALE:		
DATE	REVISION	NO.	BY.		DATE:	REV.	

THRUST AT 100 p.s.i. WATER PRESSURE

TABLE NO. 1

SIZE OF PIPE	TEES	BENDS		
		90°	45°	22 1/2°
4"	1,850	2,610	1,420	720
6"	3,800	5,370	2,910	1,470
8"	6,580	9,300	5,040	2,550
10"	10,750	15,200	8,240	4,170
12"	15,310	21,640	11,720	5,940

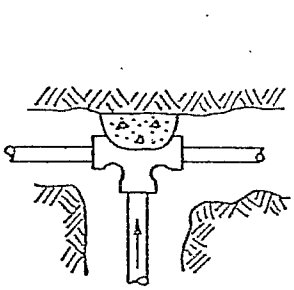
SAFE BEARING LOAD OF SOIL

TABLE NO. 2

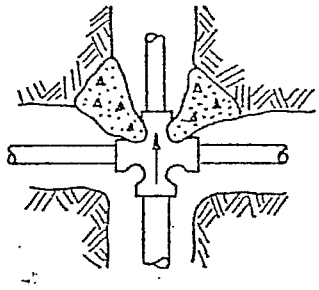
SOIL TYPE	LOAD LBS. PER SQ. FT.
MUCK PEAT ETC.	0
SOFT CLAY	500
SAND	1000
SAND & GRAVEL	1500
SAND & GRAVEL WITH CLAY	2000
SHALE	5000

IF TEST PRESSURE IS 150 p.s.i THEN ALL FIG. IN TABLE NO. 1 ARE MULT. BY 1.5

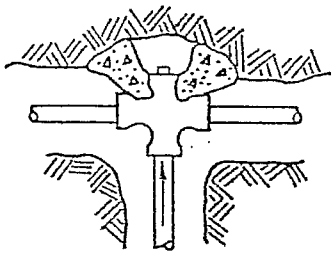
IF TEST PRESSURE IS 200 p.s.i THEN ALL FIG. IN TABLE NO. 1 ARE MULT. BY 2.0



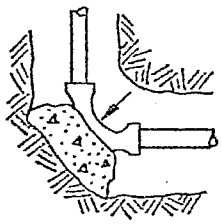
TEE



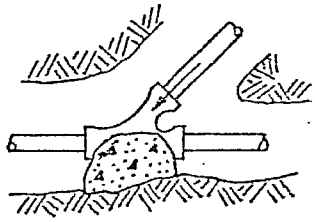
REDUCING CROSS



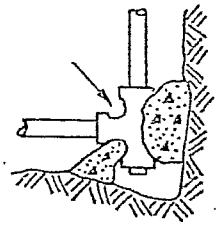
PLUGGED CROSS



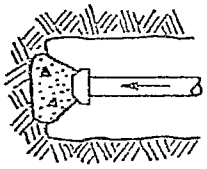
BEND



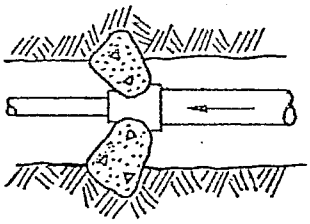
WYE



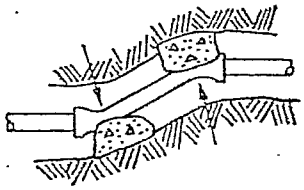
PLUGGED TEE



CAP



REDUCER



OFFSET

NOTE

- ALL THRUST BLOCKS TO EXTEND TO SOLID BEARING.
- ALL LOCATION AND AREA OF BLOCKS TO BE TO THE APPROVAL OF THE ENGINEER.
- CONCRETE TO BE IN ACCORDANCE WITH C.S.A. A-23 AS CURRENTLY IN FORCE.

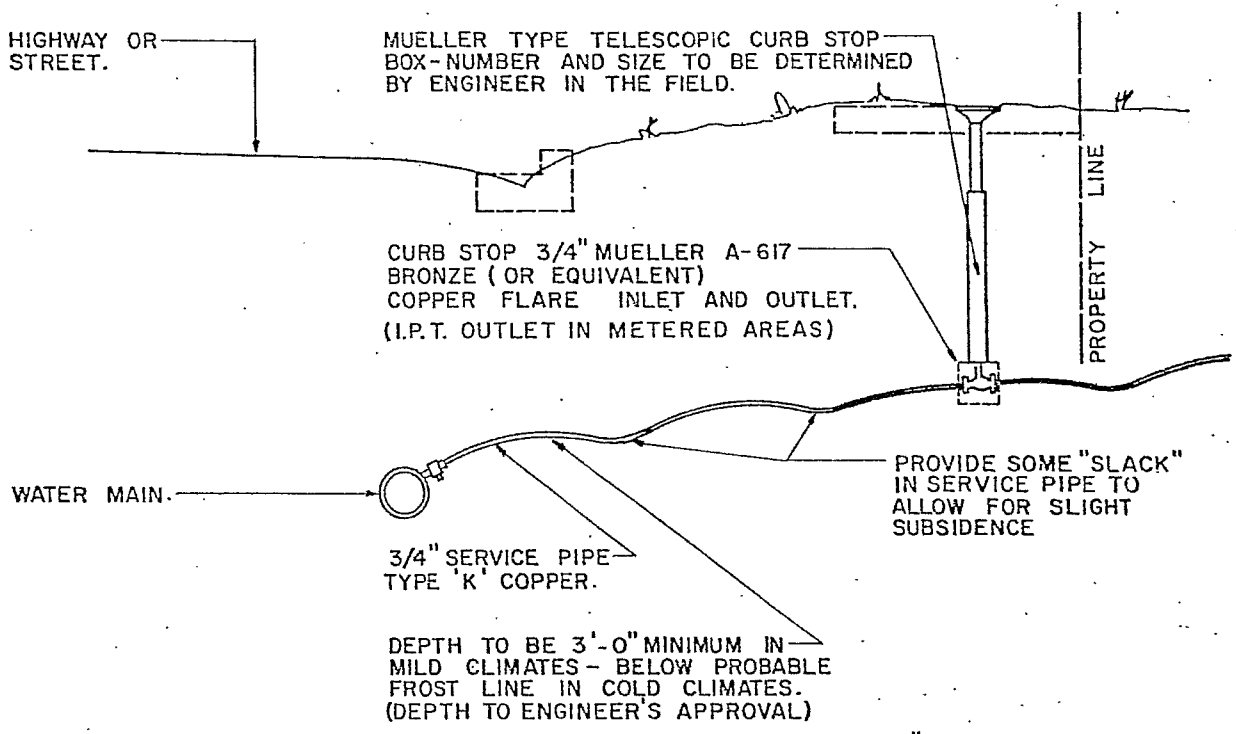
(2000 P.S.I. AT 28 DAYS)

THRUST REACTION BLOCKS N.T.S.

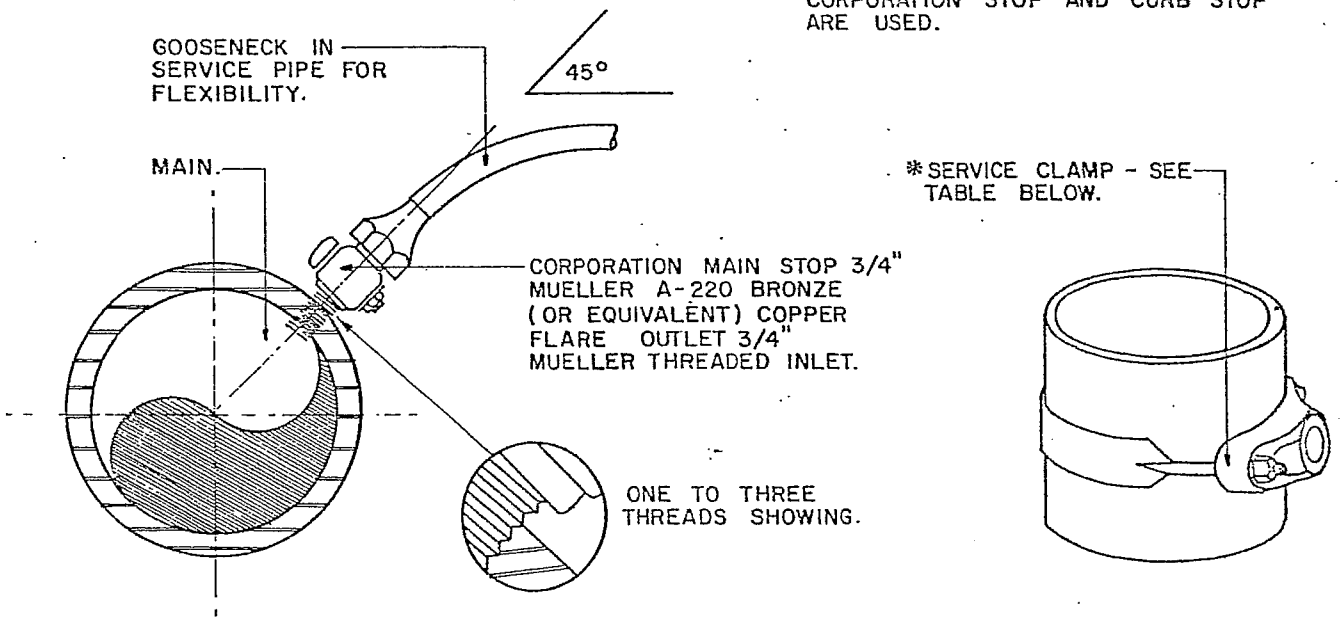
DATE	REVISION	NO.	BY.

THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

DSN:	DRW:	DWG. No.
CHKD:	APVD:	W1
SCALE:		
DATE:		REV. 83



NOTE: FOR SINGLE 1" SERVICES, DETAILS ARE SIMILAR EXCEPT THAT 1" PIPE, CORPORATION STOP AND CURB STOP ARE USED.



LARGEST SERVICE CONNECTIONS FOR CLASS 150 A.C. PIPE			
DIAMETER	DIRECT TAPPING	*WITH SINGLE STRAP	WITH DOUBLE STRAP*
4"	3/4"	3/4"	1"
6"	3/4"	1"	1 1/2"
8" AND ABOVE	1"	2"	2"
NOTE: MUELLER OR OTHER APPROVED CLAMP TO BE USED.			

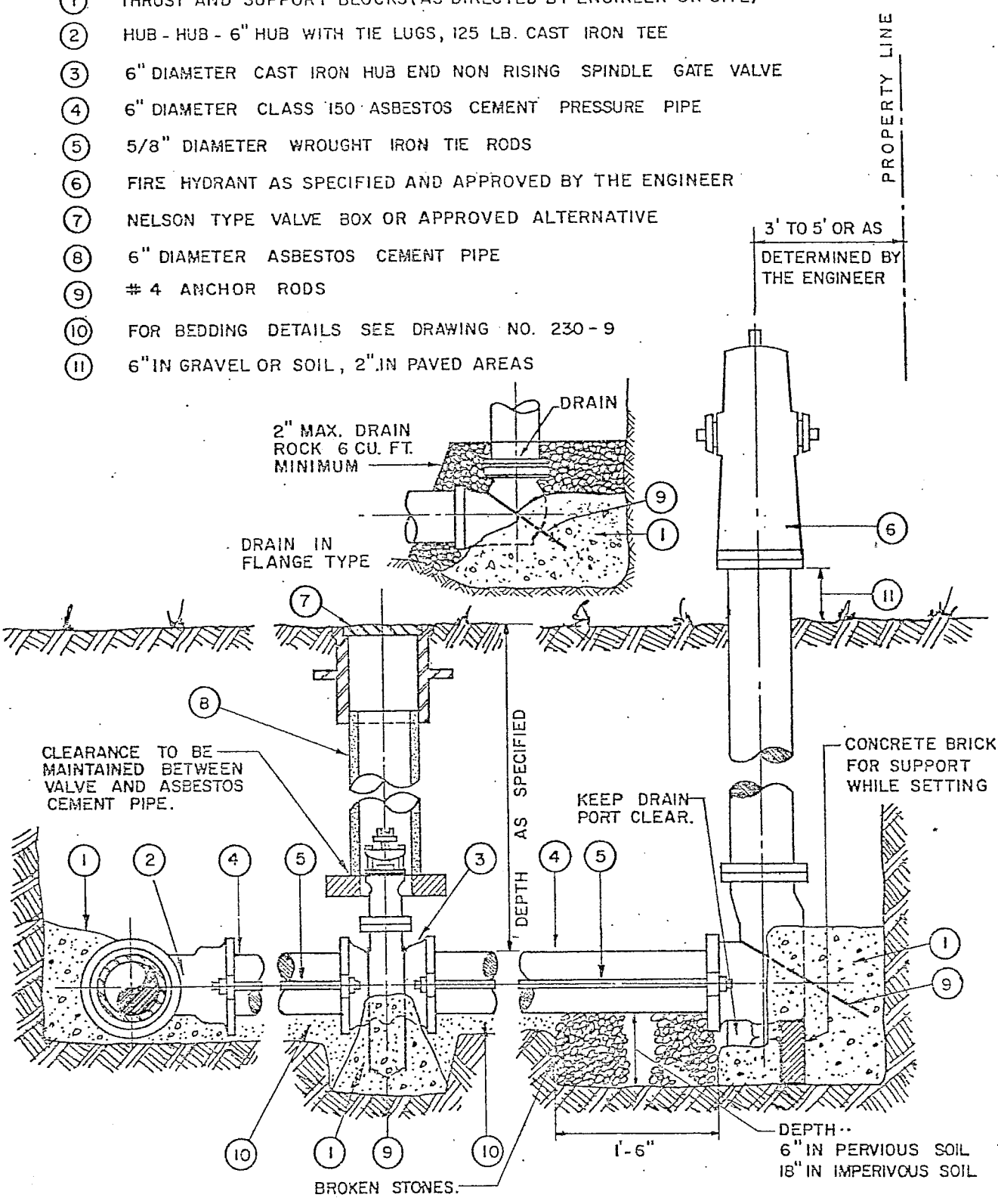
WATER SERVICE CONNECTION - COPPER PIPE N.T.S.

DATE	REVISION	NO.	BY.

THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

DSN:	DRW:	DWG. No.
CHKD:	APVD:	W 2
SCALE:		
DATE:		REV.

1. THRUST AND SUPPORT BLOCKS (AS DIRECTED BY ENGINEER ON SITE)
2. HUB - HUB - 6" HUB WITH TIE LUGS, 125 LB. CAST IRON TEE
3. 6" DIAMETER CAST IRON HUB END NON RISING SPINDLE GATE VALVE
4. 6" DIAMETER CLASS 150 ASBESTOS CEMENT PRESSURE PIPE
5. 5/8" DIAMETER WROUGHT IRON TIE RODS
6. FIRE HYDRANT AS SPECIFIED AND APPROVED BY THE ENGINEER
7. NELSON TYPE VALVE BOX OR APPROVED ALTERNATIVE
8. 6" DIAMETER ASBESTOS CEMENT PIPE
9. # 4 ANCHOR RODS
10. FOR BEDDING DETAILS SEE DRAWING NO. 230 - 9
11. 6" IN GRAVEL OR SOIL, 2" IN PAVED AREAS



FIRE HYDRANT (ASSEMBLY 'A') N.T.S.

DATE	REVISION	NO.	BY.

THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

DSN:	DRW:	DWG. No.
CHKD:	APVD:	W 3A
SCALE:		
DATE:		REV. 85

(1) THRUST AND SUPPORT BLOCKS (AS DIRECTED BY ENGINEER ON SITE)

(2) HUB - HUB 6" FLANGE, 125 LB. CAST IRON TEE

(3) 6"Ø CAST IRON HUB - FLANGE NON-RISING SPINDLE GATE VALVE

(4) 6"Ø CLASS 150 ASBESTOS CEMENT PRESSURE PIPE

(5) 5/8"Ø WROUGHT IRON TIE RODS

(6) FIRE HYDRANT AS SPECIFIED AND APPROVED BY THE ENGINEER

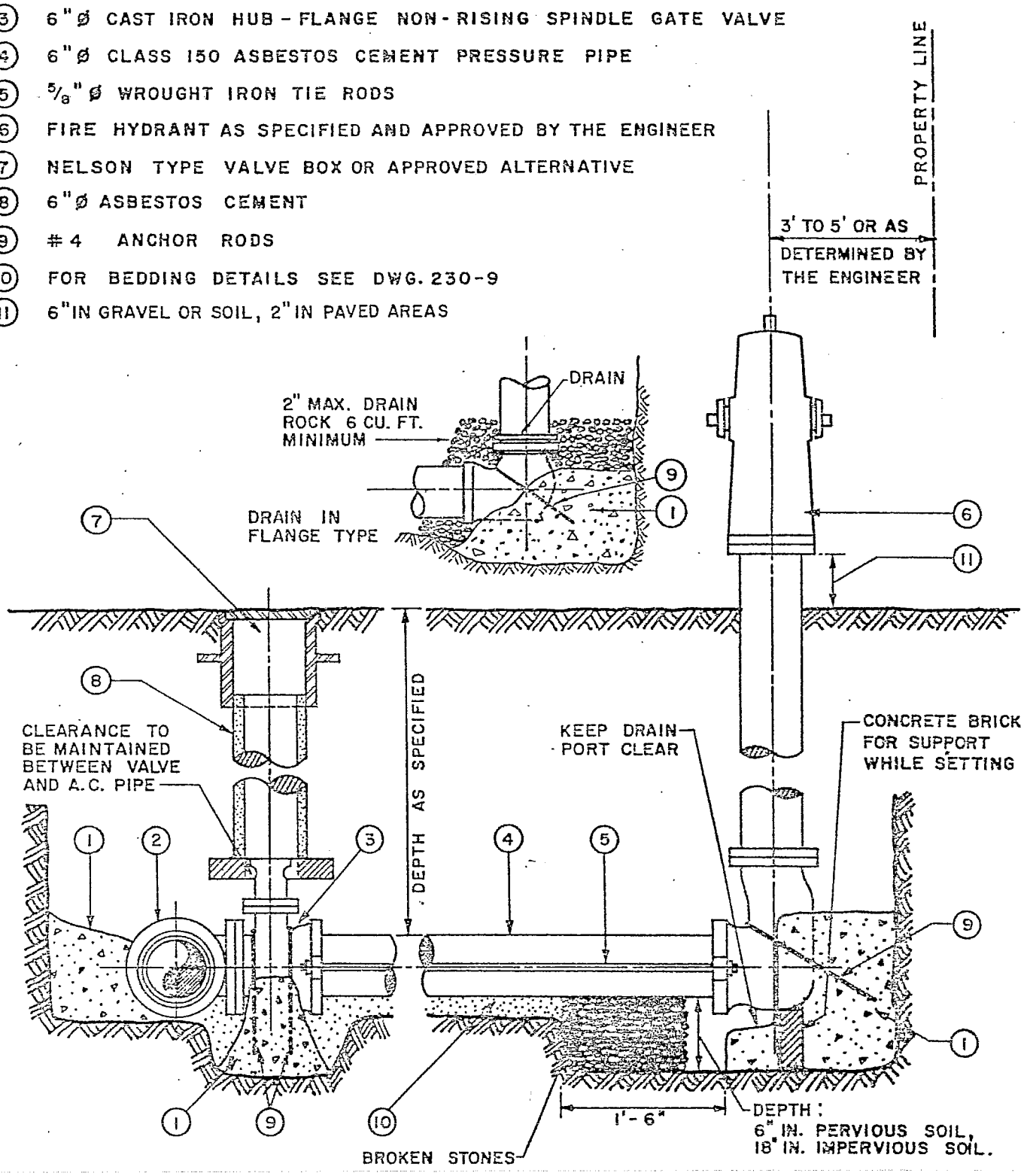
(7) NELSON TYPE VALVE BOX OR APPROVED ALTERNATIVE

(8) 6"Ø ASBESTOS CEMENT

(9) #4 ANCHOR RODS

(10) FOR BEDDING DETAILS SEE DWG. 230-9

(11) 6"IN GRAVEL OR SOIL, 2"IN PAVED AREAS

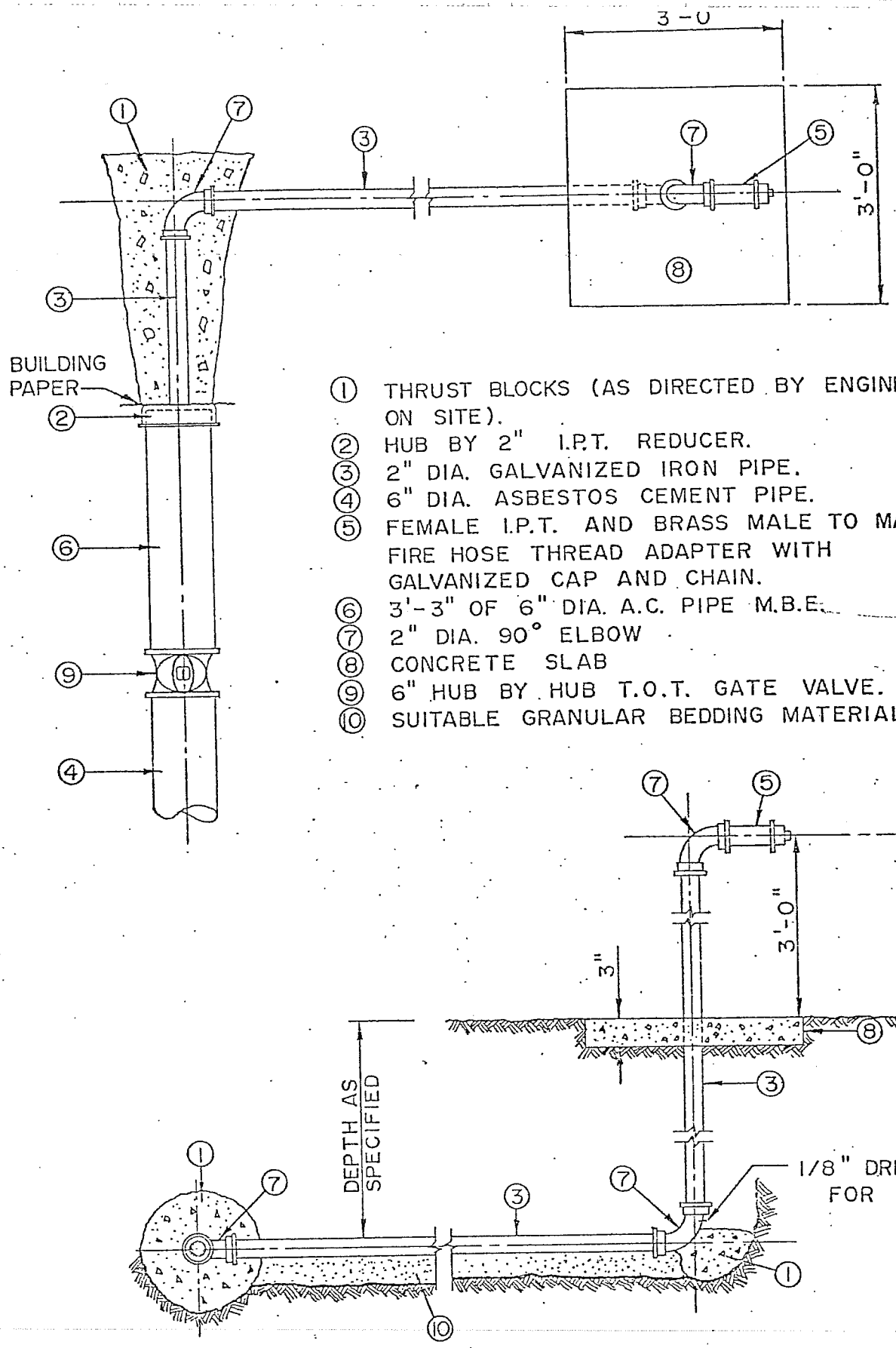


FIRE HYDRANT (ASSEMBLY 'B') N.T.S.

DATE	REVISION	NO.	BY.

THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

DSN:	DRW:	DWG. No.
CHKD:	APVD:	W 3B
SCALE:		
DATE:		REV.



① THRUST BLOCKS (AS DIRECTED BY ENGINEER ON SITE).
② HUB BY 2" I.P.T. REDUCER.
③ 2" DIA. GALVANIZED IRON PIPE.
④ 6" DIA. ASBESTOS CEMENT PIPE.
⑤ FEMALE I.P.T. AND BRASS MALE TO MALE FIRE HOSE THREAD ADAPTER WITH GALVANIZED CAP AND CHAIN.
⑥ 3'-3" OF 6" DIA. A.C. PIPE M.B.E.
⑦ 2" DIA. 90° ELBOW
⑧ CONCRETE SLAB
⑨ 6" HUB BY HUB T.O.T. GATE VALVE.
⑩ SUITABLE GRANULAR BEDDING MATERIAL

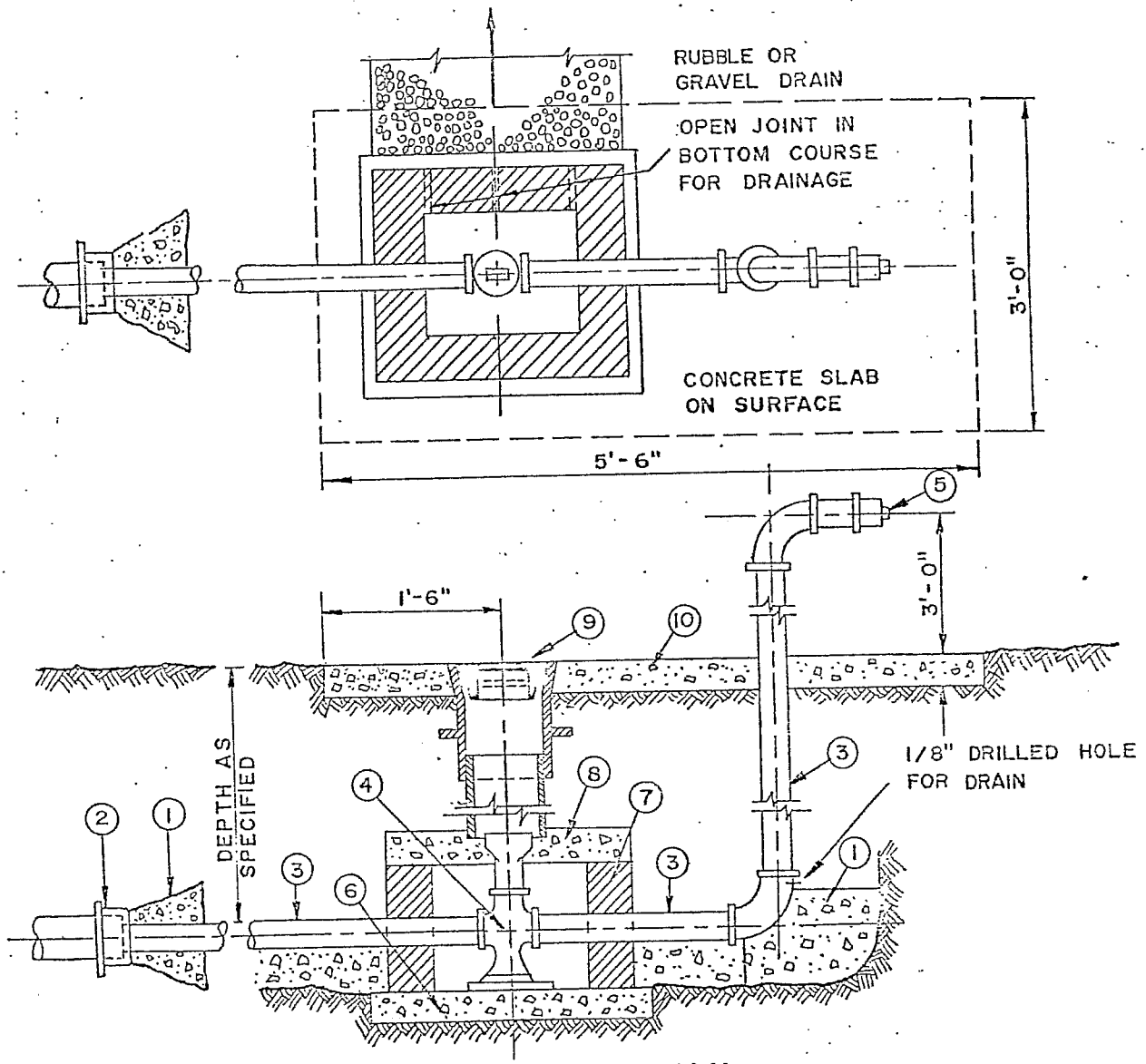
OFFSET BLOW-OFF DETAIL N.T.S.

DATE	REVISION	NO.	BY.

THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

DSN:	DRW:	DWG. No.
CHKD:	APVD:	W 4A
SCALE:		
DATE:		REV. 87

(1) THRUST BLOCKS (AS DIRECTED BY ENGINEER ON SITE).
(2) HUB BY 2" IPT REDUCER.
(3) 2" DIA. GALVANIZED IRON PIPE.
(4) 2" DIA. CURB STOP.
(5) 2" DIA. 90° ELBOW FEMALE I.P.T. AND BRASS MALE TO MALE FIRE HOSE THREAD ADAPTER WITH GALVANIZED CAP AND CHAIN.
(6) CONCRETE BASE CAST IN PLACE.
(7) BRICK
(8) CONCRETE SLAB CAST AROUND 6" DIA. ASBESTOS CEMENT PIPE.
(9) 'NELSON' TYPE VALVE BOX OR APPROVED ALTERNATIVE
(10) CONCRETE SLAB
(11) FOR BEDDING DETAILS SEE DRAWING No. 230-9



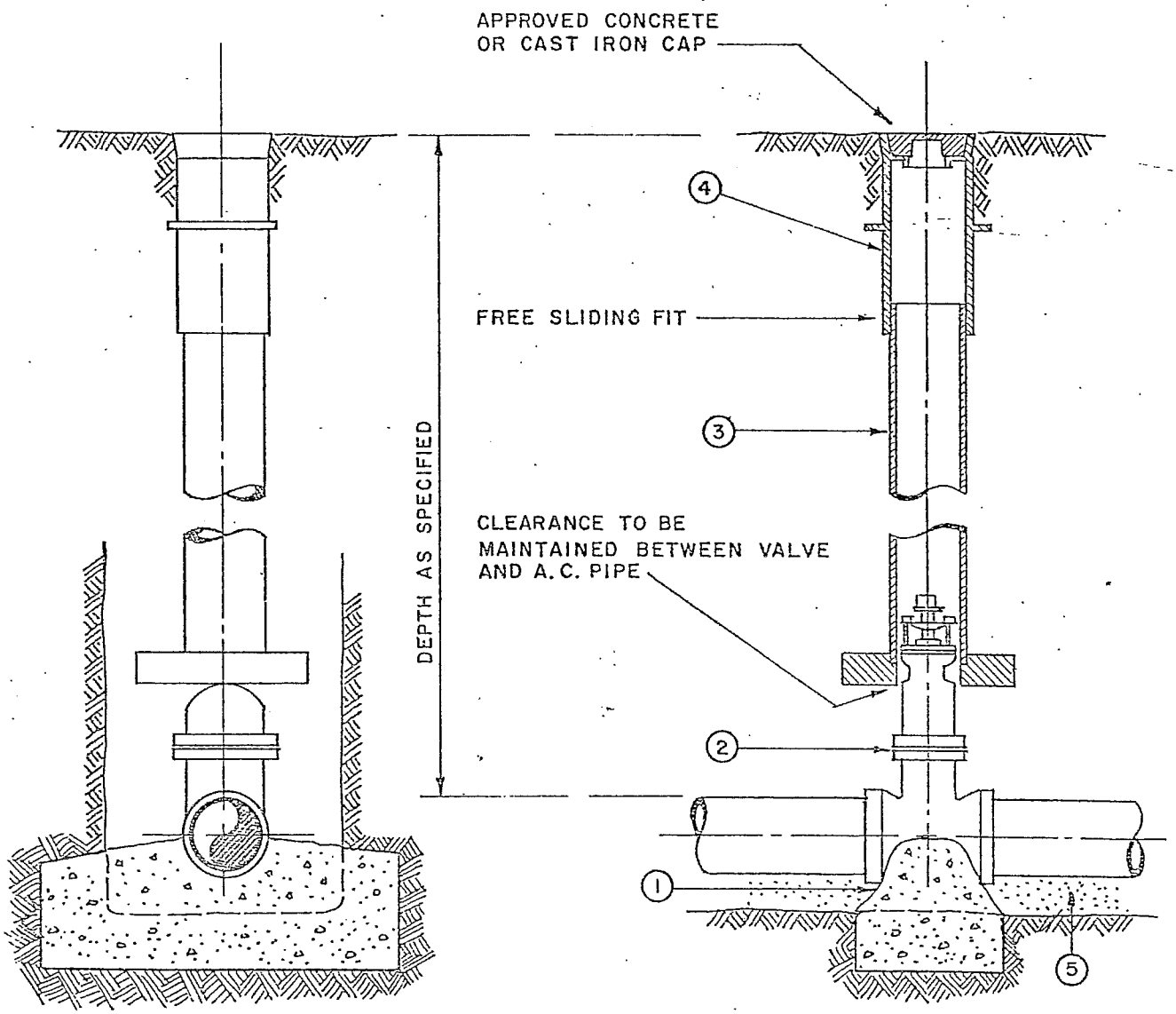
FLUSH BLOW-OFF DETAIL N.T.S.

DATE	REVISION	NO.	BY.

THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

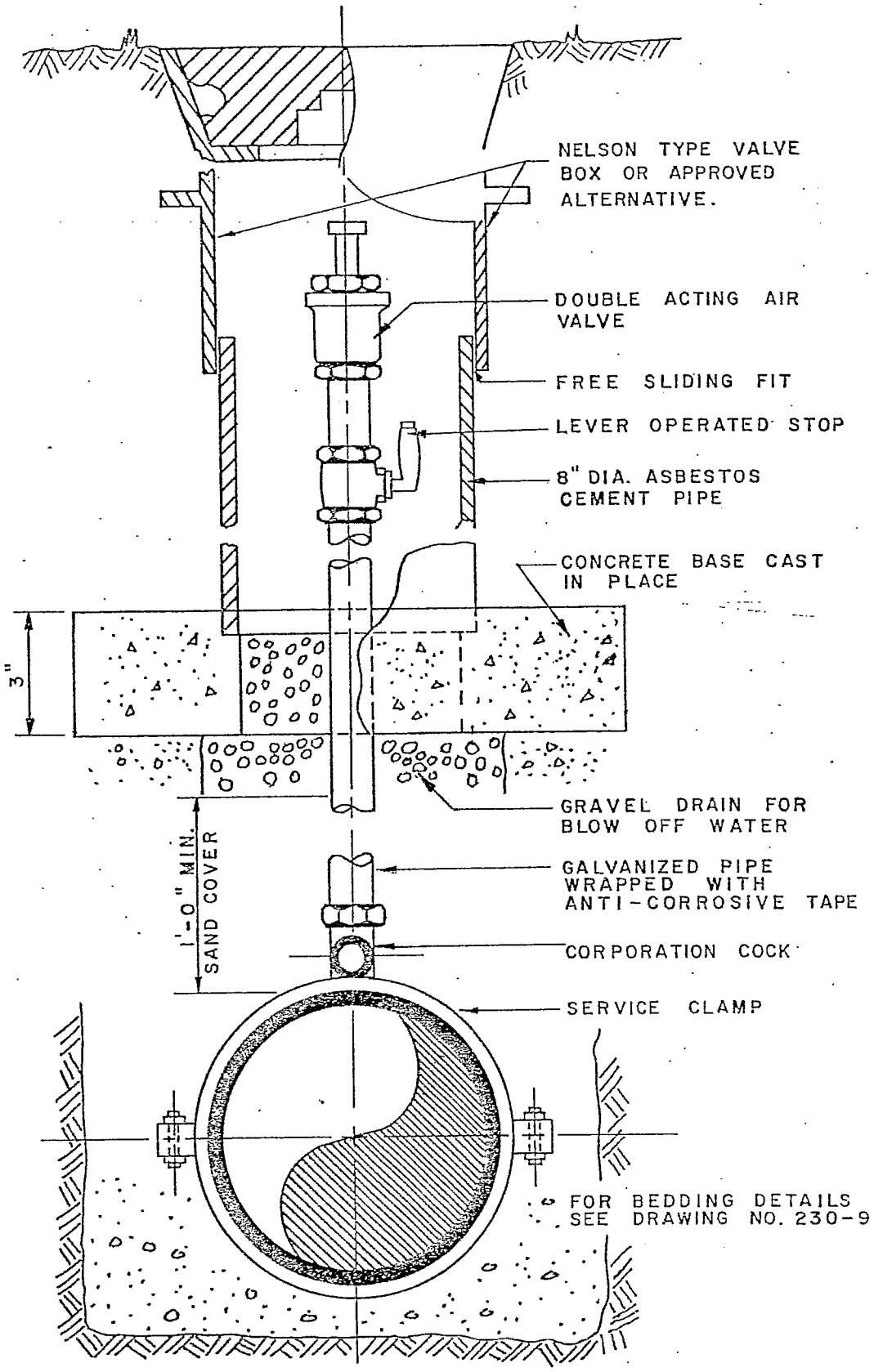
DSN:	DRW:	DWG. No.
CHKD:	APVD:	W 4B
SCALE:		
DATE:		REV.

(1) SUPPORT BLOCK (AS DIRECTED BY ENGINEER ON SITE).
(2) STANDARD 125 lb. NON RISING SPINDLE GATE VALVE, AS SPECIFIED.
(3) 6" DIA. ASBESTOS CEMENT PIPE.
(4) NELSON TYPE VALVE BOX OR APPROVED ALTERNATIVE
(5) FOR BEDDING DETAILS SEE DRAWING 230-9



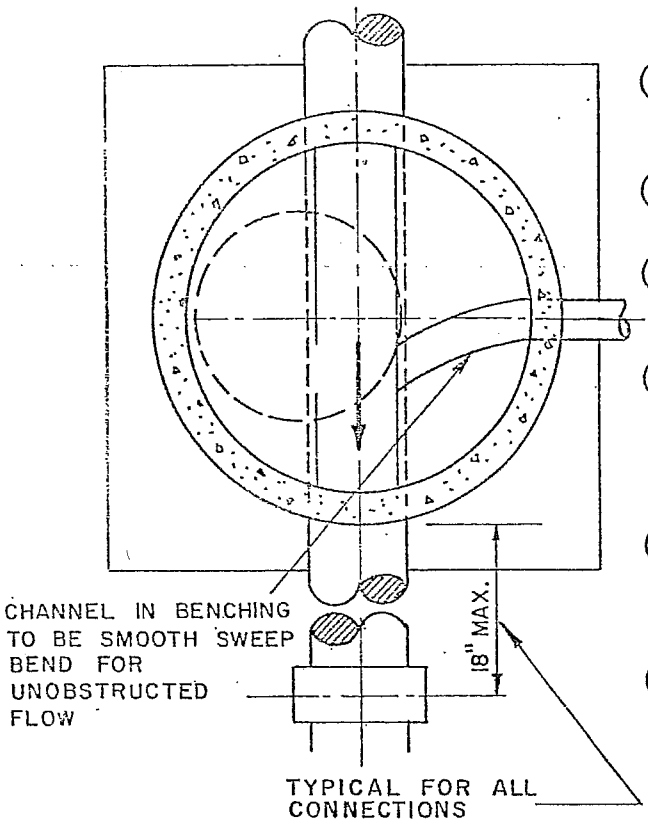
TYPICAL GATE VALVE N.T.S.

				THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS	DSN:	DRW:	DWG. No.
					CHKD:	APVD:	W5
					SCALE:		89
DATE	REVISION	NO.	BY.		DATE:	REV.	



TYPICAL AIR VALVE ARRANGEMENT N.T.S.

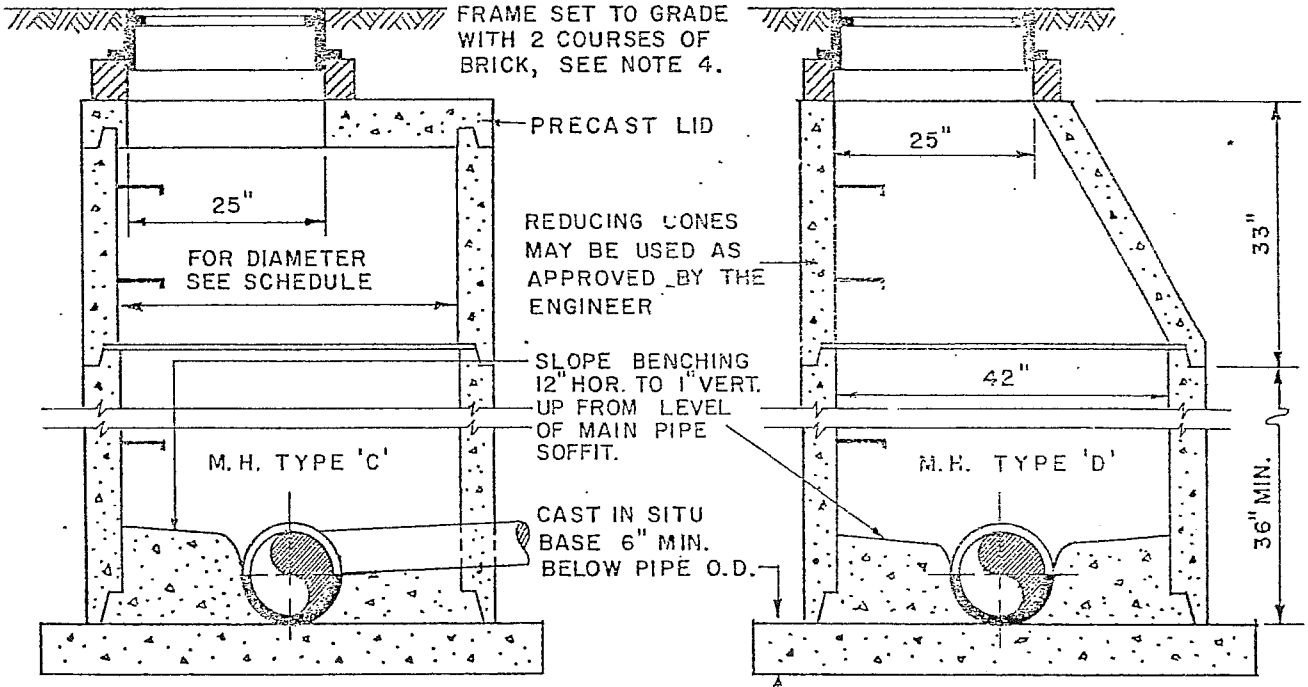
				THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS	DSN: DRW:	DWG. No.
					CHKD: APVD:	W 6
					SCALE:	
DATE	REVISION	NO.	BY.		DATE:	REV.



1. PRECAST SECTIONS TO BE PERFECT AND UNDAMAGED, SET PLUMB AND TRUE TO LINE AND GRADE WITH JOINTS CAULKED AND FILLED TO APPROVAL.
2. ALL SEWER CONNECTIONS AND MANHOLES SHALL BE TESTED.
3. IN GROUND OF LOW BEARING VALUE OR IN DEEP MANHOLES THE NEED FOR REINFORCING BASE SLAB TO BE DETERMINED IN THE FIELD.
4. FOR MANHOLES UNDER ROADS, ALLOW CONSTRUCTION DEPTH AS APPROVED, AND BRICK TO GRADE AS SHOWN. USE NEW CONCRETE BRICK AND LAY UP. SOLID AND BONDED IN CEMENT MORTAR, PARGE EXTERIOR ONLY.
5. SITE POURED CONCRETE SHALL BE IN ACCORDANCE THE CONTRACT SPECIFICATION FOR STRUCTURAL CONC AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGT OF 3000 P.S.I. AT 28 DAYS.
6. MAXIMUM DISTANCE FROM MANHOLE ALONG SEWER MAIN OR LATERAL TO FIRST JOINT NOT TO EXCEED 18".

INSIDE PIPE DIAMETER	MANHOLE DIAMETER
UP TO 12"	42"
14" - 27"	54"
28" - 36"	72"

MANHOLES TO CONFORM TO ASTM C76, AS CURRENT INFORCE- CLASS II

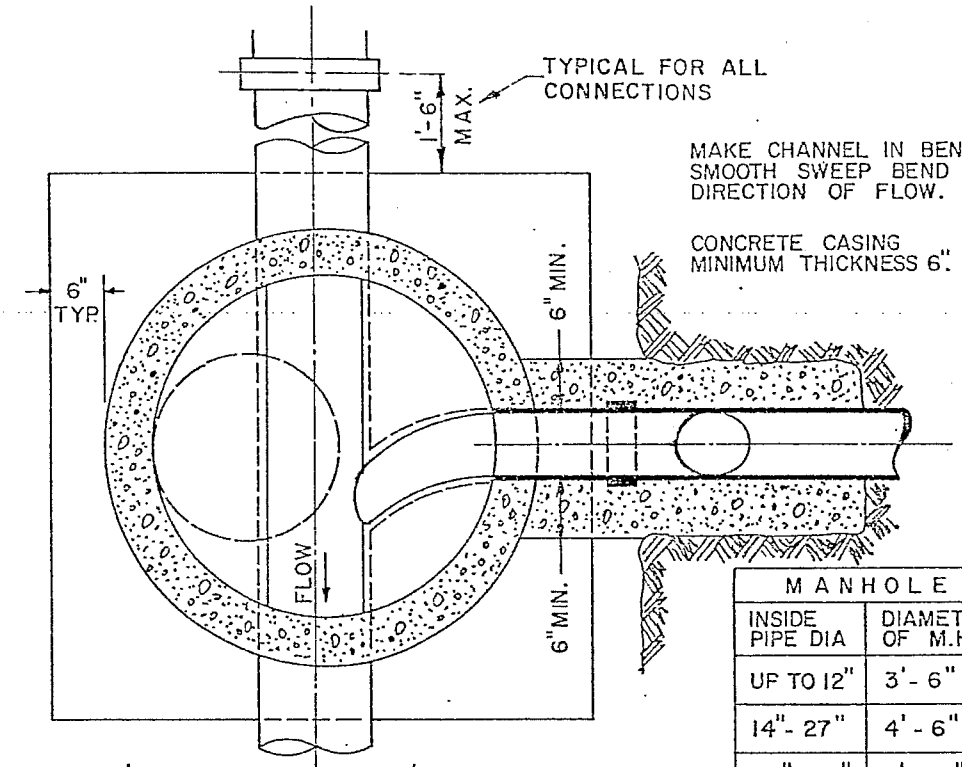


PRECAST MANHOLES TYPES 'C' & 'D' N.T.S.

				THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS	DSN:	DRW:
					CHKD:	APVD:
					SCALE:	
DATE	REVISION	NO.	BY.		DATE:	REV.

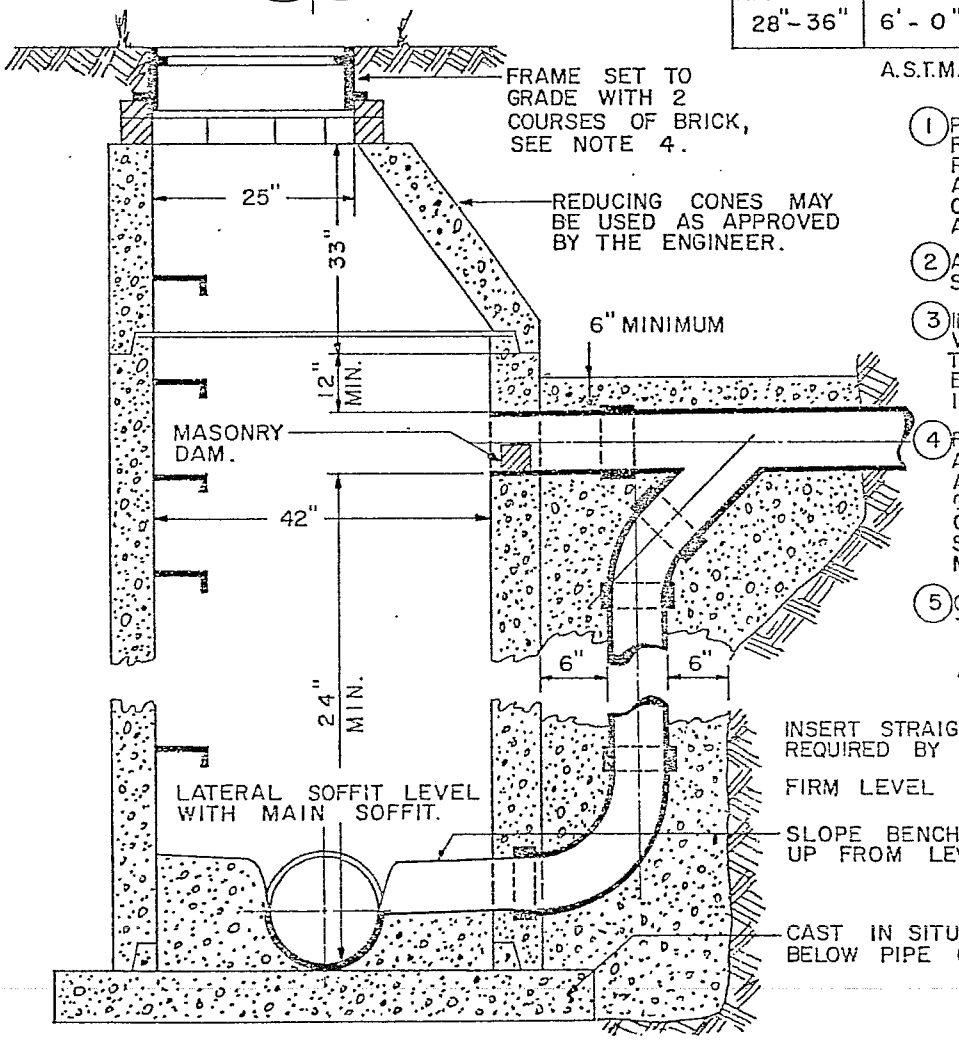
DWG. No. S1

91



MANHOLE SECTIONS			
INSIDE PIPE DIA	DIAMETER OF M.H.	WALL THICKNESS	LID THICKNESS
UP TO 12"	3'-6"	4 1/2"	6"
14"-27"	4'-6"	5 1/2"	8"
28"-36"	6'-0"	7"	10"

A.S.T.M. C 76-63 T- CLASS II



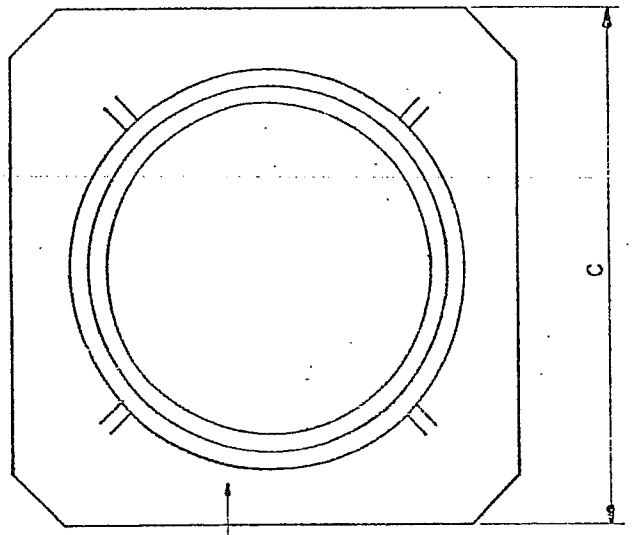
1. PRECAST SECTIONS TO BE PERFECT AND UNDAMAGED, SET PLUMB AND TRUE TO LINE AND GRADE WITH JOINTS CAULKED AND FILLED TO APPROVAL.
2. ALL SEWERS AND MANHOLES SHALL BE TESTED.
3. IN GROUND OF LOW BEARING VALUE OR IN DEEP MANHOLES THE NEED FOR REINFORCING BASE SLAB TO BE CONSIDERED IN THE FIELD.
4. FOR MANHOLES UNDER ROADS, ALLOW CONSTRUCTION DEPTH AS APPROVED AND BRICK TO GRADE AS SHOWN. USE NEW CONCRETE BRICK AND LAY UP SOLID AND BONDED IN CEMENT MORTAR. PARGE EXTERIOR ONLY.
5. CONCRETE TO BE AS SPECIFIED IN THE CONTRACT SPECIFICATIONS FOR STRUCTURAL CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 3000 P.S.I. AT 28 DAYS.

PRECAST DROP MANHOLE N.T.S.

DATE	REVISION	NO.	BY.

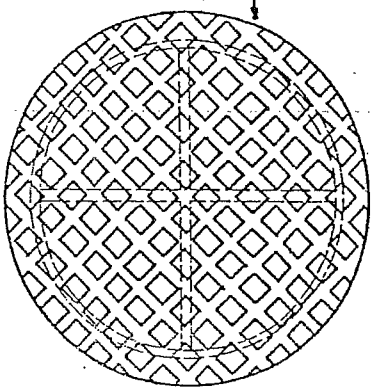
THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

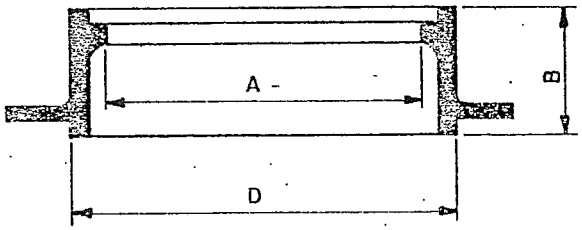
DSN:	DRW:	DWG. No.
CHKD:	APVD:	.S2
SCALE:		
DATE:		REV.



ALTERNATE ROUND BASE USED IF MANHOLE HAS ROUND ENTRANCE SHAFT.

ROUND COVER WITH 'WAFFLE' SURFACE PATTERN.





FRAME

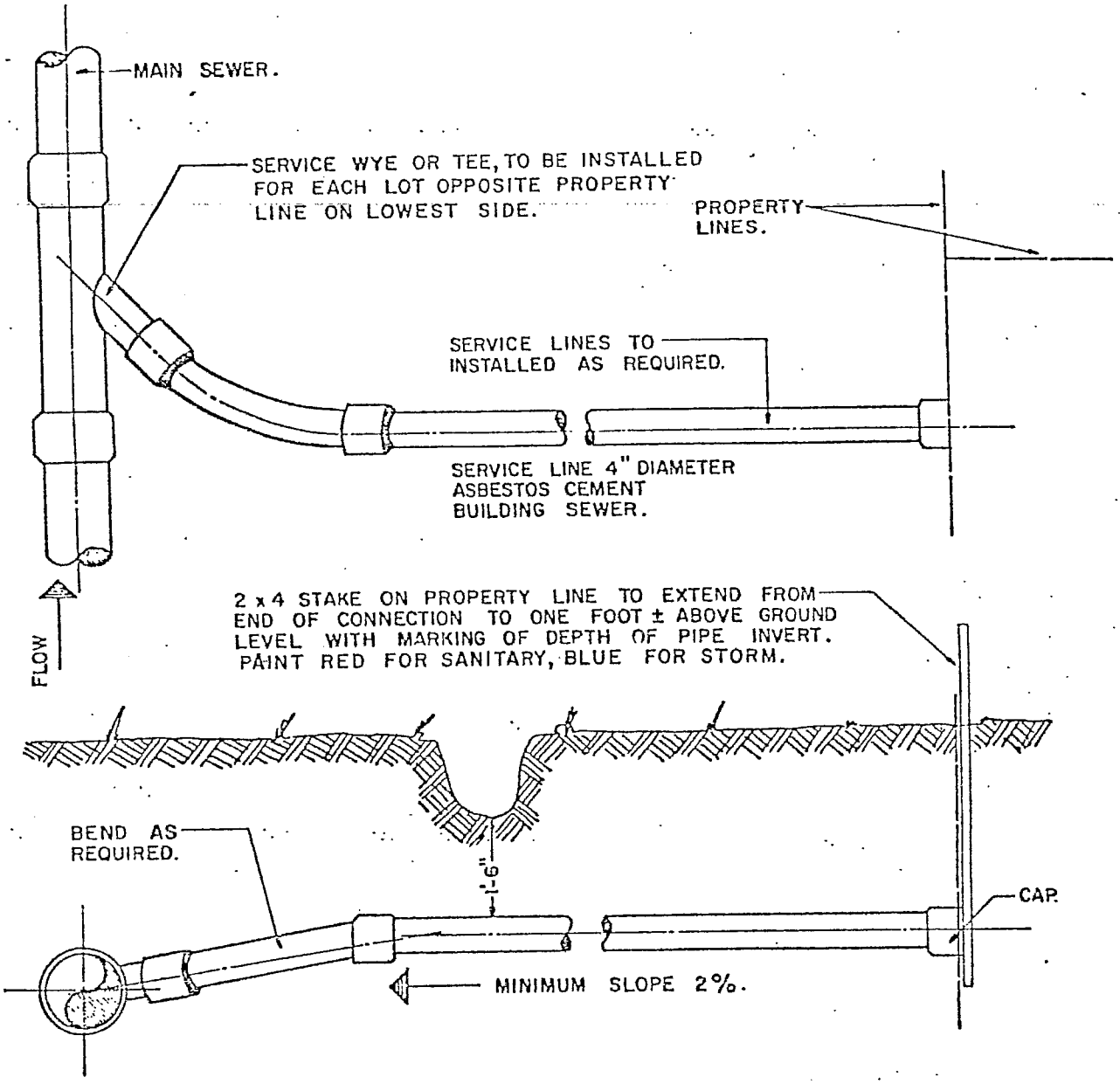
COVER

WEIGHT : COVER 125 LBS. MIN. - 175 LBS. MAX.
ROUND FRAME 225 LBS. MIN. - 275 LBS. MAX.
SQUARE FRAME 275 LBS. MIN. - 325 LBS. MAX.

DIMENSION : 'A' - 20" MIN. - 24" MAX.
'B' - 6 1/2" MIN. - 8 1/2" MAX.
'C' - 30" MIN. - 33" MAX.
'D' - TO FIT INTO 25" DIA. HOLE.

STANDARD MANHOLE FRAME AND COVER N.T.S.

				THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS	DSN:	DRW:	DWG. No.
					CHKD:	APVD:	S 3
					SCALE:		
DATE	REVISION	NO.	BY.		DATE:	REV.	93



NOTE :

1. MINIMUM CONNECTION 4" DIAMETER.
2. MINIMUM COVER OF EARTH OVER PIPE 3'-0".
3. MINIMUM COVER AT DITCH INVERT 1'-6" OR ENCASE PIPE WITH CONCRETE - MINIMUM 6".
4. PIPE BEDDED AS SPECIFIED ON PIPE BEDDING DRAWING.
5. DEPTH AND POSITION OF ALL WYES TO BE MEASURED AND RECORDED.
6. SERVICE CONNECTIONS CROSSING ROADS REQUIRE COMPACTION IN 6" LAYERS TO TOP OF GRADE.

SERVICE CONNECTION N.T.S.

DATE	REVISION	NO.	BY.

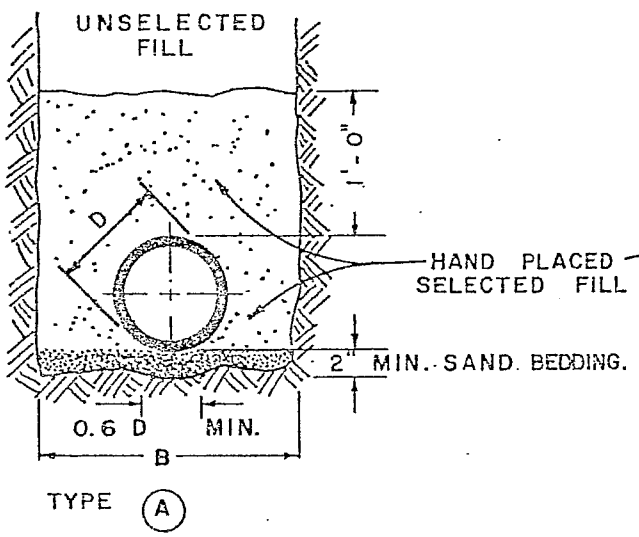
THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

DSN:	DRW:	DWG. No.
CHKD:	APVD:	S4
SCALE:		
DATE:		REV.

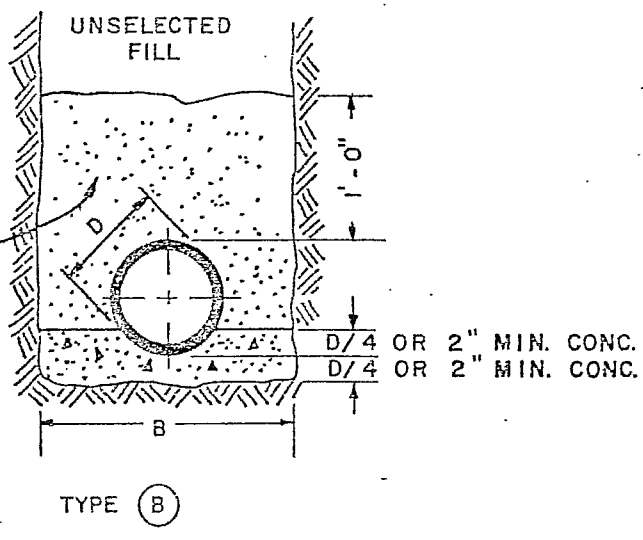
DEPTH OF COVER TO PIPE	PIPE BEDDING & PROTECTION FOR 4" – 24" PIPE DIA. UNDER AVERAGE CONDITIONS
UNDER 3 FT.	TYPE C
3 FT. – 14 FT.	TYPE A
14 FT. – 25 FT.	TYPE B
OVER 25 FT. – IN HEADING – IN FILL	TYPE C

NOTE: CONCRETE FOR BEDDING AND PIPE SURROUNDS TO BE IN ACCORDANCE WITH C.S.A. SPECIFICATION A23 AS CURRENTLY IN FORCE (2000 P.S.I. AT 28 DAYS)

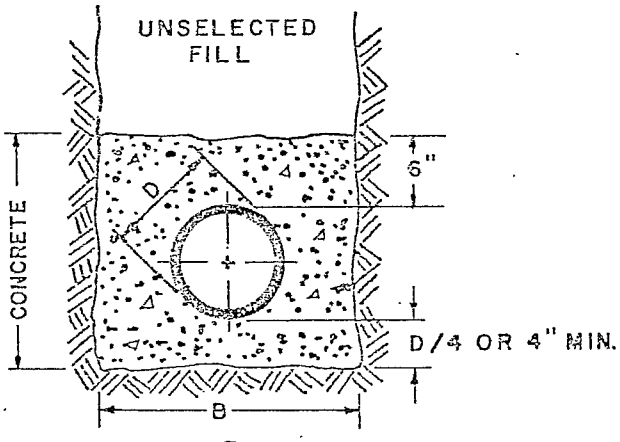
'D' IS OUTSIDE DIAMETER OF THE PIPE BARREL



TYPE (A)



TYPE (B)



TYPE (C)

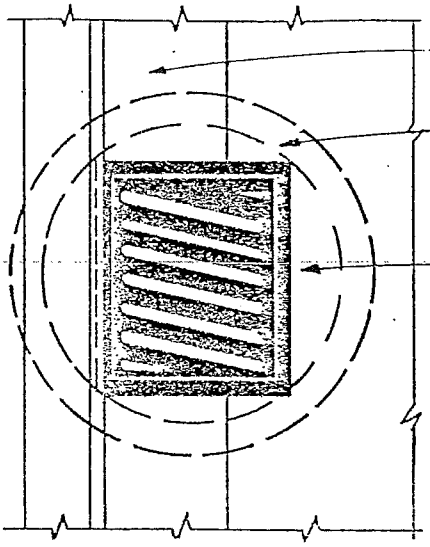
WIDTH OF TRENCH EXCAVATION "B"	
NOMINAL DIAMETER	B
UP TO 18"	D + 1'-9"
20" TO 36"	D + 2'-6"
OVER 36"	AS SPECIFIED ON CONTRACT DRAWINGS OR SPECIAL SPECIFICATIONS

STANDARD PIPE BEDDING N.T.S.

DATE	REVISION	NO.	BY.

THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

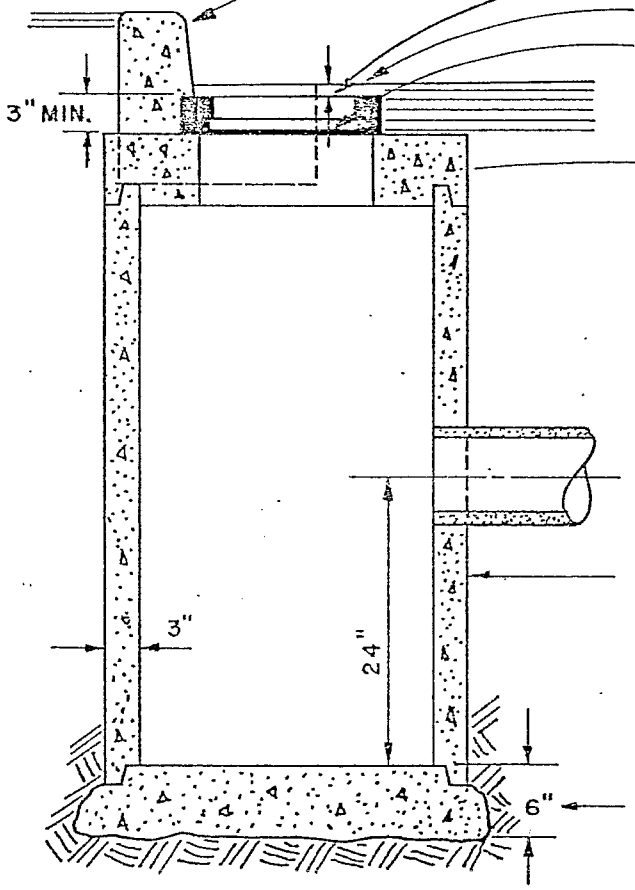
DSN:	DRW:	DWG. No.
CHKD:	APVD:	S 5
SCALE:		
DATE:		REV. 95



CURB & GUTTER SECTION

H 20 PRECAST CATCH BASIN & LID

14"x 17" CAST IRON FRAME & GRATING, VICTORIA FOUNDRIES LTD. OR EQUAL.



CURB

GRATING RECESSED 1"

ASPHALT CONCRETE

BRICK TO GRADE IF REQUIRED WITH NEW CONC. BRICK AND MORTAR

6" H 20 PRECAST LID RECESSED FOR 14"x 17" STANDARD C.I. FRAME & GRATING, VICTORIA FOUNDRIES OR EQUAL

PRECAST CATCH BASIN, 24" INSIDE DIA. 4' LONG.

CONC. BASE CAST IN PLACE

PRECAST CATCH BASIN N.T.S.

DATE	REVISION	NO.	BY.

THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

DSN:	DRW:	DWG. No.
CHKD:	APVD:	S 6
SCALE:		
DATE:		REV.

VILLAGE OF HARRISON HOT SPRINGS

SCHEDULE "C" TO SUBDIVISON AND DEVELOMENT SERVICING

BYLAW NO. 578, 1993

SUBDIVISION AND DEVELOPMENT SERVICING AGREEMENT

THIS AGREEMENT made this day of , 19___.

BETWEEN: THE CORPORATION OF THE Village of Harrison Hot Springs, a body corporate, duly incorporated under the laws of the Province of British Columbia, having an office at 495 Hot Springs Road, P.O. Box 160, Harrison Hot Springs, B.C., V0M 1K0

(hereinafter called the "Village")

OF THE FIRST PART

AND:

(hereinafter called the "Owner")

OF THE SECOND PART

WHEREAS:

The Owner is the registered owner or holder of a Registered Right to Purchase lands and premises situate, lying and being in the Village of Harrison Hot Springs, Province of British Columbia, and more particularly known and described as:

(hereinafter called the "Land");

The Owner wishes to subdivide or develop the Land, or part thereof, in the manner shown or described in a Subdivision Plan or Building Permit application which has been submitted by the Owner to the Approving Officer or Building Inspector of the Village for approval, a copy of which Subdivison Plan or Building Permit application is attached hereto as Schedule "One";

The Owner is desirous of entering into this Agreement with the Village pursuant to the provisions of Section 991 of the Municipal Act, in order to obtain approval from the Approving Officer or Building Inspector of the Subdivision Plan or Building Permit prior to completion of the construction and installation on the Land of all works and services required by the Village to be constructed and installed on the Land by the Owner.

NOW THIS AGREEMENT WITNESSES that in consideration of the premises and of the mutual covenants and agreements herein contained, the parties hereto covenant and agree as follows:

1. In this Agreement, unless the context otherwise requires:

"Approving Officer" means a person appointed as an Approving Officer for the Corporation of the Village of Harrison Hot Springs;

"Building Inspector" means a person appointed as a Building Inspector for the Corporation of the Village of Harrison Hot Springs;

"Complete" or "Completion" or any variation of these words, when used with respect to the work referred to herein, shall mean completion of the work, or a part thereof as the context requires, in accordance with the provisions of this Agreement and to the satisfaction of the Approving Officer or Building Inspector when so certified by that person in writing;

"Contractor" shall mean contractors and sub-contractors employed by the Owner, directly or indirectly, in the construction and installation of the work;

"Work" shall mean all works, services, roads and any other improvement required to be constructed and erected or installed, both on and off the Land, by the Owner under provisions of this Agreement.

2. The Owner covenants and agrees to construct and install on the Land and off-site as the case may be, in accordance with the plans and specifications initialled by each of the parties hereto for identification, the following work:

a) On-site road and fire truck turnaround;
b) Drainage works and services;
c) Sanitary sewage works and services;
d) Water works and services;
e) Off-site sidewalk;
f) Boulevards;
g) Curbs and gutters;
h) Street lighting; and
i) Underground electrical, telephone and cablevision works;

Each of the parties hereto acknowledge having possession of a true copy of the aforesaid plans and specifications (herein called the "Approved Engineering Plans"), and acknowledge and agree that the Approved Engineering Plans are hereby incorporated into and made part of this Agreement and are attached as Schedule "Two".

3. All work shall be carried out by the Owner or the Owner's contractors in accordance with the Approved Engineering Plans, and in accordance with the provisions of the Subdivision and Development Servicing Bylaw of the Village. Wherever the provisions of the Approved Engineering Plans and the said Subdivision and Development Servicing Bylaw conflict, the Approving Officer or Building Inspector shall determine and consent in writing to the provisions which shall be enforced and constructed.

4. The cost of all work herein shall be borne by the Owner, and the Owner shall employ only bonded contractors to carry out and complete the work.

5. The Owner shall obtain and provide to the Village upon request and free of charge true copies of all contracts and sub-contracts entered into by the Owner or its contractors and relating to the work.

6. The decision of the Approving Officer or Building Inspector shall be final and binding on all parties hereto in determining whether or not the work or any part thereof has been carried out and completed in accordance with the provisions of this Agreement.

7. As soon as the Owner is satisfied that the work is complete, and prior to final approval, the Owner shall submit to the Approving Officer or Building Inspector final as-built mylar drawings of all work constructed hereunder, sealed by a Professional Engineer. Where the as-built drawings have been completed using AutoCAD or a similar computer drafting software, one copy of the diskette containing the as-built drawing files shall also be provided. Until the Owner submits the final as-built mylar drawings, the Village will hold $200 per sheet for drafting deficiencies.

8. The Owner shall cause all work herein to be carried out and completed not later than the ___ day of _____, 19___ (hereinafter called the "Completion Date").

9. Prior to obtaining approval of the Subdivision Plan by the Approving Officer or issuance of a Building Permit by the Building Inspector, the Owner:

   a) Shall pay all arrears of property taxes chargeable against the Land by the Village; and

   b) Shall pay all current assessed property taxes levied against the Land by the Village.

10. The Owner further covenants and agrees to pay to the Village, prior to commencement of the subdivision or development, charges for the inspection of the works in the amount of _____, ($_____) (equal to 3% of the first $150,000, 2% of the second $150,000 and 1% of the balance of the estimated cost of constructing utilities and roads required for the new subdivision as approved by the Approving Officer or Building Inspector; or a minimum of $500, whichever is greater, plus the current Goods and Services Tax, except in the case where the estimated cost of construction is $5000 or less, then the inspection charge is a minimum of $150); and further, to pay when the same are billed by the Village, administration fees, engineering fees and legal costs incurred by the Village and relating to the subdivision or development of the Land and construction and installation of the work, and the cost of connecting the work to the Village's community drainage, sanitary sewage and water systems.

11. Prior to approval of the Subdivision Plan by the Approving Officer, or prior to issuance of a Building Permit by the Building Inspector, and as security for the due and proper performance by the Owner of all covenants and agreements herein contained, the Owner shall deposit with the Village an unconditional, irrevocable Letter of Credit, in the form of Attachment 1 (or a standard Letter of Credit used by a chartered bank as long as the chartered bank's Letter of Credit gives the Village the same security as Attachment 1), drawn on a chartered bank in Canada for a term of not less than twelve (12) months, in the amount of _____ ($), which is equal to One Hundred and Twenty-Five percent (125%) of the cost of constructing and providing all of the work required to be constructed and installed by the Owner under the terms of this Agreement, as estimated by the Approving Officer or Building Inspector, and containing such terms and provisions as may be required by the Approving Officer or Building Inspector. The Owner agrees that if the work or any part thereof is not completed in accordance with the provisions of this Agreement and by the Completion Date, or if the Owner shall be in default of any of the covenants herein contained, and such default shall continue for a period of fourteen days after notice thereof has been given by the Village to the Owner, the Village may call for and receive the funds secured by the Letter of Credit and the Village may complete the work at the cost of the Owner and deduct from any fund held by the Village as security hereunder, the cost of such completion, and the balance of the deposit, if any, shall be returned to the Owner less any administration fees required by the Village. If there is insufficient money on deposit with the Village under the Letter of Credit, then the Owner shall pay such deficiency to the Village immediately upon receipt of the Village's bill for completing the work. It is understood and agreed that the Village may do such work either by itself, or by contractors employed by the Village. Any bill rendered by the Village to the Owner under the provisions of this paragraph, shall be regarded as charges for work done or services provided under the provisions of the Municipal Act and may, in addition to any other remedy available to the Village, be collected in the same manner and with like remedies as ordinary taxes upon land and improvements are collected under the Municipal Act. The Letter of Credit may be renewed before it expires, and the Village has the right to draw down the Letter of Credit and hold the cash as security if the Owner fails to renew the Letter of Credit at least fourteen days before its expiry date.

12. The Village will consent to reduction in the amount secured by the Letter of Credit, or cash, from time to time, in accordance with the following:

a) The percentage of the credit reduction will be equal to the percentage of the cost of the work done and approved by the Approving Officer or Building Inspector; and

b) No reduction will be allowed for any amount less than 10% of the total cost of the construction and installation of the work.

c) Notwithstanding (a) and (b) herein, the Village of Harrison Hot Springs will not refund an amount of 10% of the total cost of the constructing and installing of the work or $2,000, whichever is greater; except in the case where the construction value is $5000 or less, then the Village will retain $1000; until the expiry of one (1) year following the full and final completion of all the work. The amount being retained is a maintenance bond that meets the obligation of the owner to post security for the satisfactory operation of the works and services for 1 year.

d) Upon the expiry of the aforesaid one (1) year period, and provided that the Owner is not then in default under any of the covenants herein contained, and upon final approval of the work by the Approving Officer or Building Inspector, the Village of Harrison Hot Springs, will as soon as possible, reduce the remaining security to zero (nil).

13. The Owner covenants and agrees to indemnify and save harmless the Village of Harrison Hot Springs and its servants, agents and employees from and against all actions, proceedings, costs, damages, expenses, claims and demands whatsoever and by whomsoever brought or made against the Village of Harrison Hot Springs or its said servants, agents and employees, resulting directly or indirectly from the construction or installation of the work.

14. In consideration of due and proper performance by the Owner of the covenants herein contained, the Village of Harrison Hot Springs covenants and agrees to permit the Owner to carry out and perform the work.

15. Any demand or notice required or permitted to be given under the provisions of this Agreement shall be in writing and may be given by mailing such notice by prepaid registered post to the party concerned at the address for such party first above-recited, and any such notice or demand mailed as aforesaid shall be deemed to have been received by the party to whom it is addressed on the second business day after the date of posting thereof.

16. The Owner acknowledges and agrees that immediately upon issuance by the Approving Officer or Building Inspector of certification stating that the work has been completed, all right, title and interest in and to the work shall immediately pass to and vest in the Village of Harrison Hot Springs, but nothing herein contained shall derogate from the obligation of the Owner to maintain the work for a period of one (1) year following completion as stated in Section 5 of the Subdivision and Development Servicing Bylaw.

17. It is understood and agreed that the Village of Harrison Hot Springs has made no representations, covenants, warranties, guarantees, promises or agreements (oral or otherwise) with the Owner other than those contained in this Contract.

18. Wherever the singular is used herein, the same shall be construed as meaning the plural, body corporate or politic where the context or the parties so require.

19. Notwithstanding the above conditions, the Village of Harrison Hot Springs will perform a preliminary substantial acceptance inspection one (1) month before the end of the term of the agreement to determine whether the roads and servicing requirements will be substantially complete at the end of the term. An extension of up to three (3) months may be authorized by the Approving Officer or Building Inspector provided the Owner submits appropriate bonding or an irrevocable letter of credit.

20. This Agreement and the terms, covenants and conditions herein contained shall enure to the benefit of and be binding upon the parties hereto and their respective heirs, executors, administrators, successors and assignees.

IN WITNESS WHEREOF the parties hereto have executed this Agreement at the Village of Harrison Hot Springs, Province of British Columbia, the day and year first above written.

THE CORPORATION OF THE VILLAGE OF HARRISON HOT SPRINGS

_____
Mayor:

C/S

_____
Clerk:

OWNER

C/S
(if a corporation)

_____
Owner:

WITNESS

_____
Witness:
Address:
Date:

This Agreement is hereby extended by _____ months.

_____ _____
Approving Officer Date

VILLAGE OF HARRISON HOT SPRINGS

SCHEDULE "C" TO SUBDIVISION AND

DEVELOPMENT SERVICING BYLAW NO. 578, 1993

ATTACHMENT 1

SUBDIVISION AND DEVELOPMENT SERVICING AGREEMENT
LETTER OF CREDIT

Date:_____
Bank of: _____
_____

At the request of _____
(Owner)
we hereby establish in your favour our irrevocable credit for a sum not exceeding _____ Dollars ($_____). This credit shall be available to you by sight drafts drawn on the Bank of _____, _____, B.C.
(Address)
when supported by your written demand for payment made upon us. This Letter of Credit is required in connection with an undertaking by the Owner to perform certain works and services required. We specifically undertake not to recognize any notice of dishonour of any sight draft that you shall present to us for payment under this Letter of Credit. You may make partial drawings or full drawings at any time. We shall honour your demand without enquiring whether you have a right as between yourself and the Owner.

If you have not demanded on this Letter of Credit in full by _____
(Expiry Date)
it will considered cancelled unless other arrangements or a renewal has been made with the Bank prior to the aforementioned date.

Our reference for this Letter of Credit is the Bank of _____
_____, B.C., Letter of Credit No. _____.
(Address)

BANK OF _____

_____

The Owner hereby specifically agrees that it shall not take any action to dispute the validity of this Letter of Credit unless it shall have expired prior to demand. We hereby agree to indemnify the Bank of _____ against any costs of actions relative to the above. We also authorize the Bank of _____ to make such payments as may be necessary and debit our account.

_____

_____
OWNER