THE DISTRICT OF NEW HAZELTON

SUBDIVISION SERVICING

BYLAW NO. 110, 1988

January 1988

Prepared by
KLM Engineering Ltd.

DISTRICT OF NEW HAZELTON
SUBDIVISION SERVICING
BYLAW NO. 110, 1988

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SCHEDULE "A"

DISTRICT OF NEW HAZELTON
SUBDIVISION SERVICING
BYLAW NO. 110, 1988

A BYLAW TO REGULATE THE SUBDIVISION OF LAND AND TO ESTABLISH A STANDARD OF WORKS TO BE PROVIDED AT THE TIME OF SUBDIVISION.

WHEREAS Council is empowered to regulate and require works and services in respect to the subdivision of land, pursuant to the provisions of the Municipal Act;

NOW THEREFORE the Council of the DISTRICT OF NEW HAZELTON in open meeting assembled enacts as follows:

1.0 TITLE

1.1 This Bylaw may be cited for all purposes as the "District of New Hazelton Subdivision Servicing Bylaw No. 110, 1988".

2.0 REPEAL

2.1 Bylaw No. 17 cited as "District of New Hazelton Subdivision Control By-law No. 17", and all amendments thereto are hereby repealed.

3.0 JURISDICTION

3.1 No subdivision of land within the municipality shall be allowed unless the subdivision is in accordance with the provisions of this Bylaw and is approved by the Approving Officer of the Municipality.

4.0 SEVERABILITY

4.1 If any portion of this Bylaw is for any reason held invalid by a Court of competent jurisdiction, the invalid portion shall be severed without affecting the remainder of the Bylaw.

5.0 SCHEDULES

5.1 Schedule "A" as listed below and annexed to this Bylaw is part of the Bylaw:

"A" Subdivision Servicing Standards

6.0 DEFINITIONS

In this Bylaw:

6.1 "Applicant" means a person applying for approval of a subdivision whether as owner or as a duly authorized agent;

6.2 "Approval" means approval in writing from the authority having jurisdiction;

6.3 "Approving Officer" means the person authorized by the Municipal Council pursuant to the Land Title Act to act as Approving Officer;

6.4 "Certificate of Completion" means a written acknowledgment by the Municipality over the signature of the Approving Officer or other person authorized by Council, that all or a specified portion of the works have been completed;

6.5 "Controlled access highway" means a highway designated as a controlled access highway pursuant to the Highway Act;

6.6 "Community drainage system" means a system of stormwater drainage works owned, operated and maintained by the Municipality;

6.7 "Community fire hydrant system" means a system of fire hydrants owned, operated and maintained by the Municipality;

6.8 "Community sewer system" means a common sewer, or system of sewerage or sewage disposal, which serves two or more parcels and which is owned, operated and maintained by the Municipality;

6.9 "Community water system" means a system of waterworks approved under the applicable provincial legislation which serves two or more parcels and which is owned, operated and maintained by the Municipality;

6.10 "Cul-de-sac" means a length of local highway made for vehicular use, the end of which is designed to be permanently closed by the pattern of subdivision or which is terminated by a natural feature such as inaccessible terrain;

6.11 "Developer" means the person or persons who cause subdivision of land to take place or who cause development to take place in a subdivision;

6.12 "Engineer" means the Engineer of the District or other person appointed by Council to act as Engineer under this bylaw;

6.13 "Frontage" means that length of a parcel boundary which immediately adjoins a highway other than a lane or walkway;

6.14 "Frontage road" means that length of a highway which on one side adjoins a highway designated as a controlled access highway and from which access is permitted to parcels on the other side;

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

6.16 "Intersection" means the intersection of highways and includes the intersection with a highway of a parcel created pursuant to Section 11 of Part 2 of B.C. Regulation 334/79;

6.17 "Lane" means a highway more that 6.0 metres but not greater than 9 metres in improved width which provides secondary vehicular access to an abutting parcel;

6.18 "Local street" means a street used or intended to be used primarily for access to abutting residential parcels rather than for through or commercial traffic;

6.19 "Medical health officer" means the medical health officer appointed under the Health Act and having jurisdiction over the area in which a proposed subdivision is located;

6.20 "Municipality" means the District of New Hazelton;

6.21 "Natural boundary" means the visible high-water mark of any lake, river, stream or other body of water where the presence and action of the water is are so common and usual, and so long continued in all ordinary years, as to mark upon the soil of the bed of the body of water a character distinct from that of the banks thereof, in respect to vegetation as well as in respect to the nature of the soil itself as defined in Section 1 of the Land Act and includes of the edge of dormant or old side channels and marsh areas;

6.22 "Notice of Acceptance" means notice in writing issued by the Municipality confirming that ownership of all or part of the works in a subdivision have been accepted by the Municipality;

6.23 "Official Community Plan" means an official community plan adopted by the Council of the District of New Hazelton pursuant to the Municipal Act;

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

(a) the tenant for life under a registered life estate;

(b) the registered holder of the last registered agreement for sale;

(c) the holder or occupier of land held in the manner mentioned in sections 409 and 410 of the Municipal Act;

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

6.26 "Potable water" means water which is approved for drinking purposes under the applicable provincial legislation;

6.27 "Professional Engineer" means a person who is registered or duly licensed as such under the provisions of the Engineers Act;

6.28 "Roadway" means that portion of a highway that is improved, designed or ordinarily used for venicular traffic;

6.29 "Site area" means the minimum site area required by the District of New Hazelton Zoning Bylaw;

6.30 "Sidewalk" means that portion of a highway improved for pedestrian traffic;

6.31 "Slip" means the downward and outward movement of slopeforming materials composed of natural rock, soils, artificial fills, or combinations of these materials, which movement may proceed by any falling, sliding, or flowing or any combinations thereof;

6.32 "Subdivider" means the person or persons who cause subdivision of land to take place or who cause development to take place in a subdivision;

6.33 "Subdivision servicing standards" means those specifications, drawings, general conditions and design criteria which are shown in Schedule "A" of this Bylaw;

6.34 "Walkway" means a highway less than 3 metres in width for the use of the pedestrian public only;

6.35 "Watercourse" means any natural drainage course or source of water, whether natural or man-made, having defined banks and a bed 0.6 metres or more below the surrounding land, whether usually containing water or not, and includes any lake, river, creek, spring, ravine, swamp, gorge or source of ground water;

6.36 "Works and services" means the improvements required under this bylaw to be made to subdivided land or land to be developed including the installation of water, fire hydrant, sewage and drainage systems and construction of highways, and all other services, matters and things required of the owner by this Bylaw;

6.37 "Zone" means a zone established under the Zoning Bylaw of the District of New Hazelton;

6.38 "Zoning Bylaw" means the Zoning Bylaw currently in force in the Municipality;

7.0 GENERAL

7.1 All subdivisions in the Municipality shall be serviced by a water system, a sewerage system, a storm drainage system, public

roadways, street lighting, cablevision and telephone, subject to this Bylaw. Services shall be installed by the developer in accordance with the standards, specifications, and drawings as shown in the Subdivision Servicing Standards which is marked Schedule A and forms part of this Bylaw.

7.2 Where any power line or pipeline crosses or is situated on the land which is being proposed to be subdivided, the subdivision shall be designed so that such power line or pipeline is incorporated within the limits of a highway or adjacent and parallel thereto, so that no parcel is created upon which a building is intended to be situated where such building shall;

a) in the case of a power line be sited no closer than 6 metres measured horizontally to any part of the power line or its structure;

b) in the case of a pipeline be sited no closer than 10 metres to the centre line of the pipeline or centre line of the pipeline right-of-way, whichever is the lesser.

8.0 HIGHWAYS

8.1 Subdivision

No parcel shall be created by subdivision unless it abuts a highway improved to the standards prescribed in Schedule "A" of this Bylaw. No subdivision shall be approved until the owner of the land provides works and services, in accordance with Schedule "A" of this Bylaw, on that portion of a highway immediately adjacent to the site being subdivided or developed, up to the centre line of the highway.

8.2 Standards and Specifications

All highways created by subdivision including widened strips of existing highways and walkways shall be designed, cleared,

drained, surfaced and constructed in accordance with the standards prescribed in Schedule "A" of this Bylaw. Highways in Subdivisions in Zones RR-S, and RU do not require pavement.

8.3 Alignment and Gradients

No land shall be subdivided unless the alignment and gradient of proposed highways conform with the standards prescribed in Schedule "A" of this Bylaw.

8.4 Parcels on Controlled Access Highways

No parcel shall be created by subdivision adjacent to a controlled access highway, unless the parcel also abuts a lane or local or collector street.

8.5 Intersecting Highways

a) In a subdivision containing any parcel more than 80 metres in width, local streets shall be provided and spaced at intervals of not more than 400 metres on the arterial or collector streets, except:

   i) where natural features render vehicle access impractical, or

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

b) In a subdivision containing any parcel less than 80 metres in width, local streets shall be spaced at intervals of not more than 200 metres on arterial or collector streets.

c) The number of highway intersections within a subdivision shall be kept to a minimum, and where practicable:

i) Y-shaped intersections shall be avoided;

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

iii) intersections with more than four legs shall be avoided;

iv) intersections shall not be located in or near sharp curves or near the crest of any rise.

8.6 Lanes

a) Lanes shall be a minimum of 6 metres in width, free from curbs, and be provided with triangular corner cut-offs measuring not less than 3 metres each way from the corner of bends or where lanes intersect with highways or other lanes.

b) Lanes shall be arranged with continuity from block to block so that the lanes run straight through blocks.

c) In the case of a lane which does not terminate at a intersection with another highway there shall be turning area of not less than 12.0 metres square.

8.7 Cul-de-sacs

a) The length of a cul-de-sac shall not exceed 180 metres measured to the most distant point of turnaround. In unusual cases where this is impractical, the Approving Officer may accept a greater length.

b) Cul-de-sacs shall incorporate a turnaround right-of-way having a radius of not less than 18.25 metres.

8.8 Street Lighting

Where any parcel is being subdivided and a highway or portion thereof is being created, street lighting shall be located and constructed in accordance with the standards prescribed in Schedule "A" of this Bylaw.

8.9 Sidewalks and Boulevards

Where any parcel is being subdivided and a highway or portion thereof is being created, sidewalks and boulevards shall be located and constructed in accordance with the standards prescribed in Schedule "A" of this Bylaw.

9.0 WATER SYSTEM

9.1 Where any parcel is proposed to be subdivided, every parcel in the subdivision created shall be provided with a water distribution system and connected to a community water system in accordance with the standards prescribed in Schedule "A" of this Bylaw.

9.2 Where a parcel proposed to be subdivided abuts a trunk water main the trunk water main shall be extended through the land to be subdivided by the owner whether or not the capacity of the main exceeds that required to service the subdivision.

9.3 Where a proposed subdivision does not abut a community water system the owner shall extend a water trunk main from the community water system to the subdivision except as provided in Article 9.4 below.

9.4 (a) Where a proposed subdivision is located more than 500 metres from a community water system instead of extending a trunk main from the community water system the owner may provide each parcel with its own water system in accordance with the standards prescribed in Schedule "A" of this Bylaw.

(b) For residential zones wells or sources of water other than the District's community water system must have a minimum 20 year safe yield of 9.1 lites per minutes for eacn residence the source is to serve. The minimum 20 year safe yield calculation must be based upon the results of a (minimum) continuous 24 hour pump test, the results of which must be contained in a report signed and sealed by a professional engineer registered in the Province of British Columbia and who is experienced in hydrogeology.

(c) For zones other than residential zones, wells or sources of water other than the District's community water system must have a minimum 20 year safe yield satisfactory to the Approving Officer. The minimum 20 year safe yield calculation of the well must be based upon the results of a (minimum) continuous 24 hour pump test, the results of which must be contained in a report signed and sealed by a professional engineer registered in the Province of British Columbia and who is experienced in hydrogeology.

(d) Two (2) copies of the hydrogeologist's report must be submitted to the Approving Officer within 90 days of approval in principle of the proposed subdivision.

10.0 FIRE HYDRANT SYSTEM

10.1 Where a parcel is proposed to be subdivided, every parcel created as a result of the subdivision shall be provided with a fire hydrant system in accordance with the standards prescribed in Schedule "A" of this bylaw. In Zones RR-S and RU a fire hydrant system is not required unless water service is provided by a community water system.

10.2 Where a parcel proposed to be subdivided abuts a trunk fire hydrant main, the trunk fire hydrant main shall be extended through the land to be subdivided by the owner, whether or not the capacity of the main exceeds that required to service the subdivision. In Zones RR-S and RU, this extension is not required unless water service is provided by a community water system.

10.3 Where a subdivision does not abut a community fire hydrant system the owner shall extend a fire hydrant main from the community fire hydrant system to the subdivision. In Zones RR-S and RU, this extension is not required unless water service is provided by community water system.

11.0 SEWAGE COLLECTION AND DISPOSAL SYSTEM

11.1 Where any parcel is proposed to be subdivided, every parcel in the subdivision created shall be provided with a sewage collection system and connected to a community sewer system in accordance with the standards prescribed in Schedule "A" of this Bylaw.

11.2 Where a parcel proposed to be subdivided abuts a trunk sewer main, the trunk sewer main shall be extended through the land to be subdivided by the owner, whether or not the capacity of the main exceeds that required to service the subdivision.

11.3 Where a proposed subdivision does not abut a community sewer system the owner shall extend a sewer trunk main from the community sewer system to the subdivision.

11.4 Where a proposed subdivision is located more than 500 metres from a community sewage system instead of extending a trunk main from the community sewage system the owner may provide each parcel with its own sewage system in accordance with the standards prescribed in Schedule "A" of this Bylaw and to the approval of the Medical Health Officer of the Skeena Health Unit.

12.0 DRAINAGE SYSTEM

12.1 Where any parcel is proposed to be subdivided, every parcel in the subdivision created shall be provided with a drainage collection and disposal system and connected to a community drainage system in accordance with the standards prescribed in Schedule "A" of this Bylaw.

12.2 Where a parcel proposed to be subdivided abuts a trunk drainage main, the trunk drainage main shall be extended through the land to be subdivided by the owner, whether or not the capacity of the main exceeds that required to service the subdivision.

12.3 Where a proposed subdivision does not abut a community drainage system the owner shall extend a drainage trunk main from the community drainage system to the subdivision.

12.4 Where a proposed subdivision is located more that 500 metres from a community drainage system instead of extending a trunk main from the community drainage system the owner may provide each parcel with its own drainage system in accordance with the standards prescribed in Schedule "A" of this Bylaw.

13.0 SUBDIVISION SERVICING STANDARDS

As shown on the District of New Hazelton Subdivision Servicing Standards which is shown as Schedule "A", attached to and forming part of this Bylaw:

13.1 Except as provided for in Sections 8 to 12 inclusive of this Bylaw all subdivisions within the District of New Hazelton shall be serviced by a community water system, a community sewer system, a storm drainage system, paved public roadway, street lighting and other utilities and shall be designed and constructed in accordance with the standards, specifications and drawings as shown in Schedule "A" of the District of New Hazelton Subdivision Servicing Standards and forming part of this Bylaw. Table 13.1 summarizes the requirements.

TABLE 13.1 - SERVICING REQUIREMENTS

DESCRIPTION	ZONING (3)								
	R-1	R-2	R-3	C-1	C-2	I-1	I-2	RR-S	RU
SEWAGE COLLECTION (1)	X	X	X	X	X	X	X	X	X
WATER DISTRIBUTION (2)	X	X	X	X	X	X	X	0	0
FIRE HYDRANTS	X	X	X	X	X	X	X	0	0
STREET LIGHTING	X	X	X	X	X	X	X	X	0
PAVED ROADS	X	X	X	X	X	X	X	0	0

X - required

0 - optional

(1) Zones not indicated for community sewage collection shall have sewage disposal facilities acceptable to the Approving Officer and approved by the Ministry of Health, or Ministry of Environment and Parks, Province of British Columbia.

(2) Zones not indicated for community water distribution shall have water supply facilities acceptable to the Approving Officer and approved by the Ministry of Health.

(3) Zones as designated on zoning map of Bylaw No. 108, 1988.

14.0 APPROVALS

14.1 The design, materials, construction and testing of any community water system, community sewer system and public highways to service any proposed subdivision shall be in accordance with the requirements of any senior government, regulations, or statutes which are applicable thereto.

14.2 Notwithstanding the requirement of Subsection 1 of Section 13 of this Bylaw, a subdivision may be approved prior to the construction of the required services provided that an arrangement pursuant to section 991 of the Municipal Act has been made.

14.3 Subdivision Fees

An application for approval in principle under Section 13.1 shall be accompanied by a fee of $25.00 for the first parcel to be created by the proposed subdivision and $10.00 for each additional parcel.

15.0 CONNECTIONS

15.1 General

Where an owner constructs and installs the works required under this Bylaw the owner shall not connect such works to any of the

sewage, drainage, water or fire hydrant systems of the Municipality, and the Municipality shall not give final notice of acceptance to all or any part of the works constructed and installed by the owner until:

(a) the proposed subdivision has been approved by the Approving Officer; and
(b) the owner has caused to be registered in the Land Title Office and has deposited with the Municipality a plan of all rights of way required; and
(c) the owner has deposited with the Approving Officer "as constructed" drawings of the works prepared and sealed by a Professional Engineer; and
(d) a Certificate of Completion has been issued by the Municipality; and

15.2 Supervision of Connections

Connections to municipal water, fire hydrant, sewage and drainage systems shall be made under the supervision of and in accordance with the instructions of the Approving Officer and 72 hours notice shall be required.

16.0 COMPLETION AND ACCEPTANCE

16.1 Completion of Works

No works required under this Bylaw shall be considered complete until a Certificate of Completion has been issued. Separate certificates of completion may be issued for highway, water, fire hydrant, sewer and drainage works.

16.2 Acceptance of Works

Subsequent to receipt of "as built" drawings sealed by a Professional Engineer and upon the issuance of a Certificate of

Completion the Municipality may by Certificate of Acceptance, accept ownership of any and all works installed by the owner, provided they are located within a highway or statutory right of way or are on land owned by the Municipality.

16.3 Warranty and Maintenance Period

Notwithstanding any acceptance of ownership of works by the Municipality, the owner shall be responsible for any maintenance and repairs to the works until the issuance of a Certificate of Acceptance for the works. The warranty and maintenance period shall start on the date specified in the Certificate of Completion and shall be in effect for one (1) year.

16.4 Failure to Maintain or Repair

Upon failure of the owner to maintain or repair works, the Municipality may at the expense of the owner undertake maintenance or repairs.

READ A FIRST TIME THE 27th day of September, 198__.

READ A SECOND TIME THE 27th day of September, 198__.

READ A THIRD TIME THE 27th day of September, 198__.

RECONSIDERED, FINALLY PASSED AND ADOPTED THE 4th day of October, 1988.

MAYOR

CLERK

CERTIFICATION

I HEREBY CERTIFY that the foregoing is a true and correct copy of Bylaw No. 110, cited as the "District of New Hazelton Subdivision Servicing Bylaw No. 110, 1988".

CLERK

DISTRICT OF NEW HAZELTON

SUBDIVISION SERVICING BYLAW NO. 110, 1988

SCHEDULE "A"

SUBDIVISION SERVICING STANDARDS

This is Schedule "A" to the District of New Hazelton Subdivision Servicing Bylaw No. 110, 1988.

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DISTRICT OF NEW HAZELTON

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SUBDIVISION SERVICING STANDARDS

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GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS

Specifications contained within these general specifications or named herein shall govern the planning, engineering, quality of materials and installation of the works to be included in the subdivision.

1.0 PLANNING

The Developer's plan for subdivision shall comply with all existing District Bylaws.

The plan of subdivision shall conform with the regulations as set out in Zoning Bylaw No. 108, 1988.

2.0 ENGINEERING

The Developer's Consulting Engineer shall be a Professional Engineer in good standing, registered with the British Columbia Association of Professional Engineers and all drawings prepared by the Subdivider's Engineer shall bear the Professional Seal of the Engineer.

The Developer's Engineer shall submit to the Approving Officer for approval design criteria for the design of the roads, water system, fire hydrant system, drainage system and sanitary sewerage system complete with appurtenant structures.

3.0 INSPECTION

The Developer's Consulting Engineer shall provide competent inspectors and survey personnel satisfactory to the Approving Officer, to lay out and inspect the works to be installed in the subdivision and ensure that all works are constructed and installed to the standards and specifications herein contained.

The District shall have the right to appoint its own inspectors to inspect the Developer's works from time to time and this inspection shall be at the District's cost. Any inspection carried out by the District shall in no way relieve the Developer of any obligations or responsibility whatsoever in connection with the installation of the works of the subdivision. If the District's inspector should discover any defect or require any correction, he shall immediately report the matter to the Developer's inspector for appropriate action. The District's Inspector shall not issue any direct order to the Developer's Contractor except in the case of emergency. Any requests of the District's Inspector shall be acted on immediately.

4.0 MATERIAL

All materials installed by the Developer as part of the works of this subdivision shall be as approved by the Approving Officer. Detailed materials specifications are attached to and form part of this Schedule.

At the request of the Approving Officer, the Developer shall supply, at the Developer's sole cost, materials samples for non-destructive or destructive testing. Should the materials sample tested not comply with the specifications, the Developer snall be responsible for the cost of testing.

If the Developer wishes to utilize materials which are not contained in the detailed materials specifications attached to this Bylaw, the Developer shall supply for the approval of the Approving Officer, two copies of complete specifications listing full details of the material in question, the manufacturer, dimensions, absorption, chemical properties, strength, tolerance of manufacture, method of installation, test performance and all other pertinent information including the A.S.T.M. or A.W.W.A specifications relating to the material. The Approving Officer shall not be obligated to approve any material regardless of whether the material has received prior A.S.T.M. or A.W.W.A approval. If requested by the Approving Officer, the Developer shall supply an affidavit to show compliance with this Bylaw.

5.0 EXCAVATION, BACKFILL AND SURFACE RESTORATION

The Developer shall provide, construct and maintain all the necessary barricades, signs, warning devices, detours, notices and any other requirement of the District in carrying out the excavation and backfill of the works described in this Bylaw.

The Developer shall carry out all requests and orders of the Workers' Compensation Board and the Approving Officer as they pertain to the safety of workmen employed on the project or the general public.

All surplus excavated or backfill material declared unsuitable shall be disposed of by the Developer at a location acceptable to the Approving Officer.

Backfill material in road or street rights-of-way must be good quality, non-frost susceptible backfill material and shall not include any organic material, stumps, roots, rocks in excess of 0.03 m^3 or the largest dimension of object in excess of 300 mm or any other unsuitable material. All pipes installed are to be hand backfilled in the pipe zone to a depth of 300 mm above the

crown of the pipe with selected bedding material in accordance with the pipe manufacturer's recommendations for gradation of backfill material. This selected pipe bedding material is to be compacted with mechanical compaction equipment to a minimum of ninety-five percent (95%) of standard proctor density.

Backfill to the finished sub-grade elevation is to be placed in uniform lifts not exceeding 200 mm in depth (loose) and compacted to a minimum of ninety-five percent (95%) of standard proctor density.

Where pipes are not installed under existing or proposed road right-of-ways, backfill with native material placed in the trench in layers 900 mm thick and compacted by running a tracked machine along the trench as backfilling proceeds.

When the right-of-way is not actually being excavated for the installation of mains or service connections, the road surfaces and surrounding area is to be cleaned up, graded and kept in a useable condition for public traffic.

6.0 OFFSETS - LINE AND GRADE

The Developer shall be responsible to install the works included in the subdivision to the correct offset, line and grade as shown on the drawings approved by the Approving Officer. Any discrepancies in the offset, line or grade of any works installed by the Developer or his Contractors shall be made good at the sole expense of the Developer.

7.0 CONCRETE

All concrete supplied by the Developer shall be in accordance with the attached Material Specification No. 1 (Concrete). Controlled quality ready mixed concrete is to be supplied wherever concrete is required in the works covered by this Schedule. The Developer shall carry out all concrete testing required in the Specifications. The minimum twenty-eight day concrete strengths required for various uses are as follows:

Type of Construction	Minimum Specified Strength
Non-reinforced concrete manhole bases, thrust blocks, pipe encasement	21 MPa
Non-reinforced or reinforced structural concrete	25 MPa

HIGHWAY SPECIFICATIONS

HIGHWAYS SPECIFICATIONS

1.0 DEFINITIONS

In this Schedule, unless the context otherwise requires:

"Arterial" means a highway intended to carry large volumes of traffic at speeds ranging from 60 km/h to 70 km/h primarily between major traffic generators, and it is not intended to directly serve adjacent land.

"Collector" means a highway located within an area of major traffic generation and which is used primarily for the collection and distribution of traffic between arterials and locals as well as to some adjacent land. The design speed shall be 50 km/h to 60 km/h.

"K value" means the distance required in metres to effect a one percent (1%) change in gradient on a vertical curve;

"Local" means a highway located within an area of major traffic generation and used primarily to provide access to adjacent land. The design speed is 40 km/h.

2.0 INTENDED USE

The likely or intended use of the land, the climate prevailing in the area, the relation of the subdivision to the surrounding highway system, the topography, and the necessity for on street parking shall be taken into account, and design speed, finished grade and width of roadway set accordingly as in this Schedule.

3.0 CLEARING

3.1 REQUIREMENTS

All street right-of-ways, lanes and easements shall be cleared to their full width, grubbed and all refuse completely disposed of.

3.2 DANGER TREES

Individual leaning or dangerous trees and snags outside the clearing area shall be removed.

3.3 BURNING

Burning shall be carried out in accordance with the provisions of the British Columbia Forest Act and regulations thereto and in accordance with the District's Bylaws.

4.0 ASPHALTIC CONCRETE PAVEMENT

All asphaltic concrete pavement for roads and lanes shall be manufactured and laid according to the specifications set out in Material Specification No. 8 and Material Specification No. 10.

5.0 DESIGN PARAMETERS

Parameters for various design speeds shall be as follows. The design shall normally meet the Standards established by the Roads and Transportation Association of Canada.

	DESIGN SPEED		
	40 km/h	50 km/h	60 km/h
Overhead Clearance (metres)	5.5	5.5	5.5
Maximum Grade (percent)	12	10	8
Maximum Superelevation (m/m)	0.02	0.02	0.06

Maximum grades are to be reduced by one percent (1%) of grade for each thirty (30) metres of radius below 150 metres radius curve.

5.1 WIDTH

The following minimum pavement widths shall be provided for the class designated below:

Classification	RTAC Designation	Minimum Pavement Width (m)	R/W (m)
Local Residential	ULU 40	7.5	20
Local Collector	ULU 40	9.0	25
Commercial	ULU 50	13.5	25
Local Industrial	ULU 50	8.5	20

5.2 GENERAL REQUIREMENTS

All highways within the subdivision shall be paved except where the subdivision is in Zones RR-S, and RU Roads shall have compacted thickness of asphaltic plant-mix concrete placed on a compacted gravel base.

A full-depth asphalt alternative may be considered by the Approving Officer. The thickness of the asphaltic structure shall be determined by a Professional Engineer. The applicant may, with the approval of the Approving Officer, construct a rigid concrete pavement as an alternative to asphalt pavement. Rigid pavement design shall be in accordance with accepted present day practice, recognizing the climatic and soils conditions of the area. Material and application specifications for construction of rigid concrete pavement shall be approved by the Approving Officer. The rigid pavement shall be designed by a Professional Engineer.

5.3 GRADING

Topsoil shall be removed and the road, lane and boulevard areas shall be graded to the approved profiles and cross sections. The completed subgrade profile shall be constructed to a tolerance of 30 mm and all soft, spongy or unstable areas which may exist or develop shall be excavated to a firm base and backfilled to grade with compacted select material. All utility trenches within the subgrade section shall be excavated to a firm base and backfilled to grade with compacted select material.

Acceptable native subgrade material is to be compacted to a minimum density of ninety-eight percent (98%) of standard proctor density.

5.4 SELECT GRANULAR SUB-BASE - ROADS

The road structure within a subdivision shall be designed according to the soils conditions in the area. The structural sub-base shall be designed by a Professional Engineer.

Generally speaking, a select granular sub-base shall be laid to a depth as determined by a detailed soils investigation and shall meet the requirements of the highway's intended use. The cost of the soils investigation shall be borne by the Developer.

All backfilled subgrade material is to be compacted to a minimum density of ninety-eight percent (98%) of standard proctor for the full depth of the sub-base material.

Material and application specification for granular sub-base construction shall be in accordance with Material Specification No. 9.

5.5 CRUSHED GRANULAR BASE - ROADS

A crushed granular base suitable for aspnaltic concrete surface shall be constructed over the select granular sub-base and in accordance with Material Specification No. 9.

Materials and application specifications shall be approved by the Approving Officer. The thickness of the crushed granular base shall be calculated by a Professional Engineer and it shall be suited to the classification of the roadway design.

5.6 CULVERTS

Culverts may be of concrete or galvanized corrugated steel pipe designed to carry H20 loading in accordance with A.A.S.H.O. for local roads and HS25 for arterial and collector roads.

Culverts shall be of sufficient size to properly drain all of the area naturally draining into the channel or ditch feeding into the culvert. The minimum size acceptable to the District will be 375 mm.

Allowance shall be made for increased runoff due to paving and other land development anticipated. The size shall be approved by the Approving Officer before installation.

Culverts shall be installed true to line and grade and covered with select granular material to a minimum 300 mm above the crown of the pipe. The pipe bedding shall be designed to suit the site conditions and pipe material used.

End walls must be riprapped to prevent erosion.

5.7 LANES AND PEDESTRIAN WALKWAYS

Where service lanes for vehicular traffic are included in a subdivision, tney shall be a minimum of 3 m in width and the requirements for subgrade preparation shall be as for street surfacing. The right-of-way requirements shall be a minimum of 6 m in width.

Where pedestrian walkways are provided in the subdivision for access to park, school sites, commercial areas or connecting residential streets of the subdivision, the walkways shall be cleared to a minimum width of 2 m; graded to provide proper surface drainage; organic, wet, soft material removed; and a firm granular subgrade prepared true to line and grade. The walkways shall then be surfaced with a minimum of 50 mm depth of asphaltic concrete to a width of at least 1.5 m. The Specifications for asphaltic concrete walkways shall be as for asphaltic concrete roads.

5.8 STREET LIGHTING

Where underground street light wiring and/or ornamental type street lignting is included in the subdivision, all materials to

be incorporated into the system shall be approved by the Approving Officer, as well as all the requirements of the Provincial Inspector of Electrical Energy. The street lighting shall be designed in accordance with the "Illuminating Engineering Society Roadway Lighting Standards".

Provisions shall be made for providing power for future lighting in parks by installing the necessary ducts across highways to the park property line as required by the Approving Officer.

The street lighting system shall be laid out in accordance with good engineering design and in accordance with the "Illuminating Engineering Society Roadway Lighting Standards". The minimum average maintained horizontal illumination for residential streets shall be 4.0 Lux. The minimum maintained horizontal illumination for residential collector, commercial, and industrial streets shall be 6.0 Lux.

Any ornamental street lighting system shall utilize octagonal steel poles installed on reinforced concrete foundations. All wiring shall be internal to the pole and either high pressure sodium vapour or mercury vapour type lamps shall be used. In addition to the requirements of the Electrical Energy Inspector, the Developer must work with British Columbia Hydro and Power Authority in the installation of the street lighting system. The Developer shall be responsible for obtaining all the electrical permits required and shall pay all fees in connection with these permits.

5.9 BOULEVARDS

Boulevard areas lying between the edge of pavement and property lines of the residential and commercial road allowances shall be graded and topsoiled as follows:

i) Unless otherwise approved, boulevards shall be graded to drain to the road ditch at a minimum slope of 0.02 m/m (2%).

ii) The boulevard area shall be finished by excavation or filling as required to grade from the edge of pavement to the property line. Fill sections shall be compacted;

iii) The top 100 mm of soil shall be good quality topsoil raked free of all roots and other debris which is not conducive to the growing of grass, and shall contain no rock greater than 25 mm in maximum dimension.

WATER SYSTEM
SPECIFICATIONS

WATER SYSTEM SPECIFICATIONS

1.0 DESIGN PARAMETERS

The parameters for design and construction of the water system shall meet all requirements of the American Water Works Association (A.W.W.A.), B.C. Ministry of Health Specifications and the Canadian Underwriter's Association Recommended Water Supply Guide for Municipal Fire Protection. A minimum working pressure of 75 kPa and a maximum working pressure of 550 kPa must be maintained. All water systems must be designed by a Professional Engineer.

2.0 INSTALLATION OF WATER MAINS

All materials, including pipe fittings, shall be installed to applicable A.W.W.A. Standards for the installation of the particular type and class of material being used and to any additional requirements as set out by the materials manufacturer. All water mains shall be installed to a depth of 2.4 m clear from the invert of the pipe to the finished center line grade of the ditch. All pipe shall be bedded and hand backfilled and compacted to a depth of 300 mm above the crown of pipe as specified by the material manufacturer and the applicable A.W.W.A. standard for installation. Concrete thrust blocks shall be cast in place as shown on the drawings and shall be buried at least 150 mm into undisturbed ground on all sides and bottom of the trench. Concrete quality shall be as provided in Material Specification No. 1.

3.0 MATERIALS

All materials to be incorporated in the water distribution system shall be approved by the Approving Officer and shall conform to the specifications contained in Material Specification Nos. 5, 6, and 7.

4.0 CONSTRUCTION

When the native excavated material is not suitable for pipe bedding or trench backfill, the Subdivider shall supply suitable acceptable materials.

5.0 TESTING

Each section of water distribution piping installed by the subdivider must be tested for pressure and leakage in accordance

with the procedure as set out in the applicable A.W.W.A. Specifications and the allowable leakage shall be as provided in the specification. In the event that any section of the works installed do not meet the pressure and leakage test requirements, the developer shall carry out repairs and retest until satisfactory test results have been obtained.

The developer shall advise the Approving Officer or Public Works Department 24 hours in advance of the leakage test being applied and the Approving Officer may elect to witness the test. All test data and leakage calculations shall be submitted to the Approving Officer by the developer's engineer.

Disinfection and flushing of the water distribution system shall be carried out by the developer in accordance with A.W.W.A. Specification C-601 prior to the system being placed in service. The District's Public Works Department shall be notified 24 hours in advance of the flushing operation to supervise the disinfection and a representative of the District may be present to witness the procedure.

6.0 FIRE HYDRANTS

Fire hydrants shall be complete as specified in Material Specification No. 6 and shall be installed as shown on the attached standard drawing. Hydrants in residential subdivisions shall be spaced a maximum of 150 m apart and 100 m apart in commercial, industrial and high density residential areas. All hydrant sets shall be isolated from the water main by a gate valve. Hydrants shall be installed 0.9 metres from property lines and on the north east corner of intersections. Hydrant access paths shall be provided where necessary.

7.0 WATER SERVICE CONNECTIONS

All materials to be incorporated in the water services shall be approved by the Approving Officer and shall conform to Materials Specification No. 7.

Each single family dwelling unit, and each dwelling unit of a duplex, row or townhouse project for individual ownership shall have an individual 20 mm water service connection.

Water service tapping shall be through a corporation stop with a properly formed goose neck and shall also include a self-draining curb stop, service box and thaw wires all as shown on the attached water service connection standard drawing. The minimum depth of water service connection below the property line shall be 2.7 m.

8.0 TRENCH

If a water service is a minimum of 300 mm higher than the sanitary sewer then both services may be installed in a common trench and a common trench may be used to install the services for adjoining single family or duplex building sites, otherwise a minimum of 3 m separation shall be used. The pipe subgrade shall be carefully prepared, graded and compacted prior to installation of the service pipes. Select backfill material shall be hand placed and compacted to a minimum depth of 300 mm above the crown of the pipe. When the native excavated material is not suitable for pipe bedding or trench backfilling, the unacceptable material shall be removed and acceptable material provided by the Subdivider.

Alternate methods of service pipe installation may be approved by the Approving Officer on submission of detail drawings by the developer.

SANITARY SEWER SYSTEM
SPECIFICATIONS

SANITARY SEWER SYSTEM SPECIFICATIONS

1.0 INTRODUCTION

Sanitary mains and storm mains shall be designed as separate systems and in no case shall there by any cross-connection between the sanitary and storm sewer systems, nor shall any or either of the systems be designed as a combined sewerage system. No street, boulevard or private property surface drainage system shall be connected to the sanitary sewer system. No roof drains or weeping tiles shall be connected to the sanitary sewer system.

2.0 MATERIALS

All materials to be incorporated in the sanitary sewer system shall be approved by the Approving Officer and shall conform to Material Specification No.'s 2, 3 and 4.

3.0 CONSTRUCTION

All materials including pipe, fittings, manholes and appurtenant structures shall be installed true to the line and grade shown on the construction drawings. All pipes shall be jointed in strict accordance with the manufacturer's recommended practice. Once the joint is home, restraint shall be applied to the pipe by tamping of backfill or placement of temporary blocking to ensure that the pipe does not creep and dislodge the joint.

Following installation of the pipe, bedding material shall be placed by hand to a minimum depth of 300 mm over the pipe crown and this material shall be thoroughly compacted to the design requirements and soil conditions. When the native excavated material is not suitable for backfill the Subdivider shall remove the unsatisfactory material and shall provide material satisfactory to the Approving Officer.

Sewer manholes shall be pre-cast concrete placed on concrete pads on firm compacted subgrade. Concrete benching shall be installed to the spring line of the pipe and the pipe crown broken out and finished to the benching. Manholes shall be water tight and subject to the same leakage or infiltration test as the sewer pipe.

Sewage force mains shall be installed to the same specification as water mains and the same test criteria shall apply.

Where outfalls, pumphouses or other appurtenant structures are required, additional detailed specifications may be required.

4.0 DESIGN PARAMETERS

The parameters for design of the sewer system shall meet all requirements of the B.C. Ministry of Health Regulations. The sanitary sewer main shall be installed to a minimum depth of 2.4 m from the invert of the pipe to the finished centre line grade of the street.

All sewer systems within the boundaries of the proposed subdivision must be designed by a Professional Engineer.

5.0 DEVIATIONS

Any deviations from the specifications set out in this schedule must be approved in writing by the Approving Officer.

6.0 TESTING

At the request of the Approving Officer, the developer shall provide the necessary labour and materials to test the sanitary sewer works installed in the subdivision. Testing shall consist of lamping the main from manhole to manhole by utilizing lights or mirrors. Infiltration or exfiltration tests shall also be conducted as considered necessary by the Approving Officer, and shall conform to the following:

a) Infiltration and exfiltration limits are 3.50 litres per 25 mm of internal pipe diameter per 100 m of pipe per hour;

b) If an exfiltration or infiltration test is ordered by the Approving Officer, the developer shall provide all equipment, tools, labour and water and shall perform the first and all subsequent tests at his own expense;

c) The exfiltration test is made on each section of sewer between manholes and includes the upstream manhole. The hydrostatic head shall be at least 1 m above the top of the pipe; alternatively, the developer may carry out air testing. Minimum pressure shall be 24 kPa with a maximum allowable drop of 3.5 kPa in 5 minutes;

d) The infiltration test is made on each section of sewer between manholes by measuring the flow from the section in the downstream manhole.

In the event that any section of the works installed does not satisfactorily pass the lamping, infiltration or exfiltration tests, the developer shall carry out all repairs and re-test until satisfactory tests have been obtained.

Before acceptance of the sanitary sewerage systems, the developer shall flush the mains and remove all sand, dirt or other foreign material. All materials to incorporated into the sanitary sewer system shall be approved by the Approving Officer and shall conform to Material Specification No. 2, 3 and 4.

7.0 SERVICE CONNECTIONS

Each single family dwelling and each dwelling unit of a duplex, row or townhouse project for individual ownership shall have a minimum of 100 mm diameter sanitary sewer service connection. Service connections shall be installed to the property line and shall include a cleanout at the property line.

Sanitary sewer services shall be connected to the sewer main with the use of preformed wyes.

In no case shall a connection be made by breaking into the side or top of a main and cementing in a service pipe without the use of a wye. The minimum grade of a 100 mm diameter service pipe shall be 0.02 m/m (2%), and where this grade cannot be maintained, a 150 mm service shall be installed at a minimum grade of 0.01 m/m (1%). The desired sewer invert depth below the calculated finished grade at the property line is 2 m.

8.0 TRENCHES

If a water service is minimum 300 mm higher than sanitary sewer service then both services may be installed in a common trench and a common trench may be used to install the services for adjoining single family or duplex building sites, otherwise minimum 3 m separation shall be used. The pipe subgrade shall be carefully prepared, graded and compacted prior to installation of the service pipes. Select backfill material shall be hand placed and compacted to a minimum depth of 100 mm above the crown of the pipe. When the native excavation material is not suitable for pipe bedding or trench backfilling, the unacceptable material shall be removed and acceptable material provided by the developer.

9.0 LAND DISPOSAL

9.1 PERCOLATION TESTS

A percolation test shall be made. Percolation tests shall be carried out in accordance with Section 9.5 and shall be subject to the approval of the B.C. Ministry of Health.

9.2 PERCOLATION RATE

The parcel shall contain an area of soil suitable for sewage disposal not smaller than the following, as determined by the percolation rate:

Percolation Rate (min/cm)	Minimum Size of Area of Soils (sq. metres)
less than 13	305
13 or more, but less than 25	455
25 or more, but less than 38	610
38 or more, but less than 50	760
50 or more, but less than 63	910
63 or more, but less than 75	1 065

9.3 POROUS MATERIAL

There shall be a minimum of 120 centimetres of natural porous soil above the groundwater table in the area of soil referred to Section 9.2 above, and a representative number of testholes shall be dug in that area to a minimum depth of 120 centimetres to demonstrate this.

9.4 SITING REQUIREMENTS

The area of soil required for sewage disposal in Section 9.2, above, shall be capable of meeting the siting requirements for absorption fields in the B.C. Ministry of Health Regulations Governing Sewage Disposal.

9.5 TEST PROCEDURES

Percolation tests shall be undertaken; as follows:

a) Percolation testholes shall be made at points and elevations selected as typical in the area of proposed disposal field;

b) One of these testholes shall be dug at each end of the area of the disposal field. Further holes may be required, depending on the nature of the ground and the result of the first test and the size of the proposed field;

c) Test holes shall be 300 mm square and excavated to the depth of the proposed absorption trench;

d) To make the percolation test more accurate, any smeared soil should be removed from the walls of the testhole;

e) If the soil contains considerable amounts of silt and/or clay, the testhole shall be presoaked before proceeding with the test. To do this, keep the hole as fully filled with water as possible for four (4) hours. Proceed with the test immediately after presoaking;

f) To undertake the test, fill the testhole with water. When the water level is thirteen (13) centimetres or less from the bottom of the hole, refill the hole to the top. No recording of time need be done for these two fillings;

g) When the water level after the second filling (step g) is thirteen (13) centimetres or less from the bottom of the hole, add enough water to bring the depth of water to fifteen (15) centimetres or more;

h) Observe the water level until it drops to the fifteen (15) centimeter depth. At precisely fifteen (15) centimetres, commence timing. When the water level reaches precisely twelve and one-half (12.5) centimetres depth, stop timing;

i) Repeat procedures g) and h) until the last 2 rates of fall do not vary more than 2 minutes per 2.5 cm.;

j) The time in minutes for the water level to drop 2.5 centimetres is the percolation rate for that hole and is recorded in minutes per 2.5 centimetres. The percolation rate of the absorption field is the average rate of all the percolation tests made for that field;

k) Backfill the holes with the excavated soil, flag their location and repeat the test in other locations. Record the results and submit to the local authorities.

STORM SEWER SYSTEM
SPECIFICATIONS

STORM SEWER SYSTEM SPECIFICATIONS

1.0 DESIGN PARAMETERS

All drainage facilities including culverts shall be designed for a five year flood using the most recent development rainfall intensity curves for the New Hazelton area. The storm sewer system shall be designed by a Professional Engineer and shall follow good engineering standards and practices.

2.0 INSTALLATION OF STORM SEWER MAINS

Storm sewer mains shall be designed as separate systems and in no case shall there be any cross connection between the sanitary and storm sewer systems.

3.0 MATERIALS

All materials to be incorporated in the storm sewer system shall be as approved by the Approving Officer and shall conform to Material Specification Nos. 2, 3 and 4.

4.0 CONSTRUCTION

All materials including pipe, fittings, manholes and appurtenant structures shall be installed true to the line and grade shown on the construction drawings. All pipes shall be jointed in accordance with the manufacturer's recommended practice.

Following installation of the pipe, bedding material shall be placed by hand to a minimum depth of 300 mm over the pipe crown and this material shall be thoroughly compacted to the design requirements and soil conditions. When the native material is not suitable for backfill the Developer shall remove the unsatisfactory material and shall provide material satisfactory to the Approving Officer.

Manholes shall be of precast concrete placed on concrete pads on firm compacted subgrade. Concrete benching shall be installed to the spring line of the pipe and the pipe crown broken out and finished to the benching. Manholes shall be water tight and subject to the same leakage or infiltration test as the pipe.

5.0 TESTING

At the request of the Approving Officer, the developer shall provide the necessary labour and materials to test the storm sewer works installed in the subdivision. Testing shall consist of lamping the main from manhole to manhole by utilizing lights or mirrors.

In the event that any section of the works installed do not satisfactorily pass the lamping test the developer shall carry out all repairs and re-test until satisfactory tests have been obtained.

MATERIAL SPECIFICATIONS

MATERIAL SPECIFICATION NO. 1

CONCRETE

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 1

CONCRETE

1.1 DEVELOPER'S RESPONSIBILITY

The Developer shall supply labour, materials, scaffolding, forms, cold weather protection and equipment necessary to complete all required concrete work. The Developer shall also provide:

a) Concrete mix design including admixtures and notes regarding durability of proposed aggregates;
b) Control test cylinders, as required.

The Developer shall be responsible for the quality of ingredients, strength, impermeability, durability and finish of all concrete work.

1.2 STANDARDS

a) Perform the work according to CSA CAN 3-A.23.1 unless required elsewhere in the specifications;

b) Quality Control

i) Shall conform to CSA Specification A.23.1;

ii) Make at least one test for each day's concreting or for each 75 cubic metres of concrete placed;

iii) For each test determine slump and air content, and fabricate three standard cylinders to be cured under laboratory conditions;

iv) Break one cylinder from each test at seven (7) days and the remaining cylinders at twenty-eight (28) days;

v) When temperatures are at or below five (5) degrees Celsius make additional field cured cylinders to verify that adequate strength is attained.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

a) Store all materials in accordance with CSA CAN A.23.1-8, Storage of Materials;

b) Store each shipment of cement separately to provide access for identification and inspection of each shipment;

c) Protect cement from moisture;

d) Store so as to prevent segregation and intrusion of foreign materials, and obtain uniformity;

e) Clean stockpile areas of foreign materials;

f) Do not use stockpiled material within 150 mm of the ground surface if the stockpile is placed directly on the ground.

1.4 DESIGN OF CONCRETE

The design of all concrete mixes shall be performed by a Professional Engineer and shall suit the local site conditions.

1.4.1 CEMENT

Sulphate resistant Portland Cement shall be type 50. Normal Portland Cement shall be type 10.

1.4.2 WATER

Shall conform to CSA CAN 3-A.23.1.

1.4.3 FINE AND COARSE AGGREGATE

Shall conform to CSA CAN 3-A.23.1.

1.4.4 AIR ENTRAINING ADMIXTURES

Shall conform to CSA CAN 3-A.266.1-M, Air-Entraining Admixtures for Concrete.

1.4.5 CHEMICAL ADMIXTURES

a) Shall conform to CSA CAN 3-A.266.2-M, Chemical Admixtures for Concrete.
b) Use only as approved by the Approving Officer.

1.4.6 AIR CONTENT

Entrained air content shall be maintained at 5% plus or minus 1% for all concrete.

1.4.7 SLUMP

Slump shall generally be maintained at 75 mm plus or minus 25 mm, except for toppings where it should not exceed 50 mm.

For heavily reinforced or thin section walls and columns, slump may be inceased to 100 mm maximum provided that the strength is maintained by use of a richer mix.

1.4.8 STRENGTH

Concrete shall be designed to achieve an average 28 day compressive strength sufficiently in excess of the strength specified on the drawings, or as required elsewhere in the specifications, that the average of all strength tests as well as the average of any five consecutive tests shall be equal to or greater than the specified strength; no three consecutive tests shall fall below the specified strength, all in accordance with CSA CAN 3-A.23.1.

1.4.9 READY MIX CONCRETE

Ready mix concrete meeting the above requirements may be used and shall be in accordance with CSA CAN 3-A.23.1. Section 11.3 and 11.4. The proposed mix, along with substantiation of the durability of the aggregate shall be submitted to the Approving Officer for approval.

1.4.10 FAILURE TO MEET TEST REQUIREMENT

Should the concrete tested fail to meet the specified strengths the Approving Officer shall have the right to require the Developer to remove and replace all or any portion of the work he may deem necessary.

1.4.11 REINFORCING STEEL

Reinforcing bars shall be deformed, intermediate stength and in accordance with CSA G30.12-M. Welded wire fabric shall be in accordance with CSA G30.5-M.

Metal Reinforcement shall be as called for on the drawings and shall be firmly supported to provide the spacings and concrete covers indicated. The developer shall supply for the Approving Officer's approval, as to general conformity, two copies of reinforcing bar bending and placing schedules. Details of supports, slabs spacers, beam bolsters, etc., shall be indicated.

1.4.12 MAXIMUM COARSE AGGREGATE

a) 25 mm for concrete thickness greater than 300 mm;

b) 20 mm for concrete thickness 300 mm or less.

MATERIAL SPECIFICATION NO. 2

SEWER PIPE

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 2

SEWER PIPE

2.0 SEWER PIPE

a) P.V.C. sewer pipe in size 150 mm to 375 mm shall conform to ASTM Designation D3034 SDR35, and CSA B182.1-M and B182.2-M, or approved equal. The pipe shall be colored green for in-ground identification as sewer pipe.

2.1 SEWER PIPE JOINTS

Sewer pipe joints shall be watertight, maintain the adjacent pipes in alignment, and shall conform to the following specifications:

a) PVC pipe joints shall conform to ASTM Designation C443.

2.2 ALTERNATE PIPE MATERIAL

In general, sewer pipe selection is based on the pipe flowing full with a Mannings roughness coefficient of 0.013, and the maximum depth of cover with H20 loading permitted for the particular strength classification noted. A Developer wishing to use an alternative material to that noted above may do so providing that such substitute is first approved by the Approving Officer.

Types of material used shall be highly resistive to both erosion and corrosion, and if the material is of a ferrous nature, it shall be galvanized and hot dipped in asphalt both inside and outside. Asbestos bonding may be used as an alternative.

Pipes and joints used for sanitary sewer pipe shall be water tight and resistive to thermal and chemical attack. Couplings shall be compatible to the pipe.

Details of pipe and joint, manufacturer's specifications, installation procedures, bedding and backfill requirements and a list of other users shall be supplied upon request. The Approving Officer may require a certified copy from an independent testing laboratory of a variety of chemical and mechanical tests.

2.3 FITTINGS

Fittings for sewer pipe shall be made of a material compatible with and utilizing the same jointing methods as the pipe to which the fittings will be joined. Fittings shall conform to the same strength requirements as pipes.

MATERIAL SPECIFICATION NO. 3

PRECAST CONCRETE SECTIONS AND BLOCKS

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 3

PRECAST CONCRETE SECTIONS AND BLOCKS

3.1 PRECAST CONCRETE MANHOLES

Precast concrete manhole barrels shall conform to ASTM Designation C478. Barrels shall be nominal 1065 mm diameter complete with 19 mm diameter iron safety steps, hot dipped galvanized after fabrication and of an approved design at 300 mm spacing. Steps shall be so shaped or fastened to reinforcing that they cannot be withdrawn from the barrel without breaking out a large segment of concrete. Steps shall not break out at less than a 1800 Newton pull perpendicular to the manhole wall.

3.2 PRECAST CONCRETE MANHOLE LIDS OR CONES

Manhole lids shall be supplied to suit the manhole barrels. Lids shall be designed to withstand an H20 highway loading. Manhole openings shall be 635 mm diameter. Manhole lids shall have a minimum thickness of 200 mm and shall have two hooks or lifting lugs, each capable of lifting the lid alone. The hooks shall not project more than 30 mm to insert a standard 25 mm hook.

Alternatively manhole cones shall be supplied to suit the manhole barrels and shall be 840 mm high tapering eccentrically to a 635 mm diameter opening. Cones shall be designed to withstand at least H20 loading and are to have iron safety steps as described above in item 3.1.

3.3 PRECAST CONCTRETE CATCH BASINS

Precast concrete catch basins shall have a minimum inside diameter of 525 mm.

Circular precast concrete catch basins shall conform to ASTM Designation C478. Catch basin lids shall be designed to withstand at least H20 highway loading.

3.4 CONCRETE BLOCKS

Concrete blocks shall have a minimum compressive strength of 21 megapascals at 28 days and shall be solid concrete blocks.

MATERIAL SPECIFICATION NO. 4
CAST IRON SEWER APPURTENANCES

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 4

CAST IRON SEWER APPURTENANCES

4.1 MANHOLE FRAMES AND COVERS

Manhole frames and covers shall be cast iron conforming to ASTM A48 Class 20 grey iron, 132 kilograms minimum assembly weight, with 4 vent holes and shall be designed to withstand H20 loading.

4.2 MANHOLE RISER RINGS

Manhole riser rings shall be dipped, while hot and clean, in a hot batch of asphaltic tar.

4.3 CATCH BASIN FRAMES AND GRATES

Catch basin frames and grates shall be designed to withstand at least H20 loading.

Frames and grates shall be machined for a non-rocking fit and shall be dipped, while hot and clean, in a hot batch of asphaltic tar.

MATERIAL SPECIFICATION NO. 5

WATER PIPE

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 5

WATER PIPE

5.1 WATER PIPE

Water mains shall be designed for domestic cold water service with working pressures of 1035 kilopascals, at 23° Celsius, unless other working pressures are specifically called for, and for 2.4 m bury.

Water mains shall conform to the following specifications for each type of pipe:

a) P.V.C. Pipe shall conform to A.W.W.A. Standard C900 Polyvinyl chloride (P.V.C.) pressure pipe 100 mm through 300 mm for water. Joints shall be rubber gasket ring-tite joints conforming to A.S.T.M. D2672. Pipe shall have the same outside diameter as that of cast iron pipe of the same nominal diameter. Pipe wall thickness shall be SDR-18. Pipe material shall conform to approved Class 12455-A P.V.C. compounded conforming to A.S.T.M. Resin Specification D1784 and C.S.A. B137.3. Pipe shall be Underwriters Laboratories of Canada approved pipe.

5.2 ALTERNATE PIPE MATERIAL

In general, water pipe selection is based on pipes with a Hazen - Williams roughness coefficient of 120 and the maximum depth of cover with H20 loading permitted for the particular strength classification noted. A Developer wishing to use an alternative material to that noted above may do so providing that such substitute is first approved by the Approving Officer.

Types of material used shall be highly resistive to both erosion and corrosion, and if the material is of a ferrous nature, it shall be cement mortar lined and have a petroleum based asphaltic coating.

Pipes and joints used for water pipe shall be water tight and resistive to thermal and chemical attack. Couplings shall be compatible with the pipe.

Details of pipe and joint, manufacturer's specifications, installation procedures, bedding and backfill requirements and a list of other users shall be supplied upon request. The Approving Officer may require a certified copy from an independent testing laboratory of a variety of chemical and mechanical tests.

MATERIAL SPECIFICATION NO. 6

VALVES, HYDRANTS AND FITTINGS

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 6

VALVES, HYDRANTS AND FITTINGS

6.1 CAST IRON FITTINGS

Fittings shall be in accordance with A.W.W.A Specifications C110. All fittings shall be either flanged or have rubber gasket joints. Fittings shall have a bituminous protective coating suitable for use with potable cold water.

6.2 VALVES

a) Valves shall be solid wedge or double disc, non-rising stem gate valves in accordance with A.W.W.A. Specification C500 and the following supplementary information;

i) Ends
Valve ends shall be flanged where specified "F", in accordance with Section 9.2 of A.W.W.A. Specification C500 or shall have a hub. Valves shall be provided with lugs for 19 mm diameter harness bars where noted.

ii) Stem Seal
Stem seal shall be resilient "O-Ring".

iii) Wrench Nuts
Valves shall be fitted with wrench nuts in accordance with Section 19 of A.W.W.A Specification C500.

iv) Opening Direction
Valves shall open when wrench nut is turned counterclockwise.

v) Bypasses
Bypasses are not required for 300 mm diameter valves and smaller; 355 mm diameter to 500 mm diameter valves shall have a 75 mm diameter bypass.

vi) Valve Position
Valves shall be designed for vertical operation.

b) Tapping valves shall be in accordance with Section 6.2 (a) above and shall have oversized seat rings to permit the use of cutters for the full nominal size of the tapping valves.

6.3 HYDRANTS

Hydrants shall be compression type or slide gate type Terminal City or approved equal and shall conform with A.W.W.A. Specification C502 and shall be flanged at the ground line. Hydrants shall have two hose nozzles and one pumper nozzle complete with caps. Hose nozzles shall be 65 mm in diameter and pumper nozzles shall be 117.475 mm (4.625 inches) in diameter. Nozzle threads shall conform with British Columbia Fire Hose Thread Specifications. Hydrants shall have a 2.4 m bury as measured from the ground flange to the invert of the connecting pipe.

Hydrant stems shall be turned counterclockwise to open. Stem seals shall be resilient "O-Ring".

Hydrant extensions shall be supplied complete with nuts, bolts, flange gaskets, operator extension and coupling.

Hydrant drains shall be plugged unless approved by the Approving Officer.

6.4 STAND PIPES

Stand pipes shall be self-draining suitable for 2.7 m bury, and have one male outlet for 65 mm diameter fire hose, complete with cap. Stem and drain seals shall be resilient "O-Ring". The inlet shall be 50 mm National Pipe Thread.

Stand pipe valves shall open when the hand wheel is turned counterclockwise.

6.5 TAPPING SLEEVES

Tapping sleeves shall be designed to withstand working pressures of 1035 kilopascals. Tapping sleeves shall completely seal the length of pipe within the sleeve utilizing resilient rubber rings or gaskets.

MATERIAL SPECIFICATION NO. 7

MISCELLANEOUS

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 7

MISCELLANEOUS

7.1 SEWER SERVICE PIPE

P.V.C. sewer service pipe shall be SDR-28 and shall have ring-tite rubber ring joints and have fittings conforming to CSA Specification B 182.1.

7.2 SEWER SERVICE SADDLES

Saddles shall be cast iron sewer service saddle wyes and shall include casting, bronze or stainless steel strap, gasket and rubber ring. Alternatively, PVC saddle wyes may be used in conjunction with PVC sewer pipe.

7.3 SEWER PIPE COUPLINGS

Sewer pipe couplings shall be a mechanical compression joint for plain end pipe.

7.4 MANHOLE RUNGS

Manhole rungs shall have the following dimensions:

19mm diameter, 300 mm step with 50 mm drop, 355 mm legs with 50 mm hooks bent up.

These are to be mild steel, galvanized after fabrication. The coating shall conform to A.S.T.M. Designation A153-53.

7.5 TUBING

a) Copper Tubing

Copper tubing shall be in accordance with A.W.W.A. Specification C800 for "Type K". Tubing in the 13 mm, 20 mm, 25 mm, 30 mm, 37 mm diameters shall be in coils. Tubing in 50 mm diameter and over shall be in 6 m lengths.

b) Polyethylene Tubing

Polyethylene tubing shall be Series 160 meeting CSA B137.1 and AWWA C-901 and shall be supplied in coils. One piece stainless steel inserts shall be used at connections to corporation and curb stops.

c) Polybutylene Tubing

Polybutylene tubing shall be CTS size, SDR 11, meeting ASTM D3309, CSA 137.8. and AWWA C-902. It shall be supplied in coils. One piece stainless steel inserts shall be used at connections to corporation and curb stops.

7.6 CORPORATION BRASS

Corporation brass shall be in accordance with A.W.W.A. Specification C800. Fitting ends shall be suitable for use with compression fittings in accordance with A.W.W.A. Specification C800. Where required, the following designation shall be employed to describe the end fittings:

Cu	=	flared copper end
CuC	=	compression fitting for copper pipe
IPm	=	iron pipe threads (male)
IPf	=	iron pipe threads (female)
PBc	=	compression fitting c/w stainless steel internal pipe stiffener or insert for polybutylene tubing
PEc	=	compression fitting c/w stainless steel internal pipe stiffener or insert for polyethylene tubing.

a) Corporation Stops

The thread form for the inlet band of the corporation stop shall be the same as that quoted in Table 1 and Figure 1 of A.W.W.A. Specification C800 with the starting threads chamfered in accordance with the manufacturer's standard practice. The outlet shall be a compression fitting and shall have an electrical connection lug with 21 mm diameter or 11 mm diameter drilling;

b) Curb Stops

Curb stops up to 25 mm diameter shall be of the inverted key, stop and drain type, Ford, Mueller H-15217 or approved equal. Curb stops 30 mm in diameter and larger shall have an "O-Ring" seal for the inlet port and top of valve plug and shall automatically drain when the valve is in the closed position, Mueller H-15214, or approved equal. All curb stops shall have solid tee heads with a 13 mm hole for attaching stationary rod, open counterclockwise, have a quarter turn check and be suitable for 1035 kiloPascals working pressure;

c) Corporation Coupling

Corporation Couplings shall be in accordance with A.W.W.A. Specification C800. Compression fittings shall be such that they are capable of withstanding a tensile stress similar to flared fittings.

7.7 CURB BOXES AND LIDS

Curb boxes shall be of cast iron construction and top adjusting Mueller A726 or approved equal, with 1.8 m stationary rod for 2.7 m service. Lids shall be Mueller A800 or approved equal.

7.8 VALVE BOXES AND LIDS

Valve boxes and lids shall be Daigle Ellipso or approved equal with locking lids. Valve boxes and lids shall be dipped, while hot and clean, in a hot bath of asphaltic tar. Where valve boxes are located in asphaltic pavement the Approving Officer may approve non-locking lids.

7.9 VALVE BOX EXTENSION BASE PARTS

Valve box extension base parts shall be as supplied by Terminal City Iron Works or approved equal. They should be 200 mm inside diameter at the bottom for a minimum of 275 mm in height and shall be suitable for insertion over a 150 mm pipe.

7.10 VALVE BOX RISERS

Valve box risers shall be PVC Sewer Pipe, SDR 35, in accordance with Materials Specification No. 2 , or specially molded fibre glass risers in 2.5 lengths as manufactured by Fred Surridge Limited or approved equal.

7.11 WATER PIPE COUPLINGS

Pipe couplings shall be "Robar" cast iron pipe couplings.

7.12 POLYETHYLENE PIPE FOR ELECTRICAL DUCT

Polyethylene pipe shall be Type 2 medium density standard polyethylene pipe in 300 m rolls up to 35 mm diameter and 6 m lengths for 50 mm diameter and over, suitable for buried electrical ducting between fixture bases. Polyethylene pipe to be of the type outlined in Bulletin 12-10.0 issued by the Electrical Safety Branch.

7.13 GALVANIZED IRON PIPE

Iron pipe shall be Schedule 40 pipe, galvanized after threading, in 6 m lengths complete with one coupling per pipe.

7.14 CLEAN OUT CAPS

Caps for sanitary sewer clean outs shall be cast iron.

7.15 BUILDING SEWER CAPS

Caps for sewer service pipe may be plastic or rubber and shall be suitable for temporary installation on P.V.C. building service pipe. Caps shall be provided complete with the necessary gasket.

7.16 THAW WIRE

Thaw wire shall be No. 2 RWU-90 or equivalent as approved by the Approving Officer.

MATERIAL SPECIFICATION NO. 8

ASPHALTIC CONCRETE - AGGREGATE MANUFACTURE

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 8

ASPHALTIC CONCRETE - AGGREGATE MANUFACTURE

8.1 MATERIAL ACQUISITION

The Developer shall be responsible for the acquisition of materials, crushing location, crushing and screening plants, stockpile site locations and all royalties. The Developer shall satisfy himself that the materials at the site are of such characteristics that he can consistently supply aggregates conforming to the requirements of the pertinent specifications, either by a continuous crusher run production or by crushing and blending as may be required. If the Developer's pit does not yield satisfactory aggregate within the specifications, the Developer shall be required to blend materials to meet the specifications.

8.2 STOCKPILING

Handle all aggregate in a manner that will prevent segregation and intrusion of foreign material.

8.3 CRUSHING AND SCREENING

The Developer shall adjust his crushers, provide such screens and perform such testing as may be necessary to produce and maintain an acceptable gradation of aggregates. Copies of aggregates tests performed by the Developer shall be submitted to the Approving Officer. The Approving Officer may arrange for regular sieve analysis to be made of the aggregate during production within normal District working hours. If the District so tests, the Developer will be notified if it appears that the product is moving out of specifications or, in the case of intended blending at the cold feed of the paving plant, is no longer meeting the stated and approved objectives. If the Developer fails to remedy the defects as soon as reasonably possible, crushing will cease and not recommence until the necessary adjustments to the equipment have been completed to the satisfaction of the Approving Officer.

MATERIAL SPECIFICATION NO. 9

CRUSHED GRANULAR SUB-BASE AND BASE COURSE

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 9

CRUSHED GRANULAR SUB-BASE AND BASE COURSE

9.1 REGULATIONS

The Developer shall perform the work under observation of Safety Regulations of the Worker's Compensation Act.

9.2 MAINTENANCE OF TRAFFIC

a) The Developer shall perform work in a manner that will cause the least disruption to traffic.

b) Closing of streets, detouring of traffic, posting of traffic signs and provision of flagmen shall be the Developer's responsibility.

c) The Developer shall maintain detour roads.

9.3 PERMITS

The Developer shall obtain all permits required for this section of the work and abide by the stipulation of the permits.

9.4 PRODUCTS

9.4.1 GRANULAR SUB-BASE

The granular sub-base shall consist of sound, hard, durable, uniformly graded pit run or crushed gravel or sand as specified.

9.4.2 GRANULAR BASE

The granular base shall consist of sound, hard, durable particles crushed to a uniform gradation, and to 25 mm maximum size.

9.4.3 GRANULAR SUB-BASE AND GRANULAR BASE

a) The material shall not contain sod, roots, plants or other organic materials, neither shall they contain soft fragments such as shale or flaky particles in excess of fifteen (15%) percent by weight. The materials shall be well graded from coarse to fine within the gradation limits, and shall not be subject to extreme variation between the lower and upper limits of the gradation band specified;

b) On the prepared materials, that portion of fine aggregate, including supplementary material, if any, which passes the No. 40 Sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than 6.

9.4.4 GRADATION DESIGNATIONS

When tested on Standard Laboratory screens, the materials shall meet one or more of the following gradations.

a) Pit Run or Crushed Gravel Sub-base

Screen Size	Percent Passing
75 mm	100
25 mm	60 - 85
No. 4	30 - 60
No. 200	2 - 10

b) Crushed Base Course

Screen Size	Percent Passing
19 mm	100
12.5 mm	70 - 100
No. 4	40 - 80
No. 8	27 - 65
No. 16	18 - 50
No. 30	12 - 35
No. 50	8 - 25
No. 100	4 - 17
No. 200	2 - 8

For crushed aggregate, not less than 60 percent (60%) of the material retained on the No. 4 sieve shall be crushed particles. The ratio of the percentage passing the No. 200 sieve to the ratio passing the No. 4 sieve shall not exceed two-thirds (2/3) and preferably not less than one-half (1/2).

9.5 EXECUTION

9.5.1 SUB-GRADE

a) The Developer shall shape the sub-grade to the cross-section shown on the plans prior to placing the sub-base course thereon. The Developer shall maintain the sub-grade to the specified section, free from ruts, waves, and undulations, by means of blade graders, rolling and spraying with water whenever so directed by the Approving Officer;

b) The sub-grade for sub-base course shall be in a firm, dry condition before any material is placed thereon and the Approving Officer's approval must be obtained before placing any granular material.

9.5.2 PLACING OF SUB-BASE AND BASE COURSE

Unless otherwise specified, the granular material shall be placed in uniform layers not exceeding 150 mm in thickness before compaction. The material shall be placed by mechanical spreaders or deposited in windrows and levelled with a suitable motor grader.

9.5.3 COMPACTION OF SUB-BASE AND BASE COURSE

a) The granular sub-base and base course material shall be compacted by rolling with a pneumatic tired roller, vibratory roller or other approved type. Each layer shall be compacted at the optimum moisture content, to one hundred percent (100%) of the maximum dry density as determined by the Standard Proctor compaction test for the material used;

b) During compaction, water shall be added by an applicator, in such quantities that the moisture content will be maintained at the optimum level as determined by the Standard Proctor test. If the moisture content exceeds the optimum moisture content, the material shall be aerated by mechanical means or work shall cease temporarily until the material has dried sufficiently to reach the optimum moisture content.

9.5.4 SHAPING OF SUB-BASE AND BASE COURSE

A blade grader shall be used in conjunction with the compaction equipment to keep the finished surface of each layer even and uniform. The finished surfaces of the granular base course and sub-base course shall conform to the required cross-section and grades as shown on the drawings, within a tolerance of plus or minus 15 mm. The finished sub-base course surface shall show no depression more than 12 mm under a straight edge of 3 m long placed parallel to the road centre line. The finished base course surface shall show no depression more than 6 mm under a straight edge 3 m long placed parallel to the road centre line.

9.5.5 PROOF ROLLING

If ordered by the Approving Officer, the Subdivider shall supply and operate a loaded test venicle of 8165 kg axle load to test the sub-base and base for rutting and weaving.

MATERIAL SPECIFICATION NO. 10

ASPHALTIC CONCRETE

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 10

ASPHALTIC CONCRETE

10.1 MAINTENANCE OF TRAFFIC

a) The Developer shall perform the work in a manner that will cause the least disruption to traffic;

b) Closing of streets, detouring of traffic, posting of traffic signs and provision of flagmen shall be the Developer's responsibility;

c) The Developer shall maintain detour roads.

10.2 PERMITS

a) The Developer shall obtain all permits required for this section of the work and abide by the stipulations of the permits;

b) The Developer shall notify the Approving Officer as to intended sources of supply of aggregate.

10.3 MATERIALS TESTING

The Developer will employ a testing agency to do the on-site testing as the work progresses. The Developer will pay for all materials testing.

10.4 SUBMITTALS

a) Design Mix - The Developer shall pay for and submit duplicate copies of a design mix as recommended by a testing agency employed by the Developer. The design mix shall satisfy the following criteria based on the Standard Marshall Test procedure (A.S.T.M. D-1559).

Blows each face - Manual	50
Marshall stability lbs. @ 60° C	1000 min.
Flow index in 0.25 mm	8 - 14
% voids in mineral aggregate	
20 mm maximum aggregate	14 min.
12.5 mm maximum aggregate	15 min.
% voids in total mix	3 - 5
% voids filled with asphalt	75 - 85

The percent air voids in the compacted paving mix shall not be less than 3 percent (3%) and not more than 6 percent (6%) and shall be determined with the method outlined in A.S.T.M. D3203-73.

10.5 SITE EXAMINATION

a) The Developer shall examine all existing structures and protect them from damage during surface course laying operations;

b) The Developer shall ascertain that the base course is properly compacted and prepared for placement of the surface course.

10.6 PRODUCTS

10.6.1 PRIME COAT

The Prime Coat shall be MC-0 (MC-30) or as approved by the Approving Officer.

10.6.2 ASPHALT CEMENT

a) The asphalt cement shall be prepared by the refining of petroleum;

b) The asphalt cement shall be uniform in character and shall not foam when heated to 177° C;

c) Delivery temperature shall be between 135° C and 177° C;

d) The maximum variation of the asphalt cement content should not exceed 0.25% of the design by weight in the total mixture;

e) The following grades will be used for the asphalt mix design and the selection will depend upon laboratory analysis results.

Characteristics	ASTM Test Method	Grades AC5		Grades AC2.5	
		Min.	Max.	Min.	Max.
Viscosity @ 60° C	D2171	500	-	250	-
Penetration @ 25° C (100 grams in 5 seconds)	D5	150	-	250	-
Thin Film Oven Test	D1754	-	-	-	-
Penetration after test 25° C, 100 gm in 5 seconds percent of original	D5	45	-	45	-

10.6.3 TACK COAT

The tack coat shall be RC30 cement or as approved by the Approving Officer.

10.6.4 SAND

The sand shall be clean and granular and shall be 100 percent (100%) passing No. 4 sieve.

10.6.5 MINERAL AGGREGATE

a) Coarse fractions shall consist of hard, clean, durable crushed stone, crushed slag, crushed gravel or a combination thereof or of material naturally occurring in a fractured condition;

b) Coarse aggregates shall meet the quality requirements of A.S.T.M. D692-71;

c) Fine aggregates shall consist of natural sand and for manufactured material derived from crushing stone, slag or gravel. All particles shall be clean, tough, durable, moderately sharp and free from coatings of clay, silt or other deleterious materials and shall contain no organic matter;

d) Gradation of aggregates shall conform to the range set out in the following table.

Sieve Size	Percent of Combined Aggregate Passing	
	Base Course	Surface Course
	Type II	Type I
19.0 mm	100	-
12.5 mm	75 - 90	100
9.5 mm	62 - 82	78 - 94
No. 4	44 - 63	58 - 60
No. 8	-	52 - 74
No. 10	31 - 50	42 - 64
No. 20	23 - 41	28 - 48
No. 40	17 - 34	19 - 38
No. 100	10 - 20	10 - 24
No. 200	3 - 10	5 - 14

e) The method of grading shall be in accordance with A.S.T.M. C136-71;

f) The gradation curve developed for the design mix shall be free from acute change in direction;

g) The maximum permissable variation from the design gradation shall be as follows:

	Description	Variation
i)	Percent by weight passing Sieve No. 4	± 5%
ii)	Percent by weight passing Sieve No. 10	± 5%
iii)	Percent by weight passing Sieve No. 200	± 2%

h) A minimum of 60 percent (60%) of the particles by weight passing Sieve No. 4 shall have two or more fractured faces (Type II);

i) A minimuim of 70 percent (70%) of the particles by weight passing Sieve No. 4 shall have two or more fractured faces (Type I);

j) The method of testing the aggregate for specific gravity and absorption shall be in accordance with A.S.T.M. C127 and C128;

k) If additional material passing Sieve No. 200 is required in the base course or surface course material for compliance with the grading limits it shall consist of crushed rock, Portland Cement, hydrated lime or other material approved by the Approving Officer, and at least 75 percent (75%) of it shall pass Sieve No. 200. Where gravel is the aggregate the material passing Sieve No. 200 shall include Portland Cement or hydrated lime to the amount of 2 percent (2%) by weight of the total aggregate.

10.7 EXECUTION

10.7.1 INSPECTION

a) No priming or paving shall be carried out until the surfaces to be paved have been inspected and approved by the Approving Officer;

b) If ordered by the Approving Officer, the Developer shall supply and operate a loaded test vehicle of 8165 kg axle load to test the sub-base and base for excessive rutting;

c) The load test will be directed by the Approving Officer and the Developer shall pay for the test vehicle and for any repairs required to the road base;

d) Remove ruts, waves and undulations by mechanical means;

e) Clean and check the base course to ensure that the surface of the base course is within ± 6 mm of the design grade.

10.7.2 GENERAL

a) Construction traffic on pavements under construction shall be suitable in relation to the thickness of the courses it tranverses so that damage is not caused to the sub-grade or material already compacted;

b) The wheels or tracks of equipment moving over the various pavement courses shall be kept free from deleterious materials;

c) Base courses, shall be kept clean and uncontaminated for so long as it remains uncovered by a wearing course or surface treatment. The only traffic permitted access to base course material shall be that engaged in laying and compacting the wearing or surface course or, where the base course is to be blinded or surface dressed, that traffic engaged on such a surface treatment. Should the base course become contaminated, the Developer shall make good by cleaning it to the satisfaction of the Approving Officer and if this proves impracticable, by removing the layer and replacing it to specifications;

d) Any piece of machinery causing the spillage of fuel oil, lubricating oil or hydraulic oil onto the surface prior to laying or onto the finished surface shall be removed from the work. Any areas of base or surface course affected by the spillage will be cut out and replaced as the Approving Officer shall direct and at the Developer's own expense;

e) Any final surface found to be defective either in finished quality or as a result of subsequent laboratory testing, will be cut out and replaced at the Developer's expense. The area cut out of any final pavement surface will be not less than 15 m longitudinally by the full width of the section laid down.

10.7.3 APPLICATION OF PRIME COAT

a) All surfaces including the surface of the base and edges of existing buildings shall be completely dry and free of loose material before the prime coat is applied. No primer

shall be applied when the ambient temperature is lower than 10°C. No priming shall be carried out until the surfaces to be primed have been inspected and approved by the Approving Officer;

b) Application shall be made uniformly by means of an approved pressure distributor at a rate of 1.08 to 2.17 litres per square metre at an application temperature of 21° C to 50° C or as directed by the Approving Officer. Sufficient primer shall be applied to completely cover the surface and to be absorbed and set within a period of 24 hours;

c) Blot up excess primer with sand and keep traffic off the primed area until the primer has been absorbed;

d) Priming includes priming the edges of existing curbs, gutters and pavement.

10.7.4 HOT MIX PREPARATION

a) Use a batch mixing type plant or other type approved by the Approving Officer which is capable of combining, drying and heating the mineral aggregate, heating the asphalt and accurately proportioning all materials to produce an asphaltic hot mix possessing the foregoing characteristics and within designated tolerances. Essentially it shall meet the requirements of the A.S.T.M. Designation D99-55, complete with a drier equipped with a dust collector, a gradation control unit to reject oversize material and to separate and store, displacement asphalt pump, a twin shaft pugmill, a weight box or hopper equipped for accurately weighing the aggregates, and proper thermometric equipment;

b) The Approving Officer or his authorized representative shall have access at any time to all parts of the paving plant.

10.7.5 PREPARATION OF HOT MIX MATERIAL

a) Calibrate measuring devices and tanks so that the design mix specification limits can be met;

b) Feed aggregate into a drier and heat to required temperature, not in excess of 163° C for delivery to the mixer. Reduce moisture content to 0.5 percent maximum;

c) Provide accurate devices for continuous checking of aggregate temperatures at the discharge duct of the drier;

d) Provide a dust collector that will deliver dust to the hot stone elevator at the discretion of the Approving Officer. Dust may be washed with the approval of the Approving Officer;

e) Pass the aggregate over vibrator equipped screens to separate into three or more bins, and provide a separate bin for mineral filler;

f) Heat asphalt to required temperature in storage tank equipped with a thermometer to measure asphalt temperature at the discharge line;

g) Dry mix aggregates for 15 seconds in the pugmill, add asphalt and continue mixing for at least 30 seconds and until all aggregate particles are uniformly coated. Percentage of bituminous binder added shall be within 0.3 percent of the percentage specified in the design mix;

h) Mixing temperature will be determined by the Approving Officer. Hot mix material must yield a viscosity in the range of 150 - 300 centistokes 975 to 150 seconds Saybolt Flurol. This temperature shall have a variance allowance of $\pm$ 8°C;

i) The Developer shall furnish output weight, mixing time and asphalt inventory information at the request of the Approving Officer.

10.7.6 HAULING OF ASPHALTIC PLANT MIX MATERIAL

a) Truck boxes must be clean and lightly lubricated with thin oil, and loads shall be covered when, in the opinion of the Approving Officer, weather conditions require it;

b) Trucks must be driven in a manner such that damage will not occur to surfaces and slopes of the roadway;

c) Deliver hot mix material at a temperature within $\pm$ 8° C of the temperature specified by the Approving Officer.

10.7.7 PLACING OF ASPHALTIC PLANT MIX MATERIAL

a) Spread the asphaltic plant mix material using equipment approved by the Approving Officer;

b) The base must be inspected and approved by the Approving Officer before mixed material is placed;

c) Maintain hot mix temperatures as directed by the Approving Officer;

d) Cut transverse and longitudinal joints vertically, and paint with hot asphalt cement before proceeding with the next section;

e) Produce a true cross section and a uniform textured surface. Correct all irregularities;

f) Place hot mix material on dry surfaces and place hot mix material when the temperature 150 mm above the road is above 2^{0} C and rising;

g) Where two or more lifts of asphaltic plant mix material are to be placed, stagger the transverse and longitudinal joints by a minimum of 300 mm;

h) Place a bituminous tack coat betwen layers of asphaltic hot mix, if ordered by the Approving Officer. Apply uniformly to a clean surface at an approximate rate of 0.54 litres per square metre of pavement. Place tack coats only when air temperature is above 2^{0} C.

10.7.8 COMPACTION OF ASPHALTIC PLANT MIX COURSES

a) Rollers shall be approved by the Approving Officer;

b) Roll pavement to provide equal compaction to all parts of the road. Roller speeds shall not exceed 5 km/h and shall be slow enough to prevent surface displacement. Lubricate rollers as necessary to prevent surface damage;

c) Breakdown may be done with steel wheel tandem roller (7.2 tonne) or with pnuematic tired rollers. Begin rolling longitudinally at the outside edge and proceed towards the centre of pavement, overlapping by one-half (1/2) width. Roll longitudinal joints directly behind the paving operation. Breakdown rolling consists of two complete coverages, minimum;

d) Second rolling shall be performed by self propelled pneumatic tired rollers to achieve the following minimum in place densities;
Prior to September 1st - 97% of the laboratory design density;
After September 1st - 98% of the laboratory design density;

e) Final rolling shall be performed by a steel wheel tandem roller (10 tonne) and shall be continuous until all roller marks are gone;

f) Hand compaction is required where rollers cannot reach.

10.7.9 FINISHED SURFACE

a) Finish the surface smooth, uniform and true to the lines of the specified grade;

b) Test surfaces with a 3 m straight edge supplied by the Developer, laid parallel to the centreline of the road. Surfaces must be within 3 mm of the straight edge;

c) Correct uneven surfaces by loosening the surface and adding new material or removing high areas.

10.7.10 TESTS BY THE DISTRICT'S TESTING AGENCY

a) The District may take any or all of the following:

i) Tests of Combined Aggregates

The Subdivider shall provide the means at the asphalt mixing plant for the Testing Agency to obtain a representative combined sample of aggregate prior to its being combined with asphalt:

Sieve Analysis (A.S.T.M. C136)	Daily Frequency
Moisture Content of Dried Aggregates	Daily Frequency

ii) Tests in Asphaltic Mixture

The District may arrange for the Testing Agency to sample the asphaltic mixture daily, and in accordance with A.S.T.M. D1559-73 method, subject the samples to a Density and Air Voids analysis, and an asphalt content determination. A Stability Value shall be established at least once in each five days of mixing

iii) Tests on In-Place Asphaltic Pavement

1) Density Determination and Air Void Content	-one for each 1600 m^2 per layer, and at least one each day during placing operations.

NOTE: Nuclear testing for density determination shall be acceptable in accordance with A.S.T.M. D2950-71. However, a minimum of five (5) tests for eacn 1600 m^2 per layer shall be required.

2) The cores shall be measured and tested to provide the following information relative to the in-place pavement.

Thickness	Density
Asphalt Content	Sieve Analysis

Percentage Voids (using A.S.T.M. D3202-73 method).

b) The Developer shall supply means for testing by the District's Testing Agency.

c) If additional tests are required because of the Developer's failure to meet the specifications, the costs of any extra tests shall be borne by the Developer.

MATERIAL SPECIFICATION NO. 11

CONCRETE SIDEWALKS, CURBS AND GUTTERS

DISTRICT OF NEW HAZELTON

MATERIAL SPECIFICATION NO. 11

CONCRETE SIDEWALKS, CURBS AND GUTTERS

11.1 MATERIALS

Concrete, reinforcing steel and admixtures shall be in accordance with Material Specification No. 1 - Concrete.

Concrete shall have a minimum 28 day compressive strength of 25 megapascals and the maximum aggregate size shall be 25 mm. The air entrainment shall be 5 to 7% and the water cement ratio shall be 0.50 maximum. The slump shall be 25 mm to 75 mm.

11.2 REGULATIONS

Perform work under observation of safety regulations of the Workers' Compensation Act.

11.3 MAINTENANCE OF TRAFFIC

a) Perform work in a manner that will cause the least disruption of traffic;

b) Closing of streets, detouring of traffic, maintaining detour roads, posting of traffic signs, barriers and flagmen shall be the Subdivider's responsibility.

11.4 TESTING

a) Employ and pay all costs of an independent testing agency, approved by the Approving Officer, to carry out mix designs, aggregate testing and strength tests in the required numbers as listed below;

b) The Subdivider or his agency shall carry out all tests in the presence of the Approving Officer, and in accordance with CSA A.23.2;

c) Cast three test cylinders for each test, one cylinder for seven (7) day test and two for the twenty-eight (28) day test;

d) Minimum numbers of field tests shall be as follows:
Curb and gutter - one test for each section - 0 - 200 lineal metres of curb and gutter;
Sidewalk - one test for each section - 0 - 200 lineal metres of sidewalk;
Monolithic Sidewalk - one test for each curb and gutter - Section 0 - 100 lineal metres of monolitnic sidewalk, curb and gutter;

e) Make air content tests in accordance with CSA A.23.2.19. (Pressure method), one test per load or batch of concrete;

f) Make slump tests at the discretion of the Approving Officer.

11.5 ALTERNATIVES

a) The Approving Officer will consider alternative materials and methods of construction such as extruded curb and gutter;

b) Submit complete details and specifications to the Approving officer, including materials, methods of construction, method of control and equipment details;

c) Written approval of the Approving Officer is required for any alternatives.

11.6 SAND CUSHION

The cusion material shall consist of sand, crusher screenings, or other approved material meeting the following requirements.

Passing	19.0 mm sieve	100%
Passing	No. 40 sieve	20% to 60%
Passing	No. 200 sieve	10% to 20%

11.7 EXPANSION JOINTS

Premoulded expansion joint filler minimum thickness 13 mm, cut to the same shape as the component into which it is installed.

11.8 FILL MATERIALS

a) Pit run gravel - maximum 75 mm graded to comply with the following:

Passing	25 mm	80% maximum
Passing	No. 4	60% maximum
Passing	No. 200	10% maximum

b) Common fill hauled from borrow areas or from excavation of other parts of the work, that is free of organic material or other objectionable material that would prevent proper compaction. All common fill material shall be approved by the Approving Officer.

11.9 EXCAVATION

a) Excavate material to the required grade, elevations, and cross-sections as shown on the drawings;

b) Remove all deleterious material encountered at the subgrade level and replace with approved fill material, compacted to one hundred percent (100%) of Standard Proctor Density to provide a uniform bearing over the area of the structure;

c) If the sub-grade is excavated in error, below the specified grade, replace with approved fill material compacted to one hundred percent (100%) of Standard Proctor Density;

d) Load, haul and dump in waste areas excavated material that is unsuitable for use as fill, or surplus excavated material.

11.9.1 FILL

a) Areas to be filled shall be stripped of topsoil and graded uniformly before fill is placed;

b) Fill material shall be approved fill material, either pit run gravel or common fill;

c) Spread fill material in 150 mm layers and compact to ninety-seven percent (97%) of Standard Proctor Density.

11.9.2 UNSUITABLE SOILS

Soft, boggy or spongy areas encountered in excavation must be wholly removed to such depths and extent as may be required by the Approving Officer. All such areas shall be refilled with suitable pitrun gravel compacted to a minimum of ninety-five percent (95%) Standard Proctor Density.

11.9.3 CUSHION

a) Before placing cushion material, obtain the Approving Officer's approval for the condition of sub-grade;

b) Place the cushion material with a maximum of 50 mm compacted thickness;

c) Compact cushion to ninety-five percent (95%) Standard Proctor Density.

11.9.4 FORMING

a) Use straight, smooth and clean metal or timber forms, oiled as necessary;

b) Place forms to line and grade; and brace and stake firmly in place;

c) Use wooden forms or other approved equal for curved surfaces with radii less than 50 m.

11.9.5 ADJUSTMENT

Adjust elevations of manholes, valves, catch basins and other structures to suit final grades.

11.9.6 INSPECTION

a) Inspect the sub-grade and cushion to ensure that the base has not been softened by moisture, and to ensure that the base is not too dry for placing concrete;

b) Delay placing concrete as required to dry the base if the base is to wet or add moisture as necessary to prevent absorption of water from concrete if the base is to dry;

c) Obtain approval of the Approving Officer before placing any concrete;

d) Provide the Approving Officer with templates in accordance with the cross-sections on the drawings to enable the Approving Officer to inspect cross-sections.

11.10 CONCRETE

11.10.1 COLD WEATHER REQUIREMENTS

a) Do not place concrete when air temperature is below 4^{o} Celsius, unless the following requirements are met;

b) Preheat water and aggregates as well as reinforcement, forms and the ground;

c) When temperature in the shade is 2^{o} Celsius and indications are that the temperature will fall, cover the concrete and maintain an adequate air cushion between the concrete and the cover. Maintain temperature of the air cushion at 10^{o} Celsius and if forced air heating is used add moisture. Keep the air cushion heated for 72 hours and keep the protection for 96 hours;

d) Do not use calcium chloride, except with the written permission of the Approving Officer and then only with Portland Cement and in quantities less than two percent (2%) by weight. Close control of calcium chloride quantities and careful mixing is required.

11.10.2 POURING AND VIBRATING

a) Place concrete in forms and consolidate in the forms using mechanical vibrators;

b) Vibrate sidewalks and rolled face monolithic sidewalks with a vibrating screed, approved by the Approving Officer;

c) Vibrate curb and gutter sections with a poker type vibrator not exceeding 50 mm in diamter.

11.10.3 EXPANSION JOINTS

Place expansion joints material at each expansion joint, construction joint and at the following locations.

a) transversely at the beginning and end of curve where the radius is less than 15 m;

b) around all structures such as poles, valve boxes, hydrants, and existing concrete;

c) adjacent to any existing building or structure.

11.10.4 CONTRACTION JOINTS AND SURFACE JOINTS

a) Form 6 mm deep contraction and 12 mm deep surface joints in sidewalks every other 1.5 m;

b) Provide 3 mm wide contraction joints in curb and gutter every 3 m by placing a steel plate in the forms and withdrawing the plate after concrete has attained its initial set.

11.10.5 FINISHING

a) Work the concrete surface with a wood float and brush with a stiff brush or broom to provide an even surface;

b) Avoid excessive trowelling;

c) If there is excessive water, delay finishing until excess water has evaporated;

d) Remove surplus water from brushes before brushing;

e) Tool all edges 50 mm wide with rounded edges.

11.10.6 PRIVATE AND LANE CROSSINGS

a) Construct private crossings at all existing private driveways and where required by the Approving Officer - concrete thickness - 150 mm;

b) Construct lane crossings at all lanes, commerical buildings, service stations, and where required by the Approving Officer - concrete thickness - 180 mm;

c) Dimensions reinforcing and joints shall be as shown on the drawings;

d) Place 25 megaPascals concrete.

11.10.7 PROTECTION

a) The Subdivider shall supply and place all tarpaulins and other materials necessary to protect the work from the weather;

b) Supply and sprinkle water as necessary to control dust;

c) Barricade the work as necessary to prevent damage to the work. Barricades shall remain in place for at least seven (7) days.

11.10.8 STRIPPING FORMS

Remove forms carefully after initial set, and repair damaged surfaces immediately.

11.10.9 CURING

a) Apply curing compound as soon as possible after forms are removed;

b) Apply curing compound uniformly with an approved pressurized spray.

11.10.10 SEALING

a) Concrete curfaces must be clean and dry;

b) Make the first application of sealing compound between three (3) to seven (7) days after the time that the concrete is poured;

c) Apply the second coat immediately after the first coat has been absorbed and appears dry.

11.10.11 BACKFILLING

a) Backfilling is required on all the concrete poured;

b) Backfill material is common fill;

c) Commence backfilling within ten (10) days, but not sooner than seven (7) days from the day the concrete was finished.

d) The area between the edge of the concrete work and the surrounding ground shall be backfilled;

e) If the top of the concrete is below the elevation of the surrounding ground, backfill to the full height of the concrete section and back slope at 3:1 slope; excavating as necessary;

f) If the top of the concrete is above the elevation of the surrounding ground, backfill to the full height of the concrete and back slope at 3:1 to the level of existing ground;

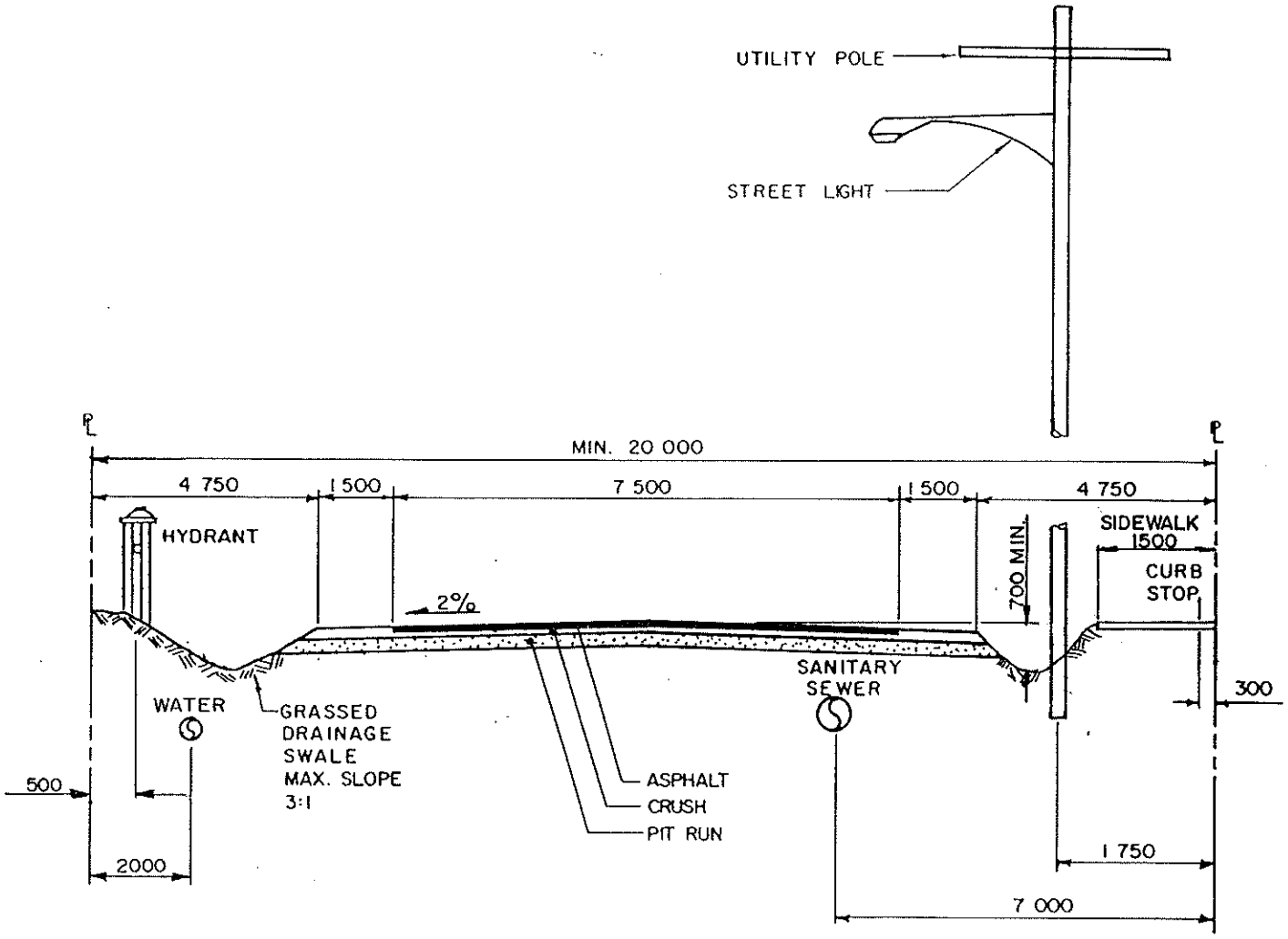
g) If road construction does not immediately follow curb and gutter construction, fill in front of the gutter as specified in (e) and (f) above.

11.10.12 CLEAN-UP

a) Remove all debris amd excess material from the site immediately after completion of the work;

b) Cleanup operations shall be carried on continuously as the work progresses.

STANDARD DRAWINGS



NOTE:

1. MINIMUM AVERAGE MAINTAINED HORIZONTAL ILLUMINATION = 4.0 LUX. (1.0 LUX IN RR-S ZONE)
2. DESIGN OF ROAD STRUCTURE TO SUIT LOCAL CONDITIONS.
3. PAVEMENT NOT REQUIRED IN ZONES RR-S AND R.

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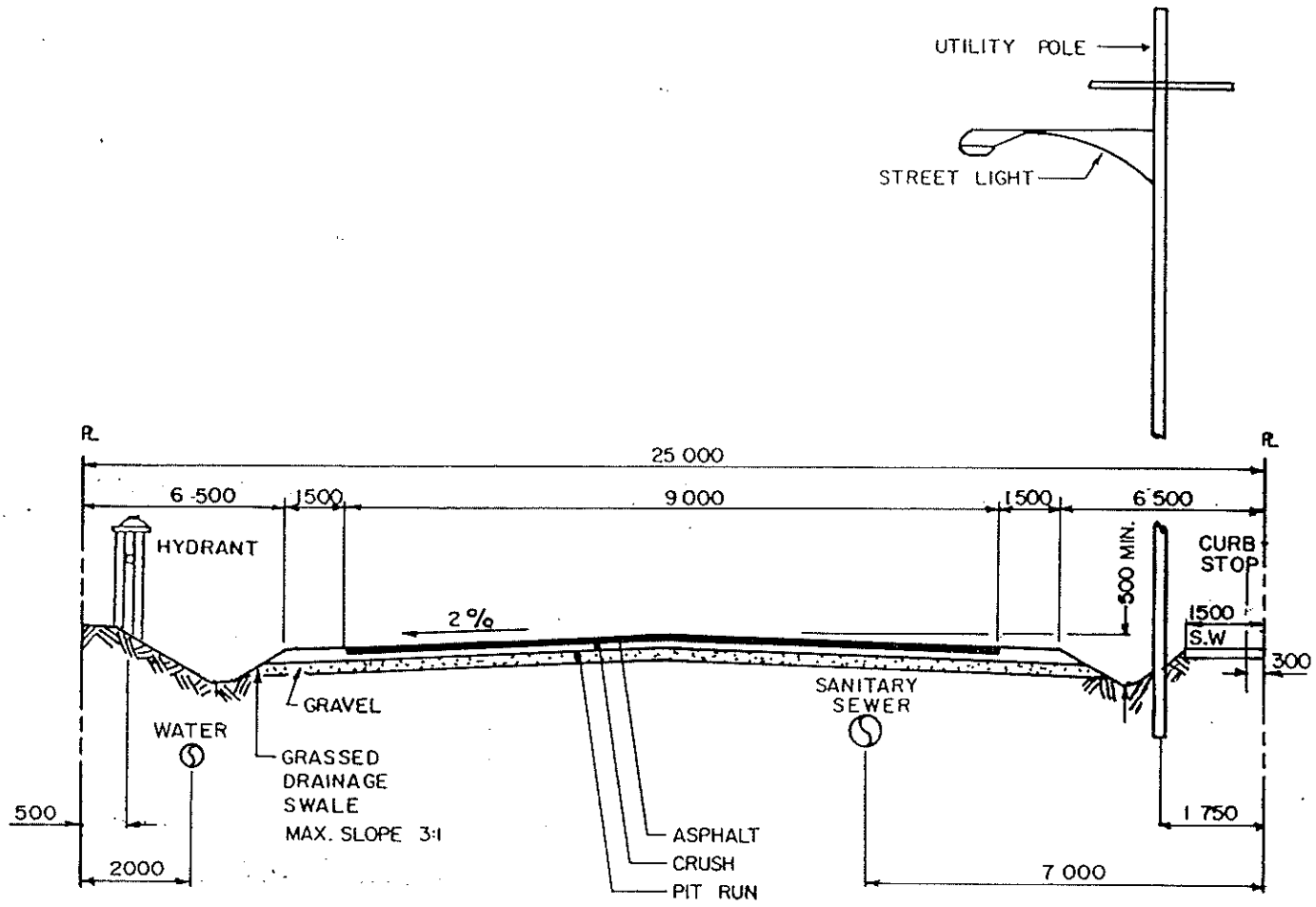
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	LOCAL RESIDENTIAL	H1
	REVISION		



NOTE:

1. MINIMUM AVERAGE MAINTAINED HORIZONTAL ILLUMINATION = 6.0 LUX.
2. DESIGN OF ROAD STRUCTURE TO SUIT LOCAL CONDITIONS.
3. PAVEMENT NOT REQUIRED IN ZONES RR-S AND R

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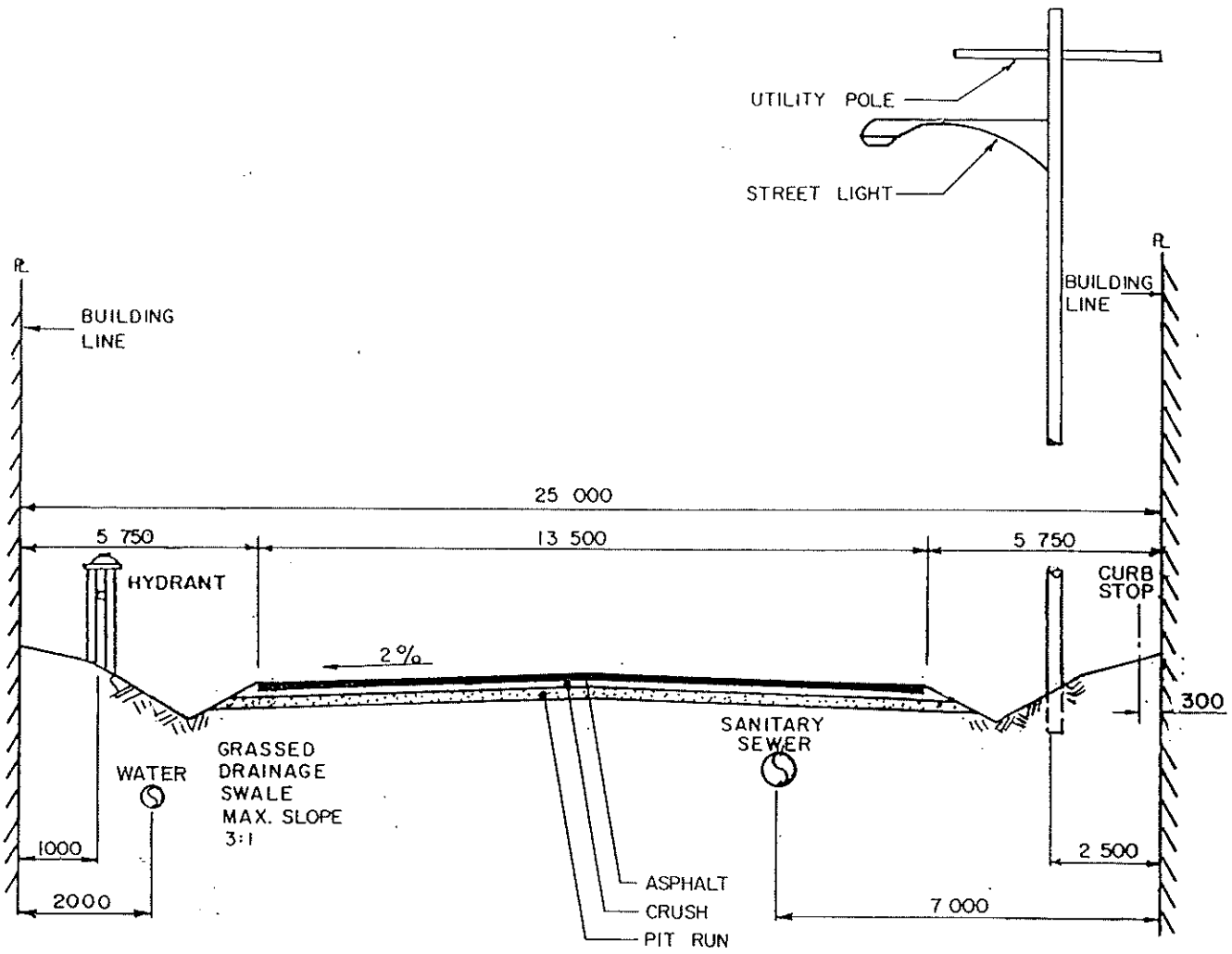
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	LOCAL RESIDENTIAL COLLECTOR	H2
	REVISION		



NOTE:

1. SIDEWALK ON BOTH SIDES OF STREET.
2. MINIMUM AVERAGE MAINTAINED HORIZONTAL ILLUMINATION = 10.0 LUX.
3. DESIGN OF ROAD STRUCTURE TO SUIT LOCAL CONDITIONS.

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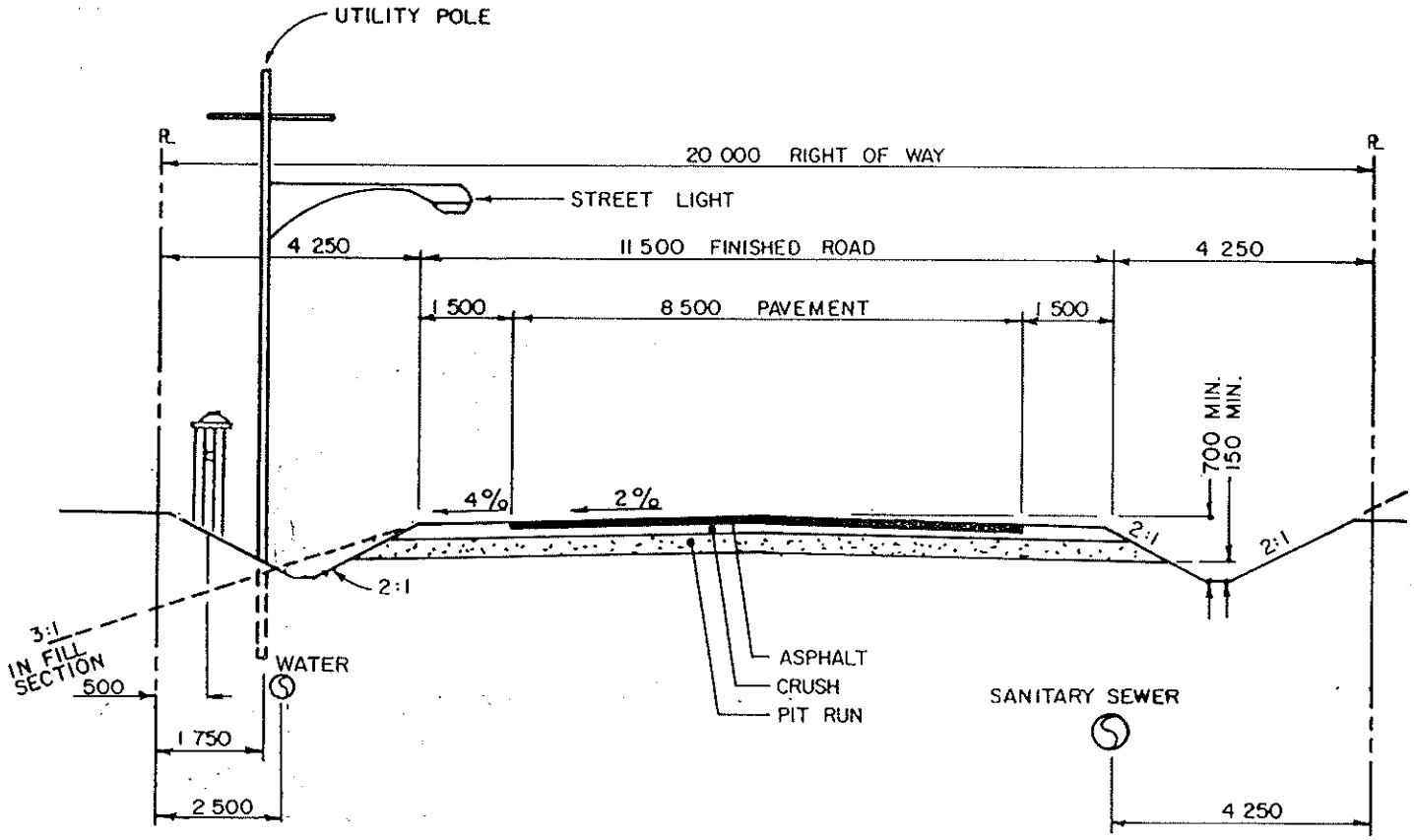
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE N.T.S	COMMERCIAL STREET (13.5m WIDE)	H3
	REVISION		



NOTE:

1. MINIMUM AVERAGE MAINTAINED HORIZONTAL ILLUMINATION = 6.0 LUX.
2. DESIGN OF ROAD STRUCTURE TO SUIT LOCAL CONDITIONS.

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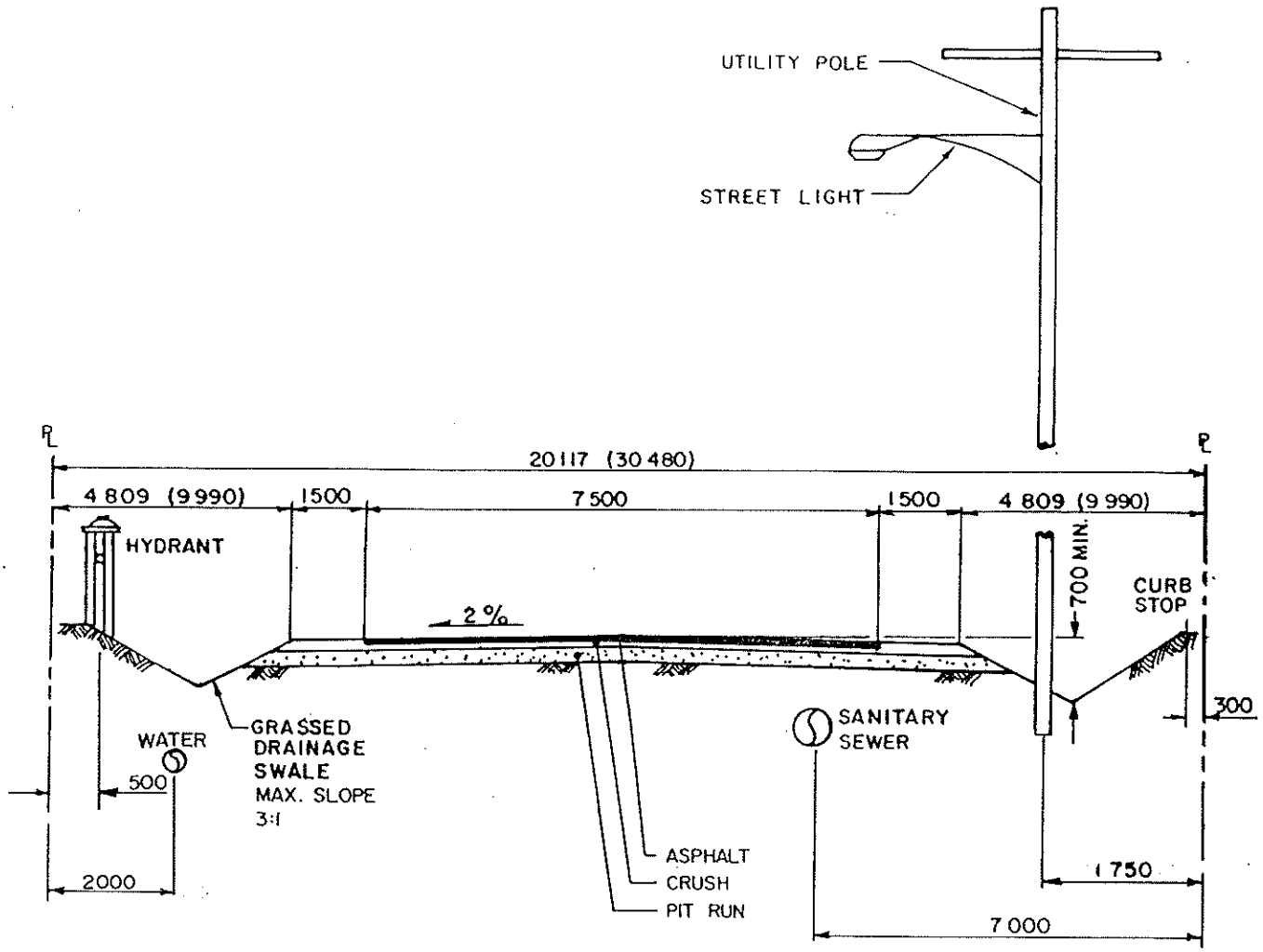
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	LOCAL INDUSTRIAL	H4
	REVISION		



NOTE:

1. MINIMUM AVERAGE MAINTAINED HORIZONTAL ILLUMINATION = 4.0 LUX.
2. DESIGN OF ROAD STRUCTURE TO SUIT LOCAL CONDITIONS.
3. PAVEMENT NOT REQUIRED IN ZONES RR-S AND R

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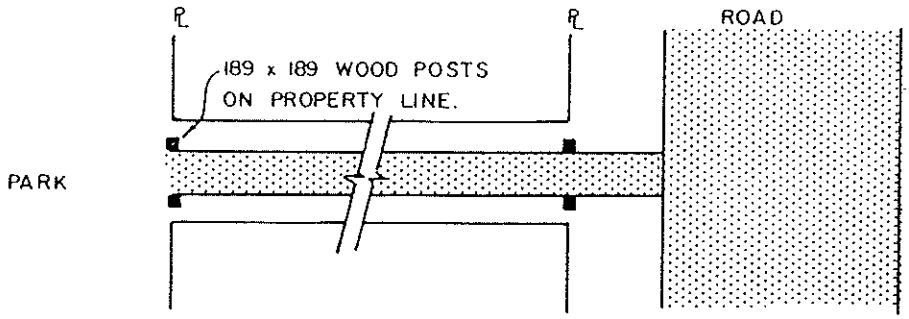
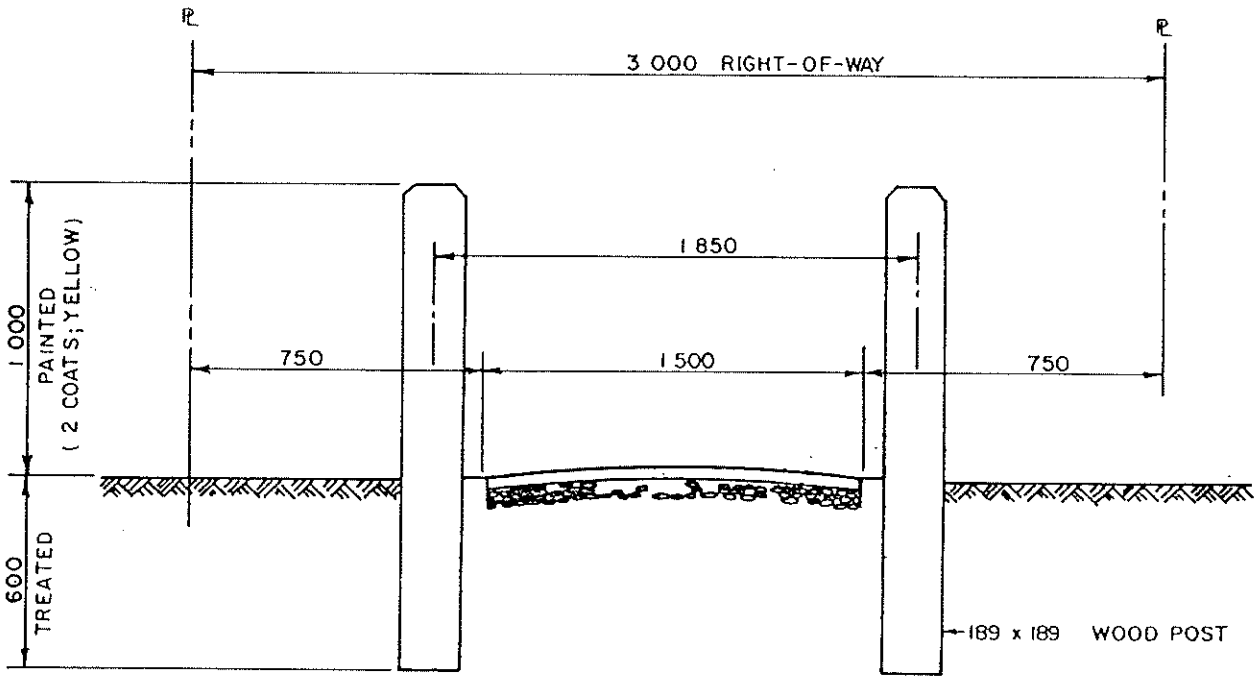
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	EXISTING SUBDIVISION	H5
	REVISION		



PLAN



SECTION

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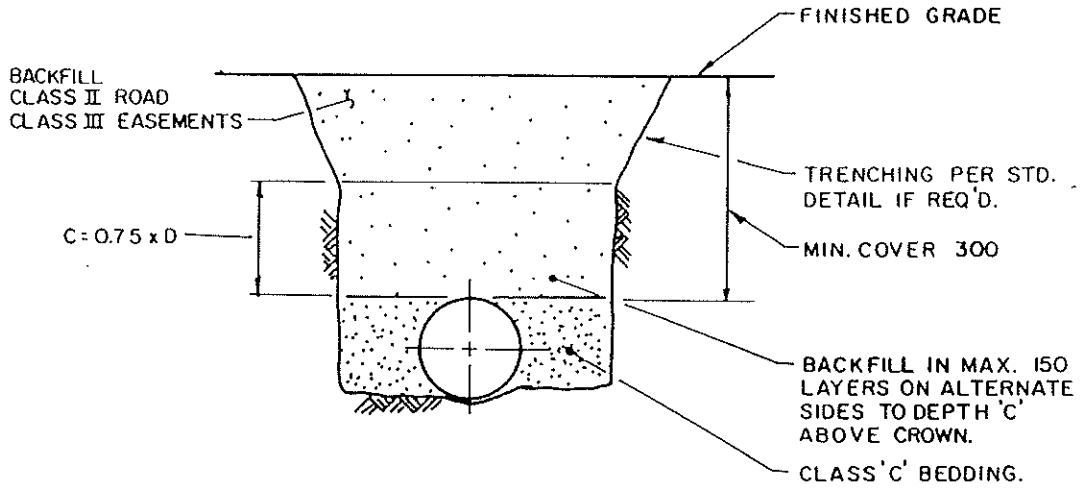
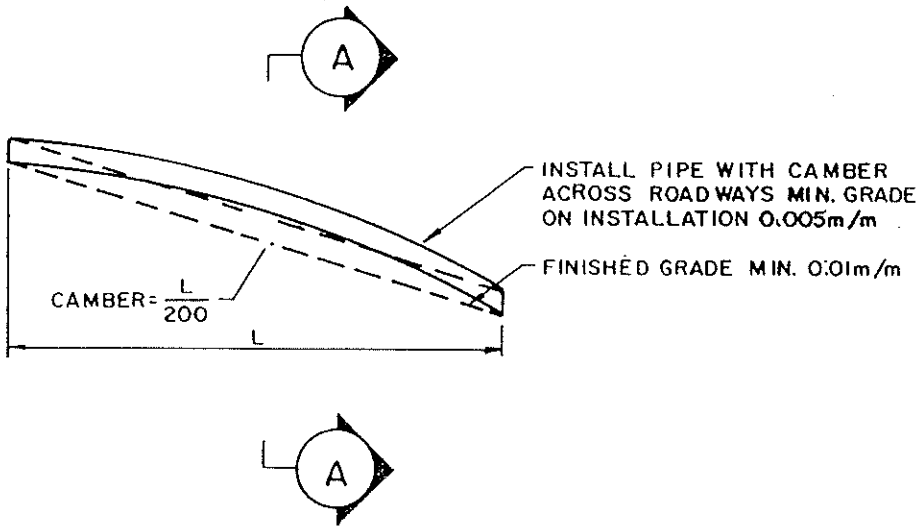
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	PAVED WALKWAY	H6
	REVISION		



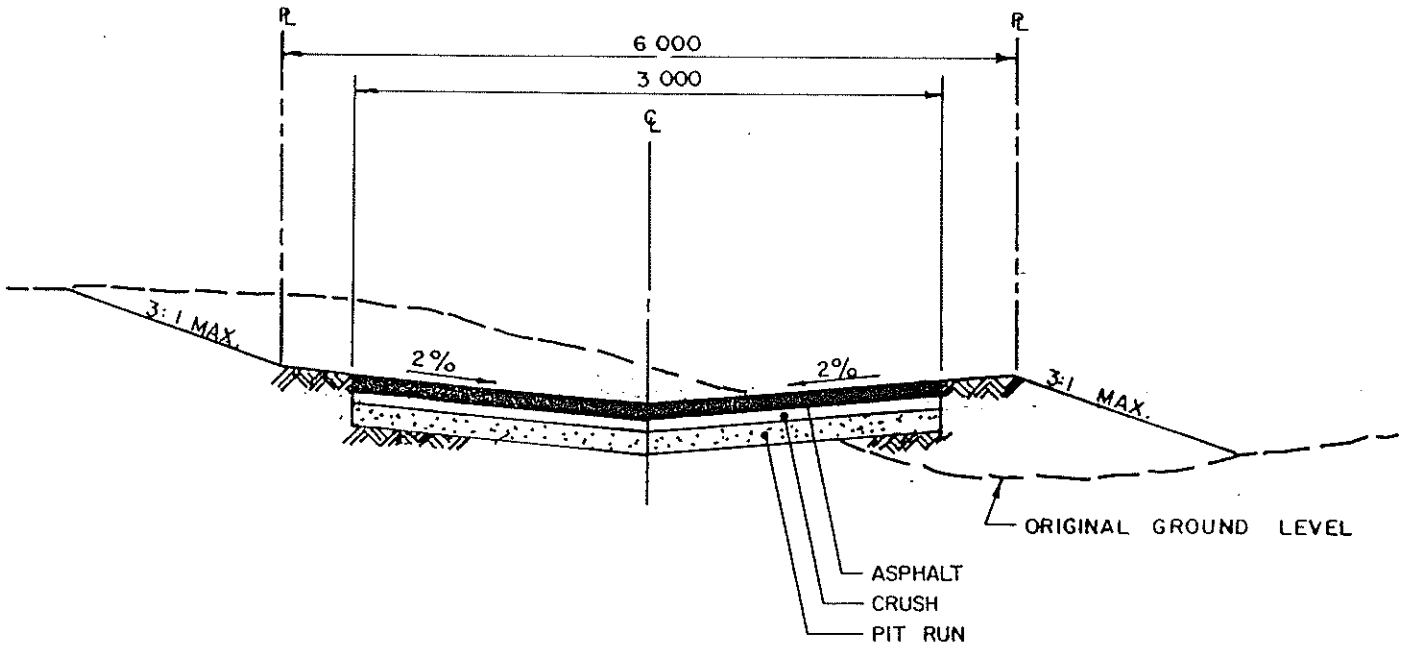
SECTION A



ELEVATION

ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	CULVERT INSTALLATION	H7
	REVISION		

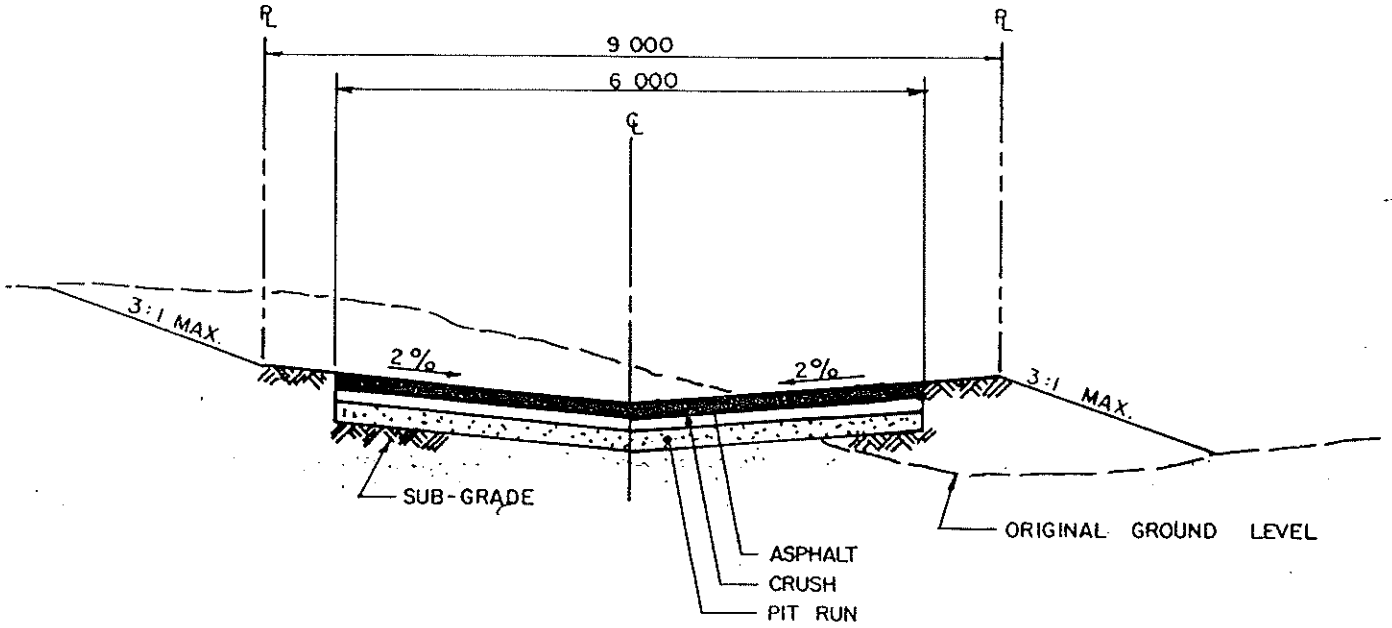


NOTES:

1. SIDE SLOPES IN CUT & FILL TO BE DONE AT TIME OF SUBDIVISION ROUGH GRADING.
2. DESIGN OF ROAD STRUCTURE TO SUIT LOCAL CONDITIONS.

KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN.1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE NTS.	RESIDENTIAL PAVED LANE	H8
	REVISION		

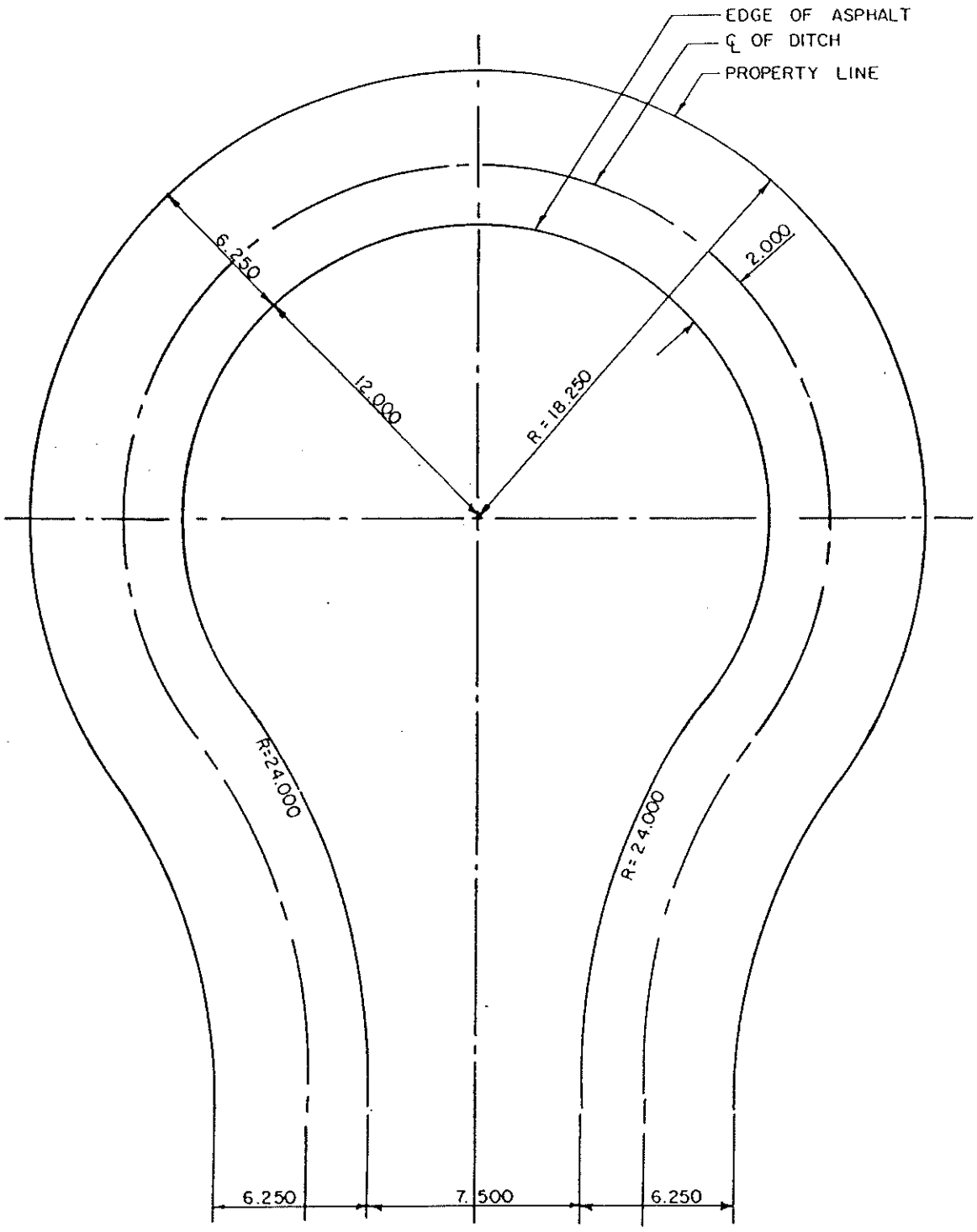


NOTES:

1. SIDE SLOPES IN CUT & FILL TO BE DONE AT TIME OF SUBDIVISION ROUGH GRADE.
2. DESIGN OF ROAD STRUCTURE TO SUIT LOCAL CONDITIONS.

KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	COMMERCIAL PAVED LANE	H9
	REVISION		



NOTE:

1. PAVEMENT NOT REQUIRED IN ZONES RR-S AND R

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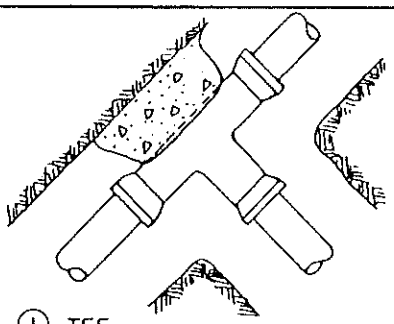
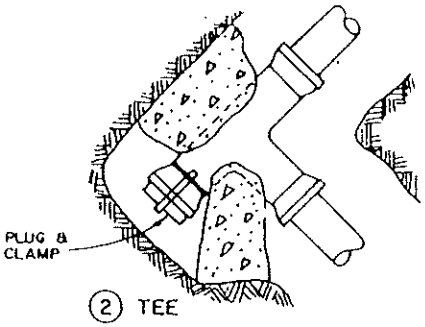
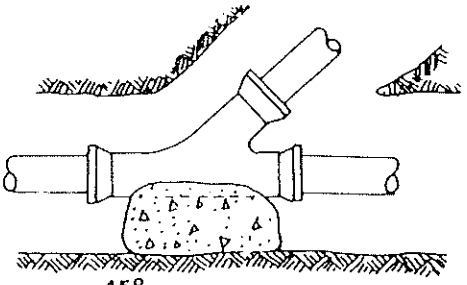
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	HIGHWAY SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	CUL-DE-SAC (LOCAL RESIDENTIAL)	H10
	REVISION		



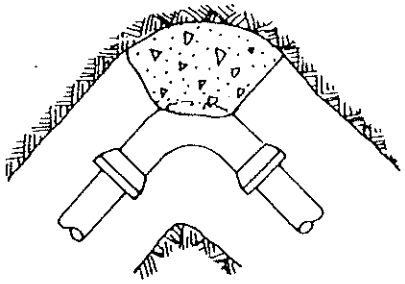
(1) TEE



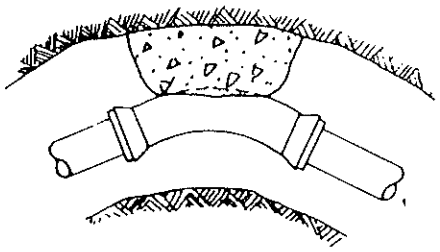
(2) TEE



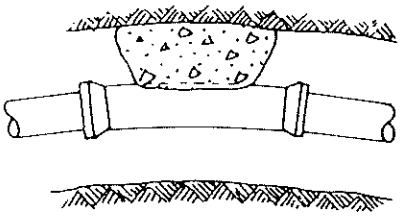
45°
(3) WYE



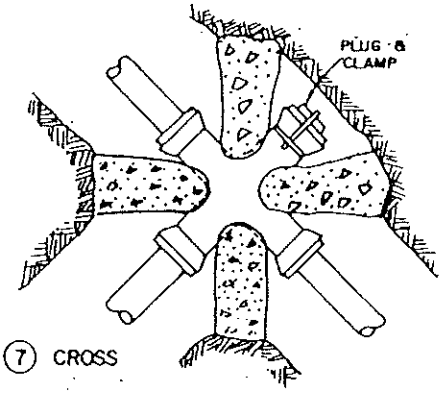
(4) 90° BEND



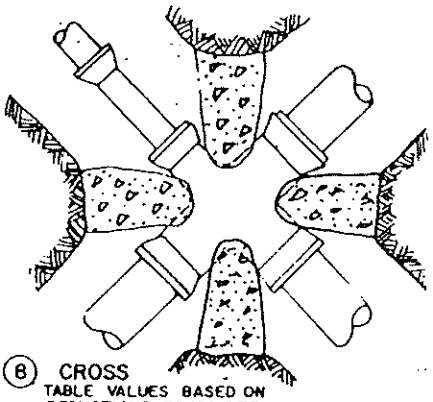
(5) 45° BEND



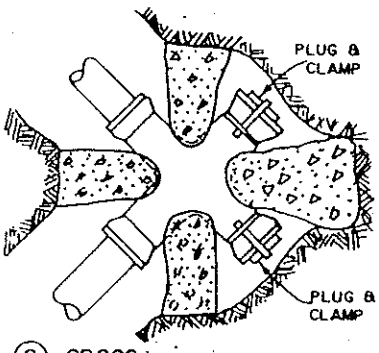
(6) $22\frac{1}{2}°$ & $11\frac{1}{4}°$ BEND



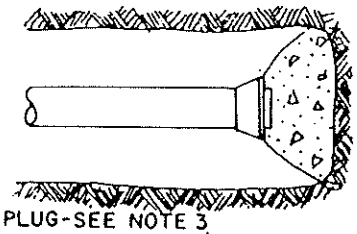
(7) CROSS



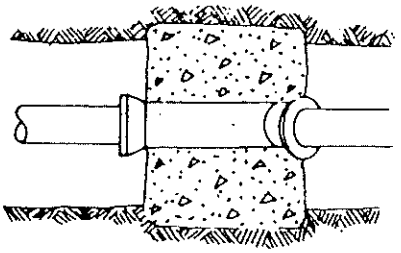
(8) CROSS
TABLE VALUES BASED ON REDUCTIONS TO 150 SIZE



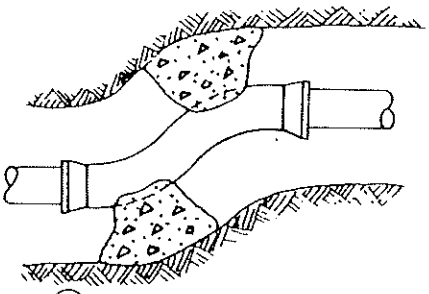
(9) CROSS



(10) PLUG-SEE NOTE 3



45°
(11) VERTICAL SAG



(12) OFFSET BEND

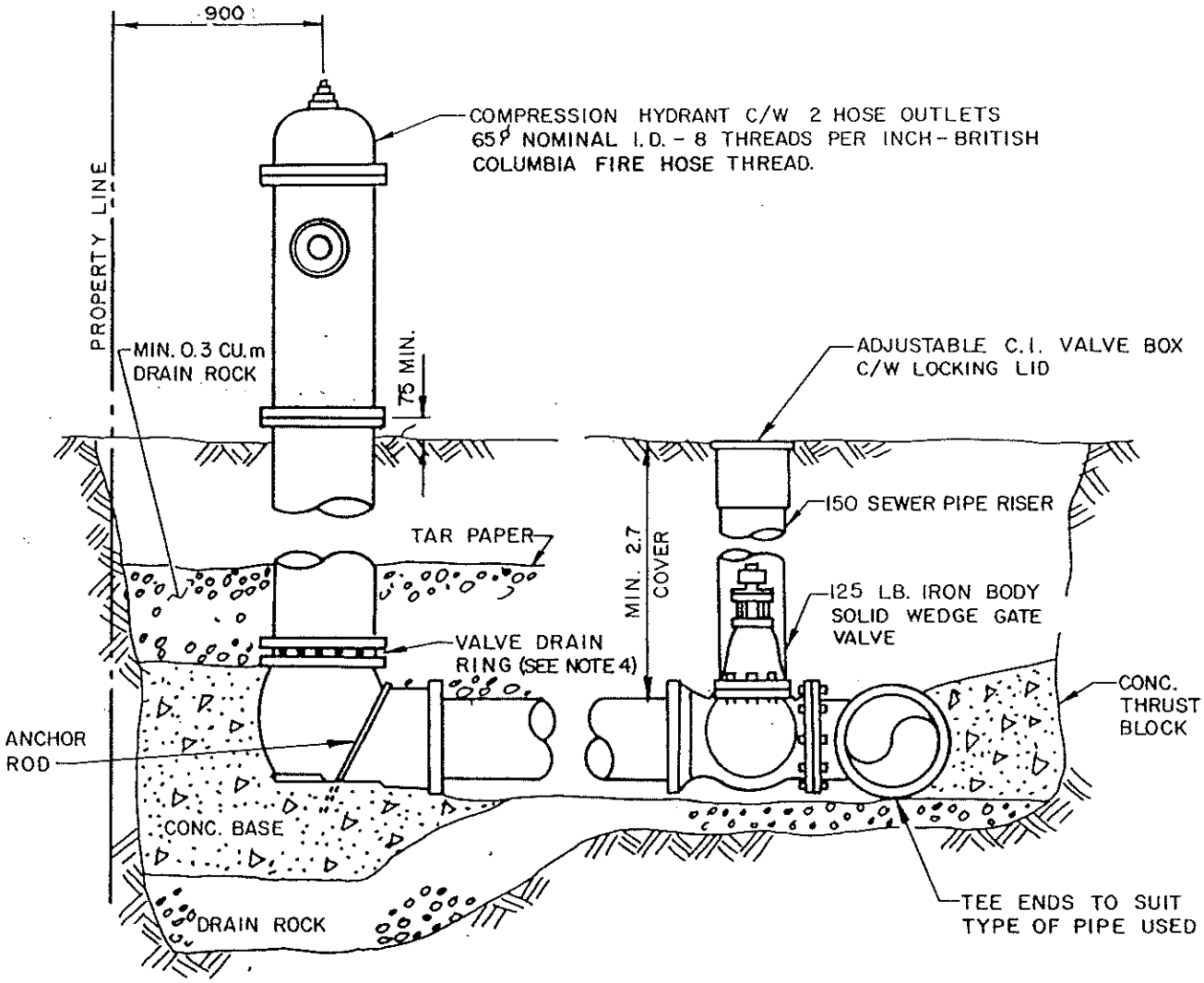
CONC. BEARING AREAS IN SQUARE METERS						
PIPE SIZE	100	150	200	250	300	400
1, 7, 10	0.2	0.4	0.7	1.0	1.4	1.9
2, 4, 9	0.3	0.5	0.9	1.4	2.0	2.6
3, 5, 11	0.1	0.3	0.5	0.6	1.0	1.4
6	0.1	0.1	0.3	0.4	0.6	0.7
8			0.2	0.5	0.7	1.6
12	0.3	0.6	1.0	1.2	2.2	2.9

NOTES:

1. CONCRETE SHALL BE 21MPa @ 28 DAY STRENGTH
2. DESIGN ASSUMPTIONS
   a) HYDRAULIC HEAD = 1380 kPa
   b) SOIL BEARING = 96 kPa (MED. SOFT CLAY)
3. TEMPORARY BLOCKING MUST BE APPROVED BY THE ENGINEER.

KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988	WATER SYSTEM SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	THRUST BLOCKS	W1
	REVISION		

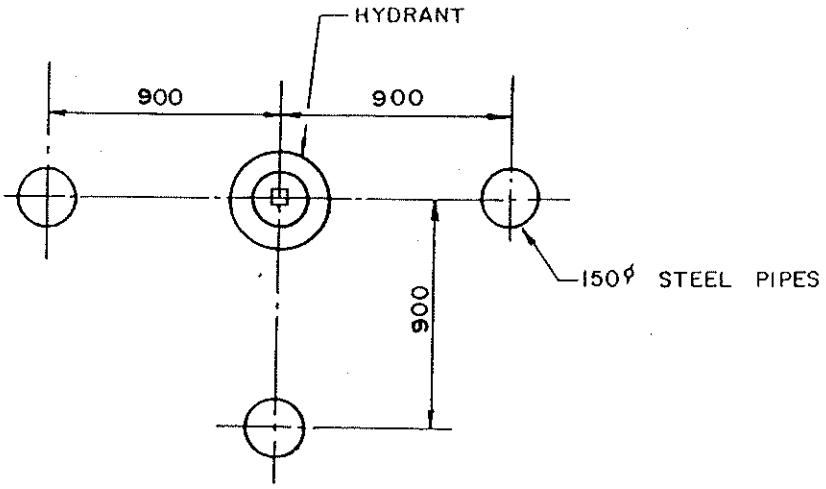


NOTES:

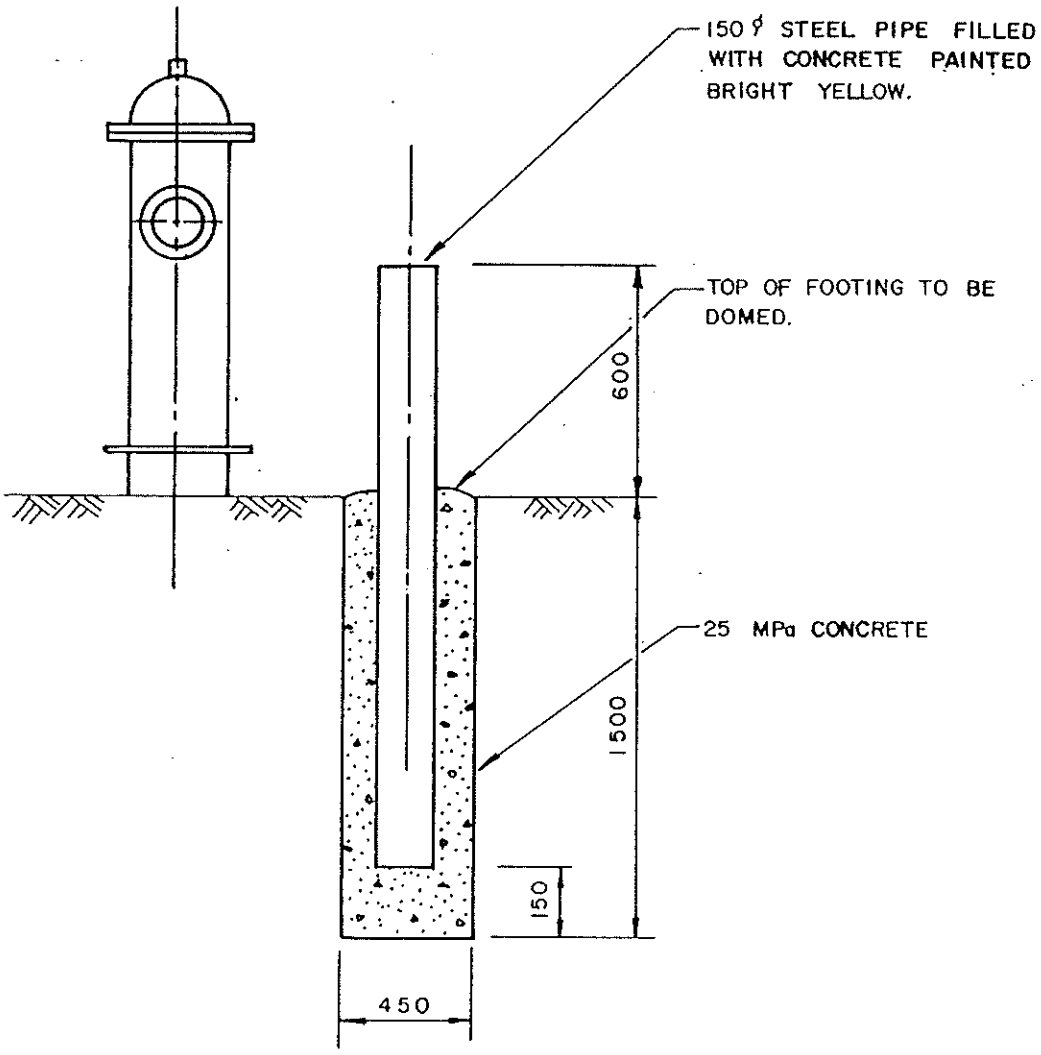
1. DRAINROCK MAY BE DELETED WHERE APPROVED BY ENGINEER IN GRANULAR SUBSOIL
2. CONCRETE SHALL BE 21 MPa AT 28 DAY STRENGTH (TYP.)
3. BACKFILL MIN. 1500 FROM OUTSIDE FACE OF HYD. COMPACTED TO 98% OF STANDARD PROCTOR DENSITY
4. VALVE DRAIN RING SHALL BE PLUGGED IN HIGH WATER TABLE AREAS.
5. BEARING AREA OF THRUST BLOCK TO BE MIN. OF $0.5\ m^2$

KGM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988	WATER SYSTEM SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	**FIRE HYDRANT ASSEMBLY**	W 2
	REVISION		



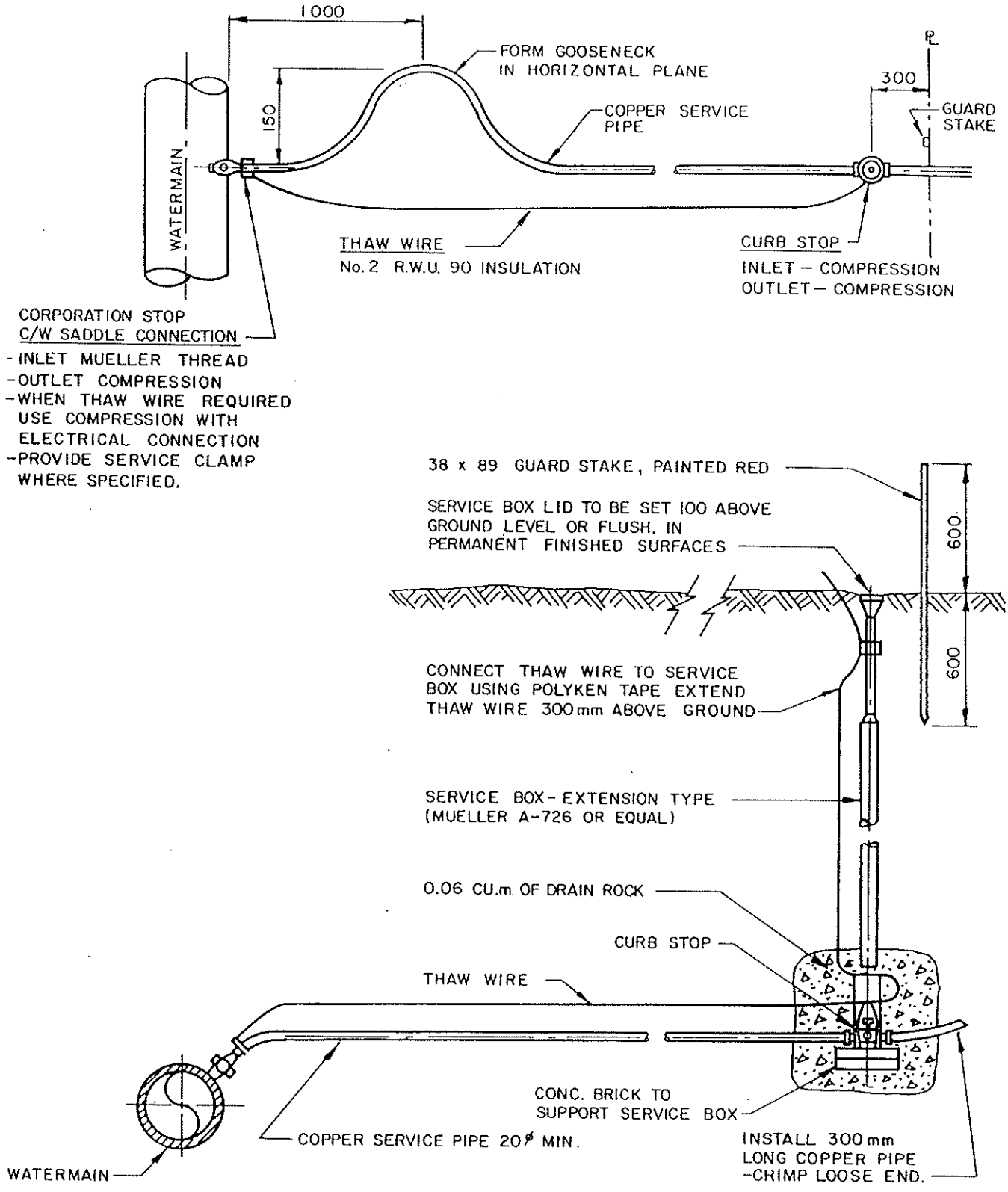
PLAN



ELEVATION.

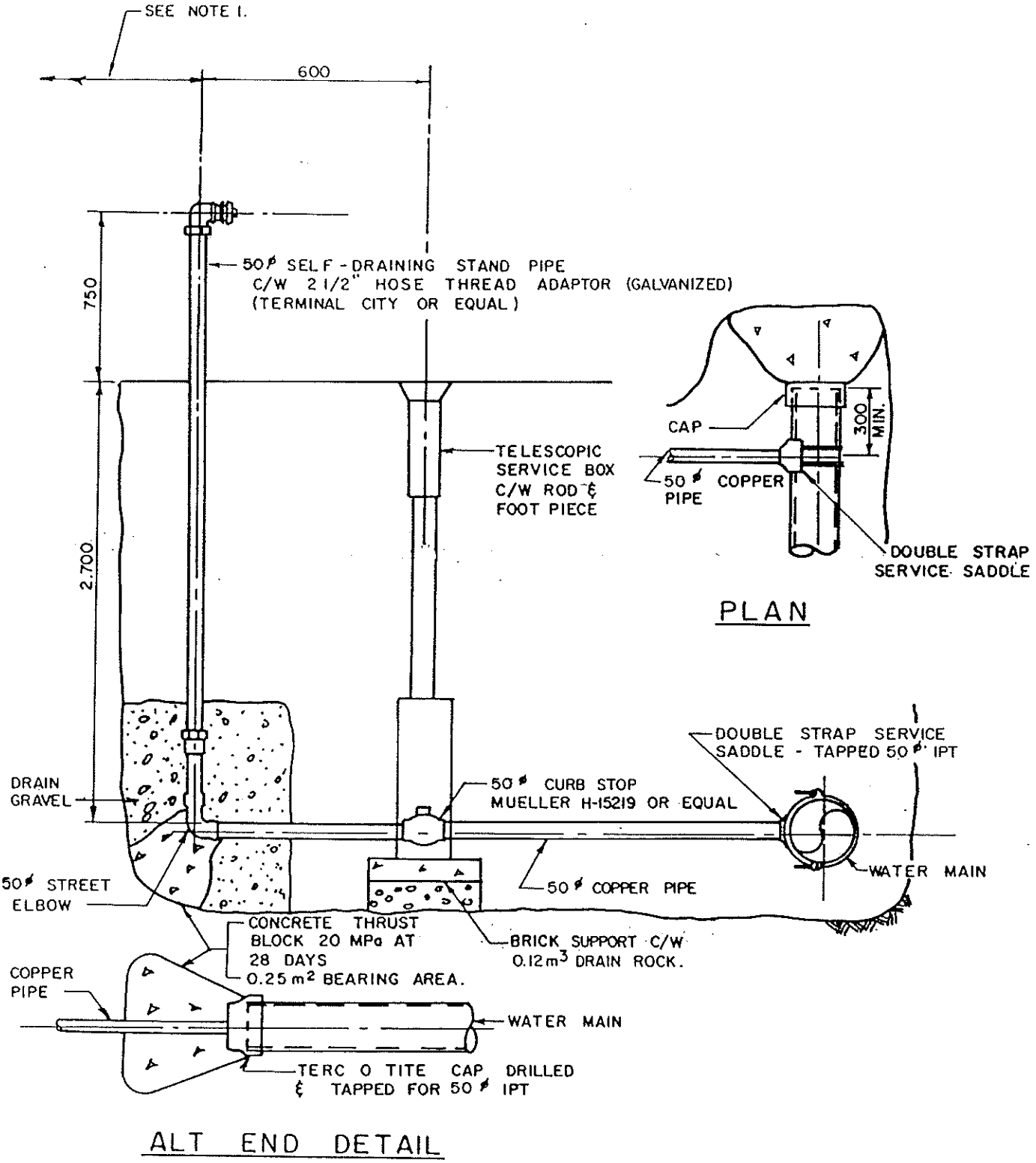
ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988	WATER SYSTEM SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	HYDRANT PROTECTION	W3
	REVISION		



KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988 SCALE N.T.S. REVISION	WATER SYSTEM SPECIFICATIONS **SERVICE CONNECTION**	DWG Nº W4



PLAN

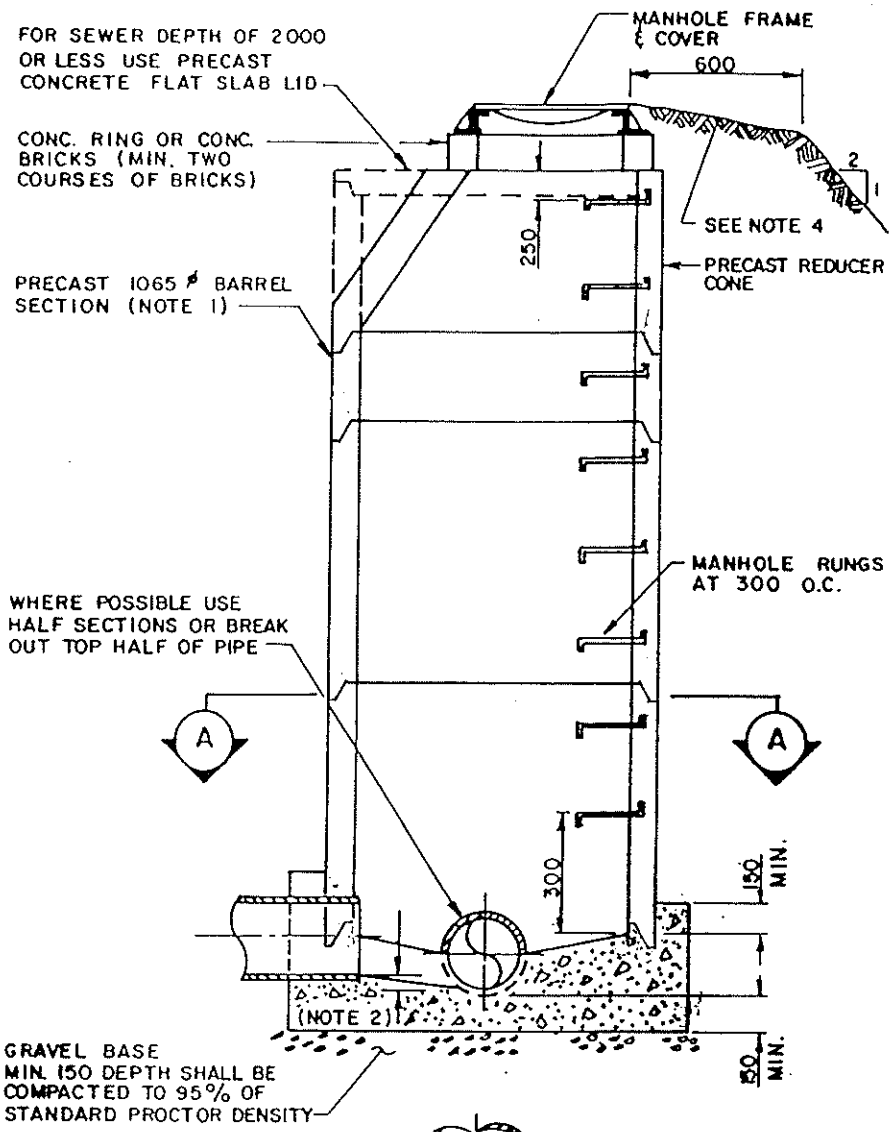
ALT END DETAIL

NOTE:

1. USE SAME OFF SET FROM PROPERTY LINE AS REQUIRED FOR HYDRANTS.

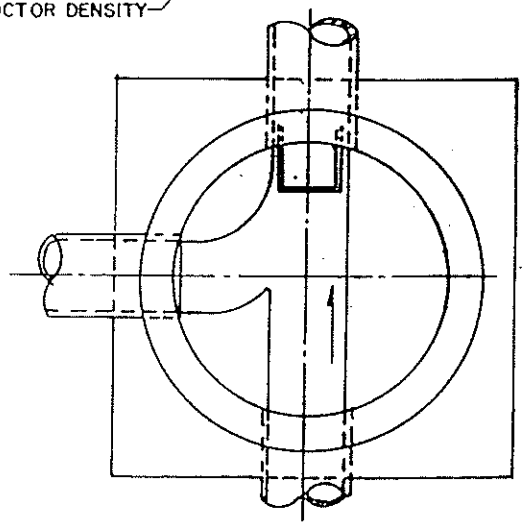
KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988	WATER SYSTEM SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	STAND PIPE DETAIL	W5
	REVISION		



NOTES:

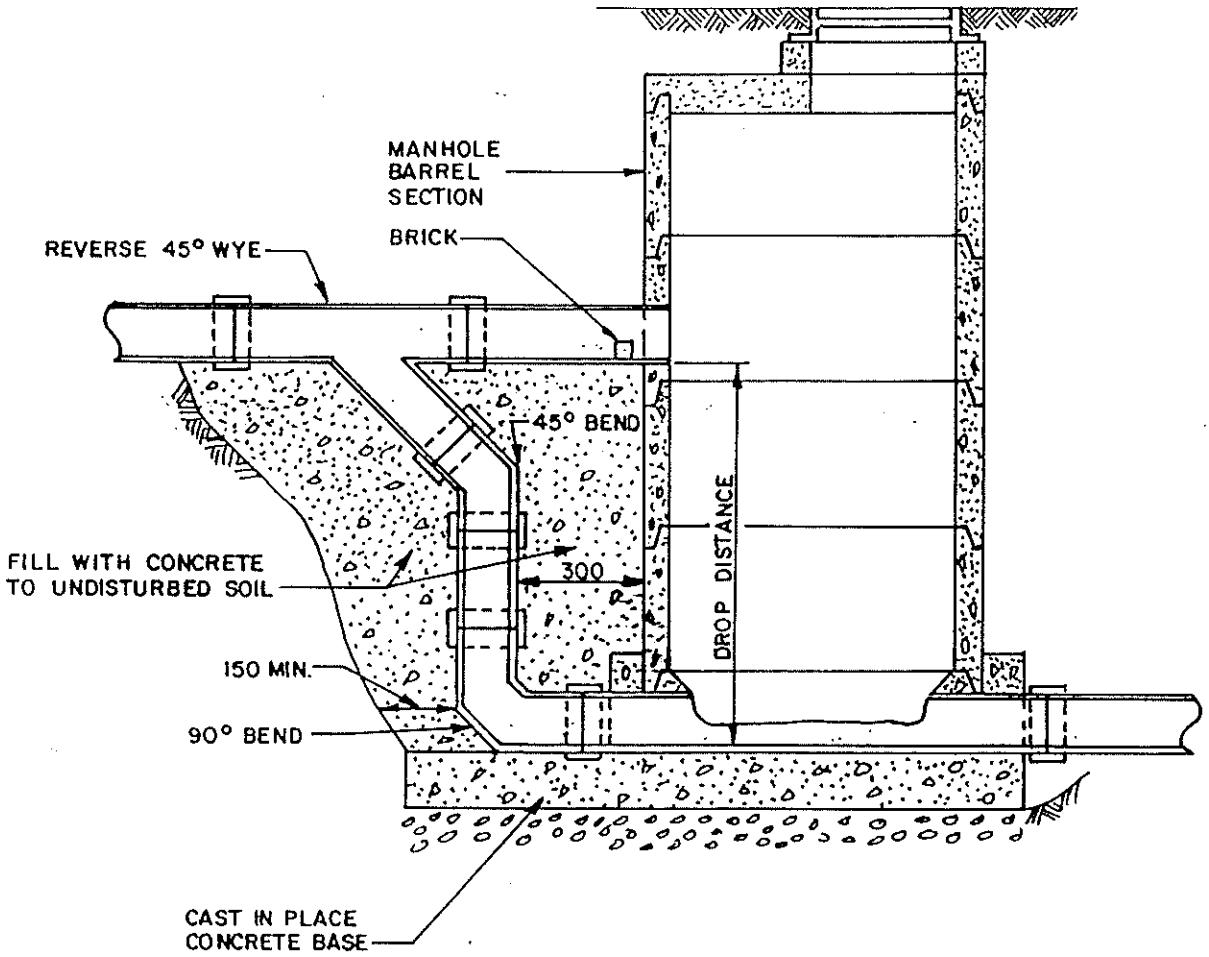
1. PRECAST BARREL SECTIONS SHALL CONFORM TO A.S.T.M. SPEC. C 478
2. ALL CONNECTIONS OF LATERALS SHALL BE CROWN TO CROWN OR FOR PIPES OF THE SAME DIA. A MIN. DROP OF 30mm IS REQ'D.
3. LOCATION OF MANHOLE COVER & RUNGS ON DOWNSTREAM SIDE OF MANHOLE.
4. TOP OF MANHOLE COVER
   PAVED AREAS — 13 mm BELOW FINAL GRADE
   OPEN FIELD — 750 mm ABOVE EXIST. GROUND
5. ALL JOINTS MUST BE MORTAR FINISHED & WATERTIGHT.
6. BACKFILL. MIN. — 1500 FROM OUTSIDE FACE OF MH. COMPACTED TO 98% OF STANDARD PROCTOR DENSITY



SECTION A-A

KGM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN 1988	SANITARY SEWER SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	STANDARD MANHOLE	S1
	REVISION		



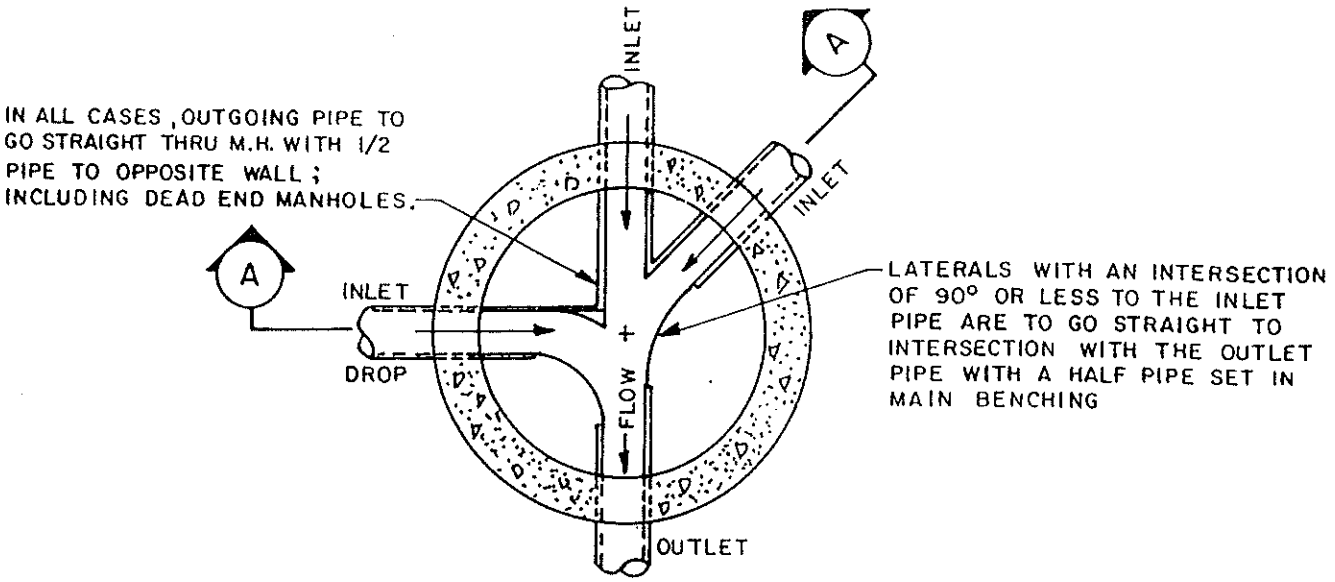
NOTES:

1. THIS DRAWING ONLY APPLIES TO THE DROP SECTION (SEE STANDARD MANHOLE DETAILS)
2. AN EXTERIOR DROP IS REQUIRED WHERE THE DROP DISTANCE IS MORE THAN 600
3. MINIMUM 200 THICKNESS OF CONCRETE AROUND DROP PIPE EXCEPT WHERE OTHERWISE SHOWN.
4. BACKFILL MIN. 1500 FROM OUTSIDE FACE OF MH. COMPACTED TO 98% OF STANDARD PROCTOR DENSITY (EXCEPT IN AREA OF DROP PIPE.).

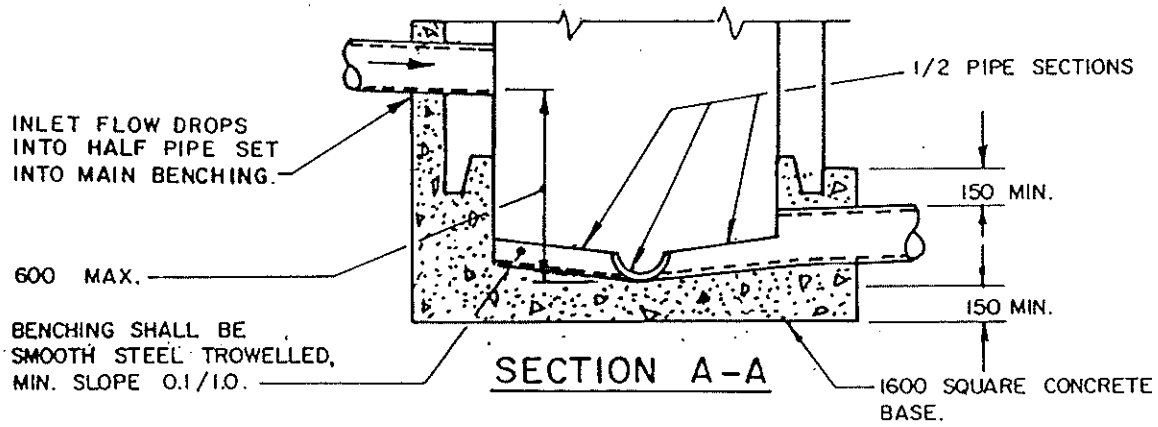
PIPE DIA.	
INFLOW	EXT. DROP
200 TO 450	200
525 TO 750	250
900 TO 1200	450

KLM ENGINEERING LTD.

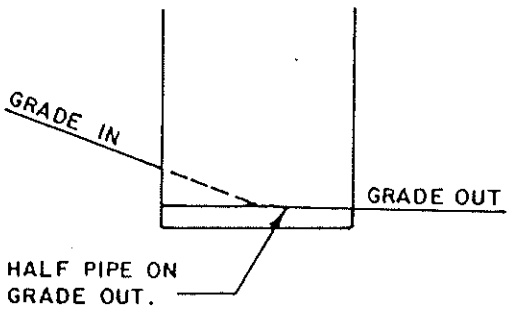
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	SANITARY SEWER SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	EXTERIOR DROP MANHOLE	S2
	REVISION		

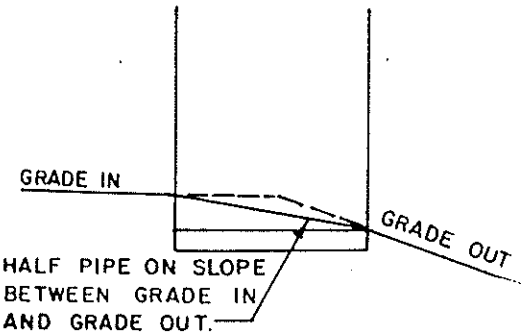


PLAN OF MANHOLE



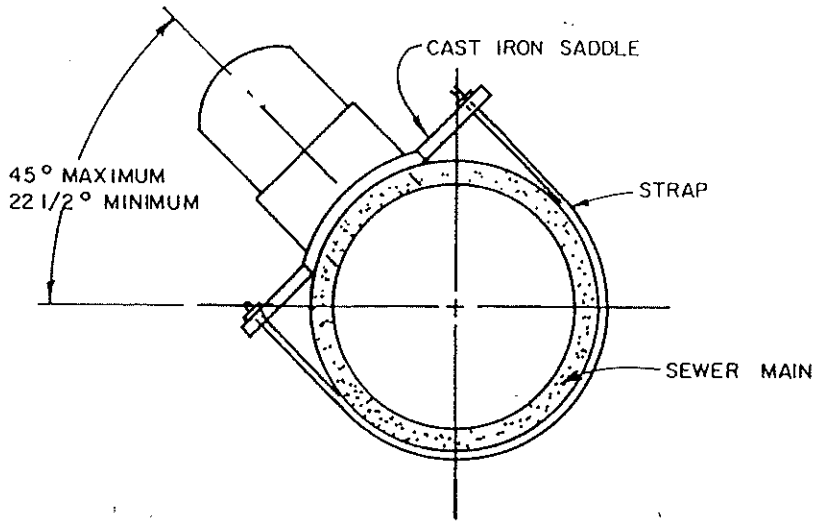
SECTION A-A





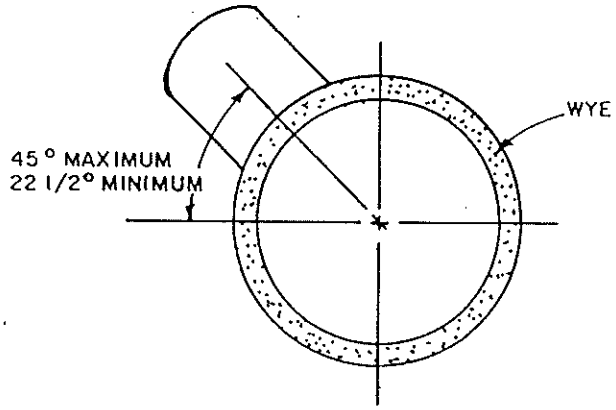
KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN 1988 SCALE N.T.S. REVISION	SANITARY SEWER SPECIFICATIONS MANHOLE BENCHING	DWG Nº S3



SADDLE WYE CONNECTION

NOT TO BE USED WITH 150ø SERVICE CONNECTING TO 200ø MAIN.

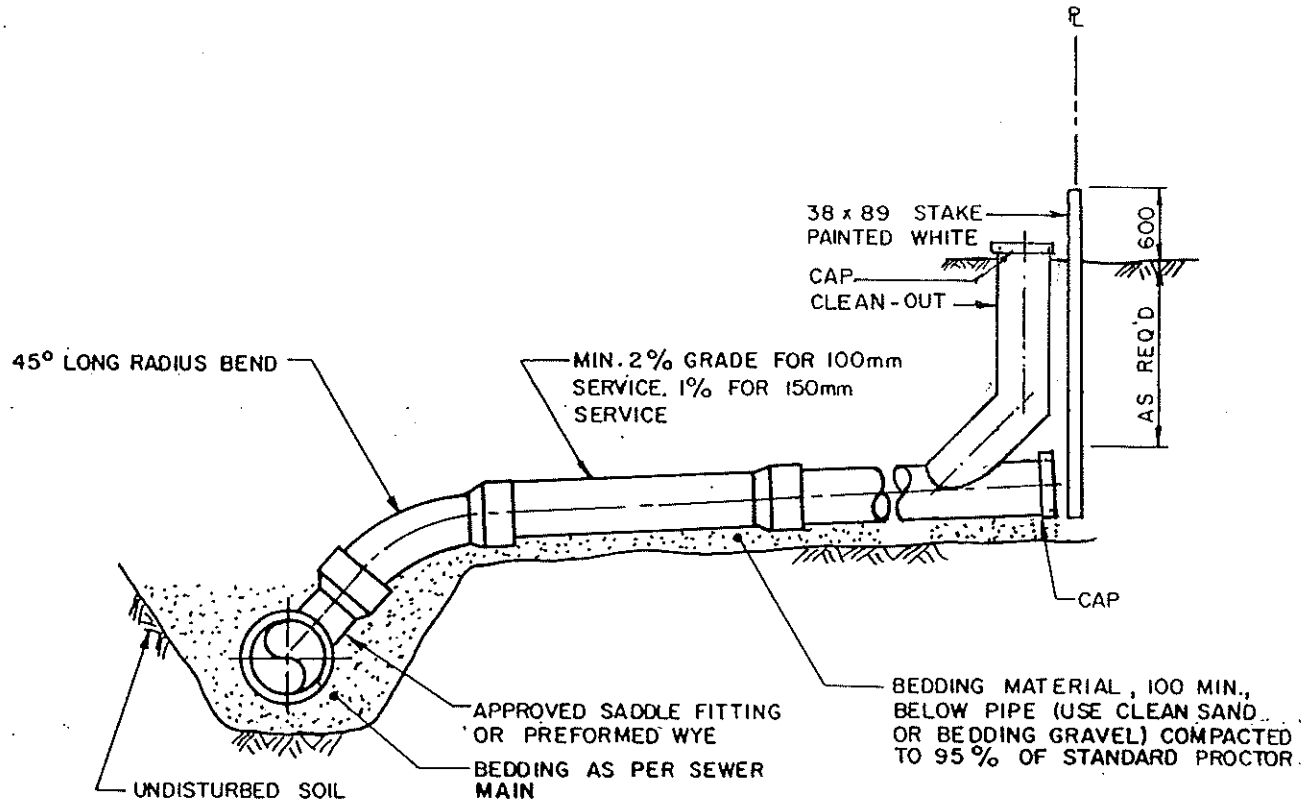


HOR. ℄ OF SERVICE IS AT 45° ANGLE TO SEWER MAIN IF WYE USED.

WYE CONNECTION

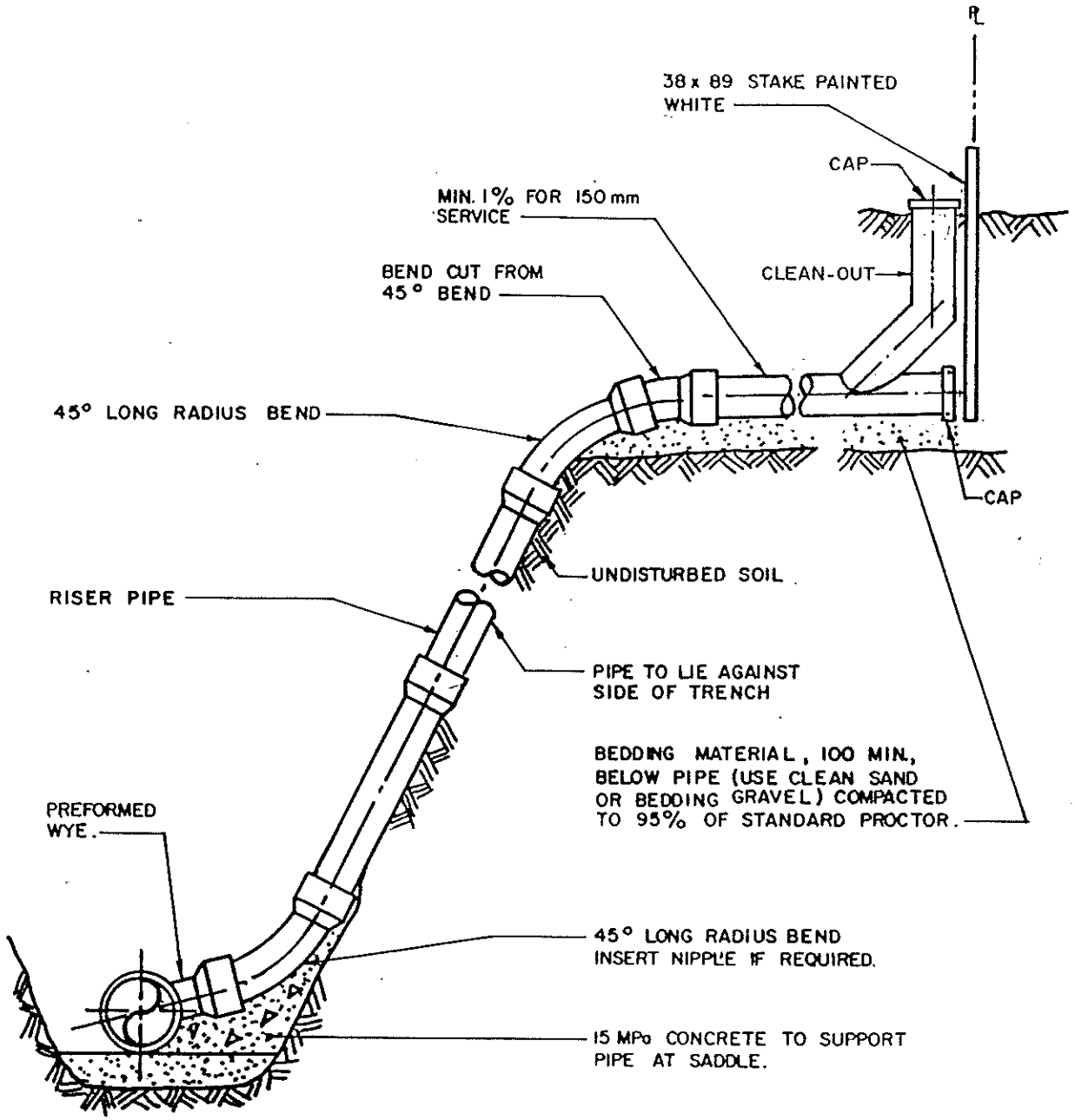
KGM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988	SANITARY SEWER SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	STANDARD SEWER CONNECTIONS	S 4
	REVISION		



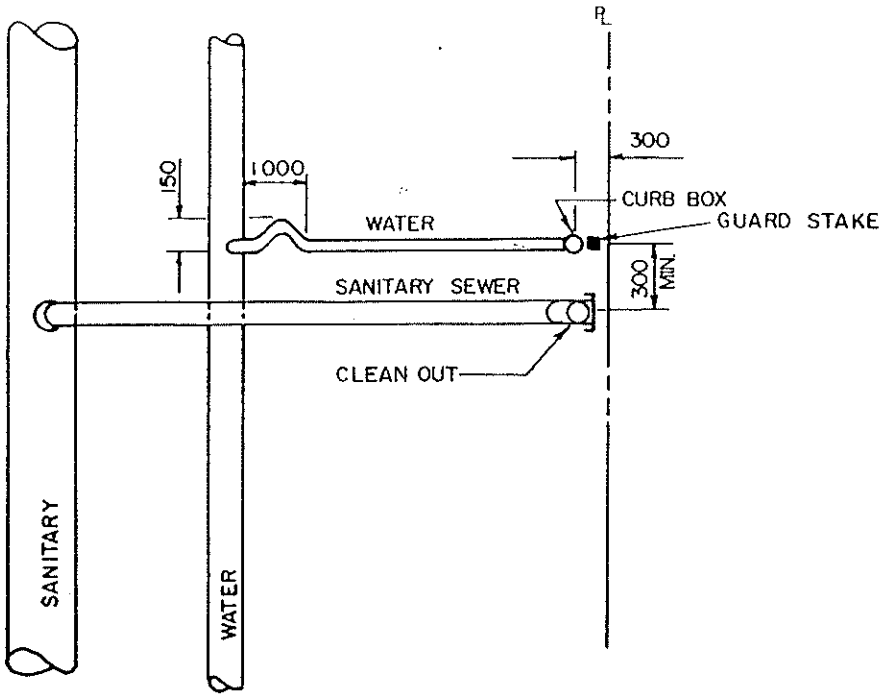
KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988 SCALE N.T.S. REVISION	SANITARY SEWER SPECIFICATIONS SEWER SERVICE (NON-RISER TYPE)	DWG Nº S 5



KGM ENGINEERING LTD.

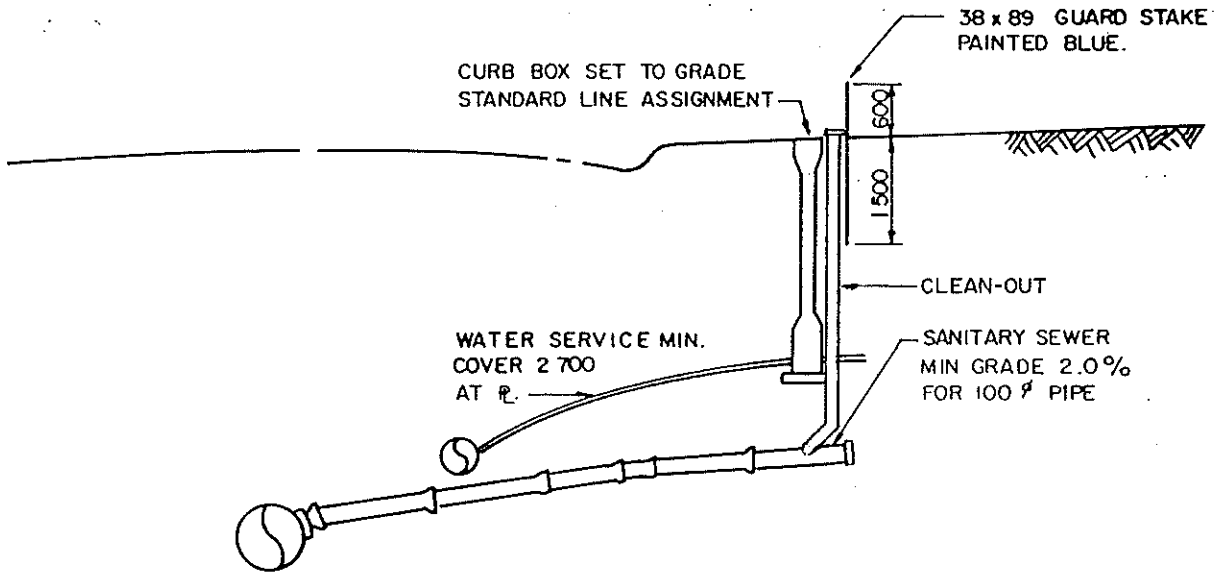
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	SANITARY SEWER SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	SEWER SERVICE (RISER TYPE)	S6
	REVISION		



NOTE:

1. CURB BOX LOCATED ON CENTER LINE OF LOT UNLESS SPECIFIED OTHERWISE.
2. VIEWING THE TRENCH FROM THE LOT, THE SANITARY SEWER SERVICE IS LOCATED TO THE LEFT OF THE CURB BOX.

PLAN



NOTE:

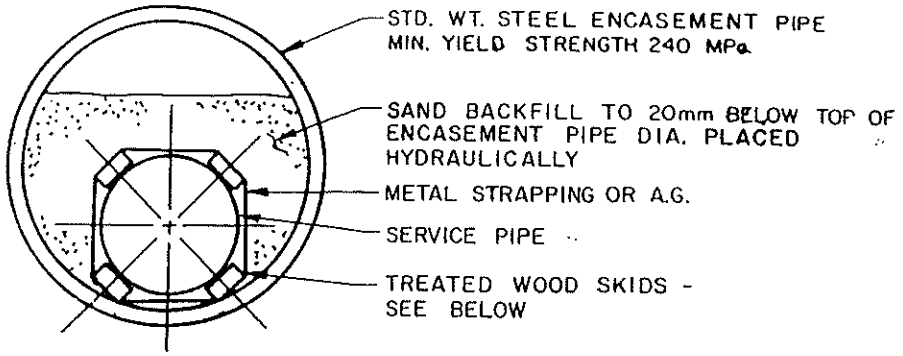
1. SANITARY SEWER MIN. COVER 3 000 IF IN COMMON TRENCH & 2 200 IF 3 000 HORIZONTAL SEPARATION IS PROVIDED.

ELEVATION

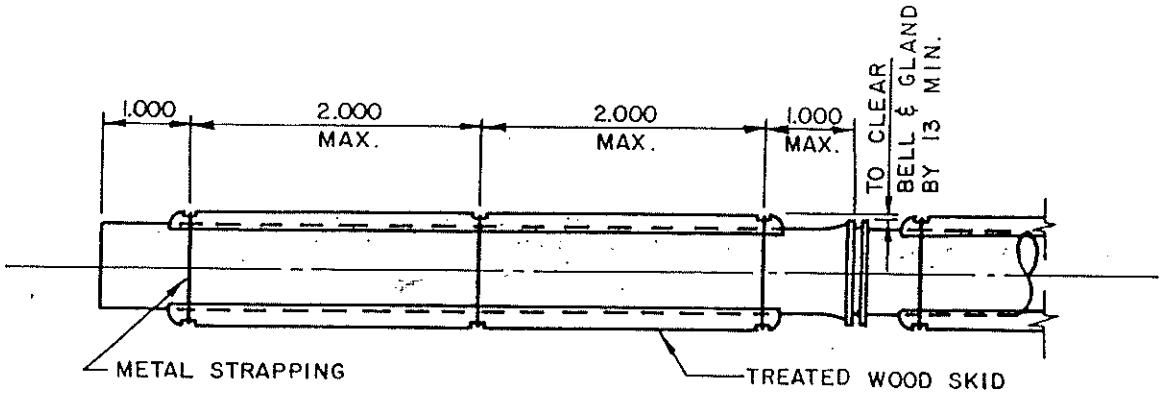
KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN.1988	MISCELLANEOUS SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	SEWER & WATER SERVICES	M1
	REVISION		

POLYVINYL CHLORIDE AND DUCTILE IRON PIPES



SECTION



SKID LOCATION DETAIL

TABLE OF CASING SIZES	
PIPE SIZE DIA. IN mm	CASING SIZE DIA. IN mm
75	225
100	250
150	300
200	400
250	450
300	500
350	550
400	600
450	650
500	700
600	875
675	975
750	1075
850	1150
900	1225
1000	1375
1075	1450

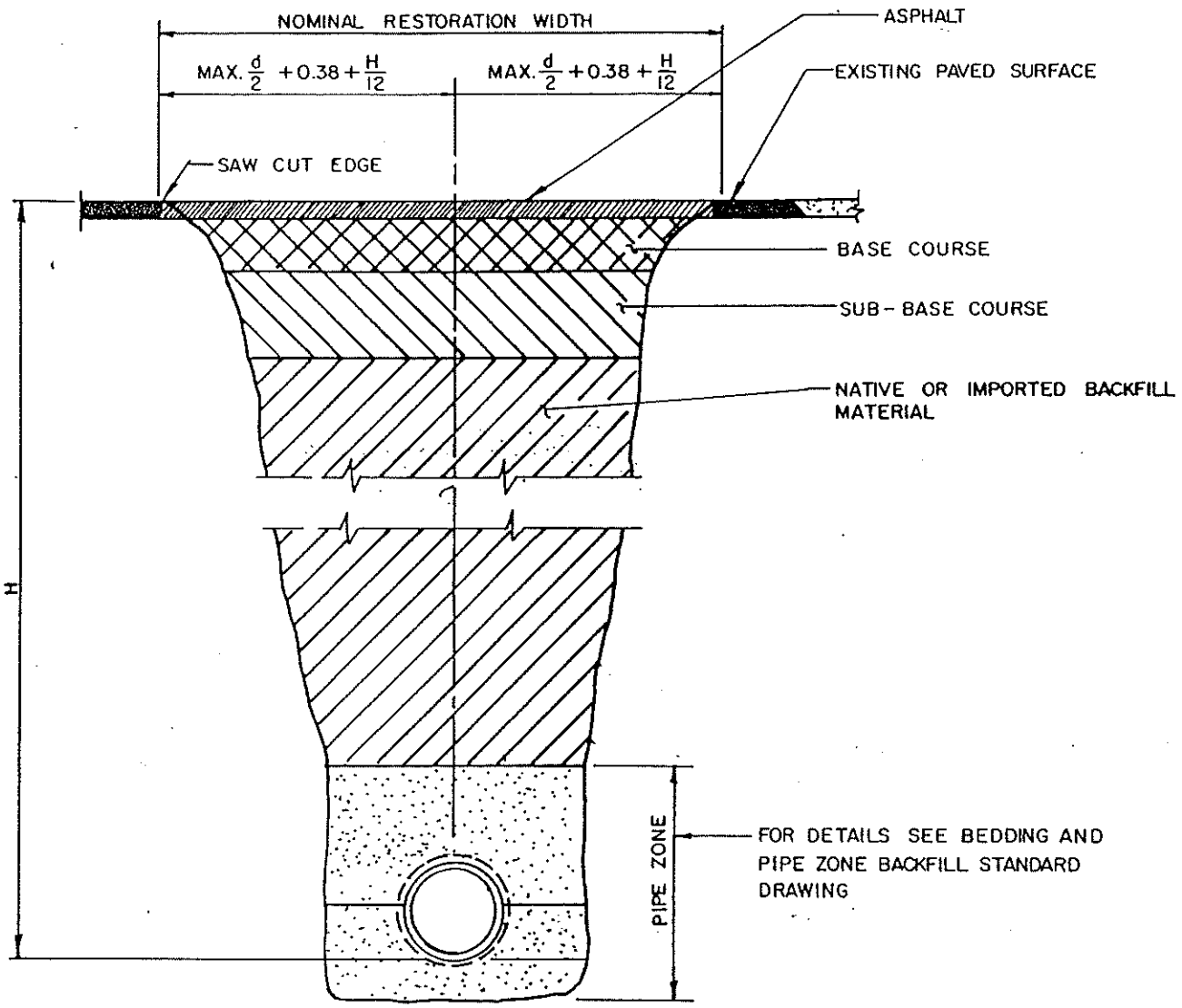
NOTE:

SKIDS MUST BE EVENLY SPACED AROUND PIPES

4 SKIDS ARE REQ'D. FOR PIPES 300 ϕ UNDER
5 SKIDS FOR 350 - 400
6 SKIDS FOR 450 - 600
8 SKIDS FOR 750 AND OVER

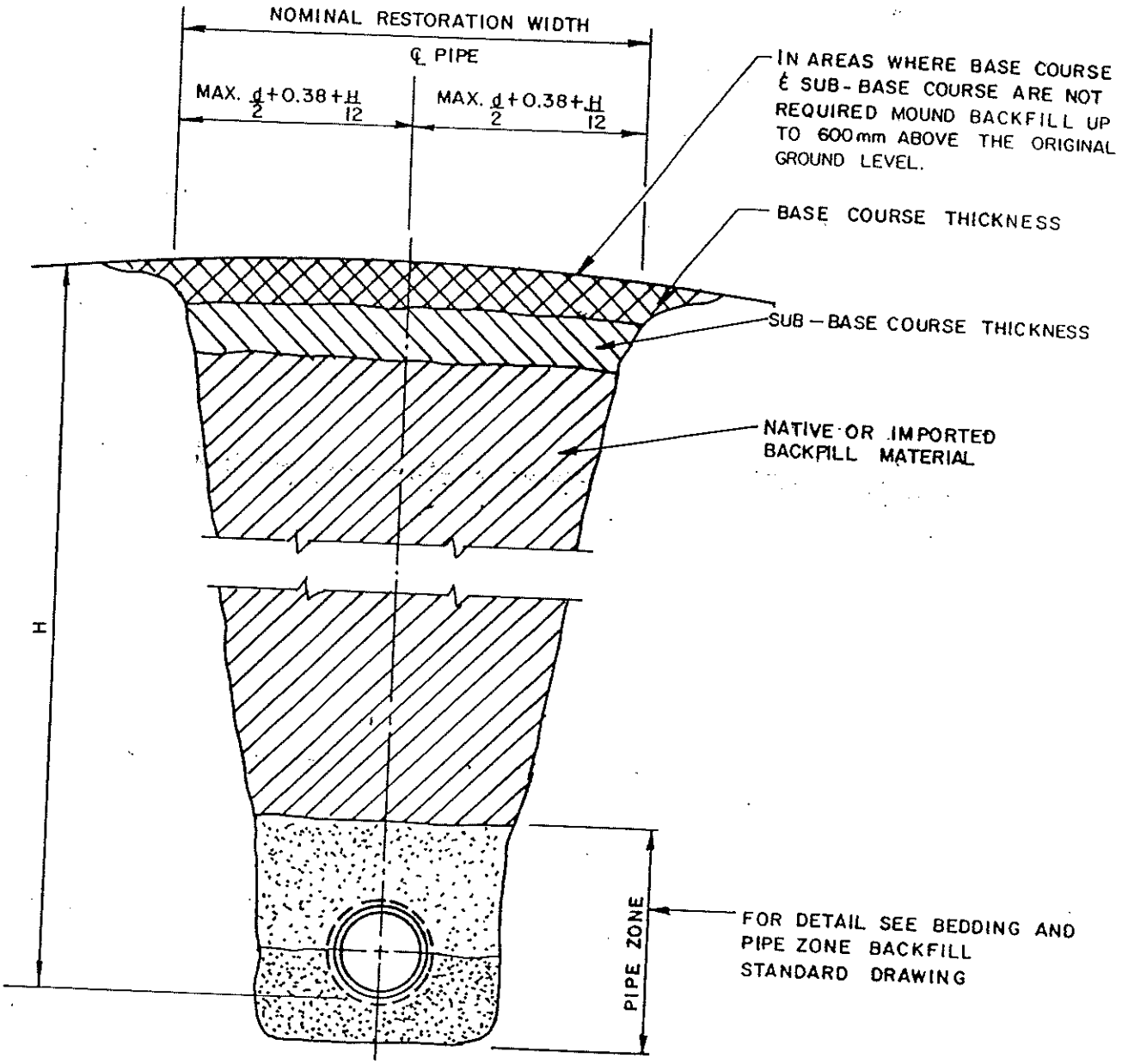
KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988	MISCELLANEOUS SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	**ENCASEMENT PIPE DETAIL**	M 2
	REVISION		



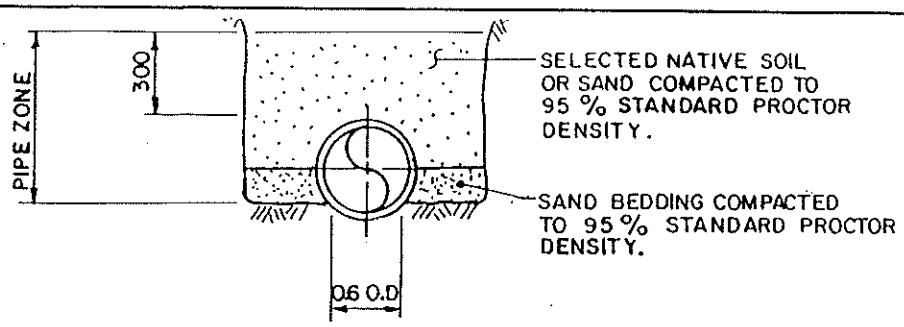
KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988 SCALE N.T.S. REVISION	MISCELLANEOUS SPECIFICATIONS TRENCH DETAILS IN PAVED AREAS	DWG Nº M3

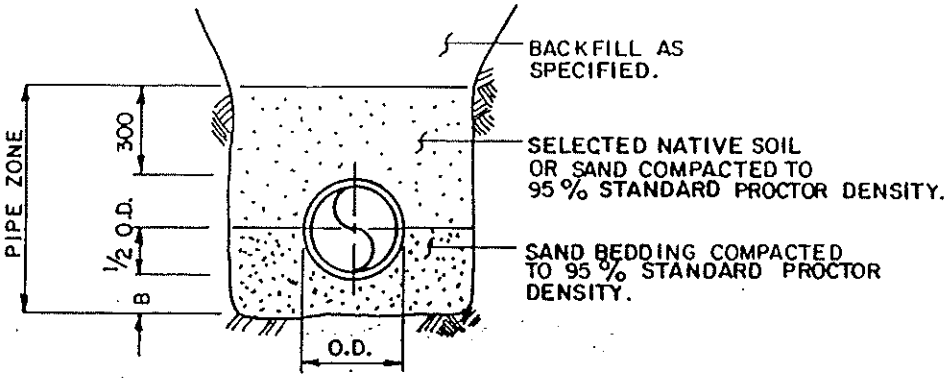


ENGINEERING LTD.

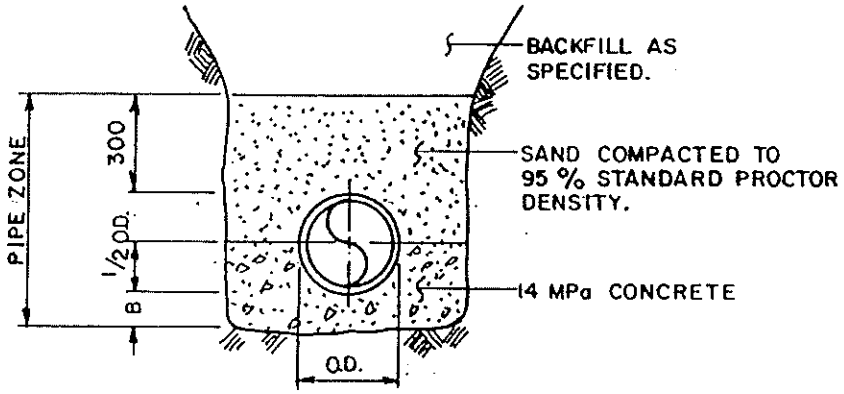
DISTRICT OF NEW HAZELTON	DATE JAN. 1988	MISCELLANEOUS SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	TRENCH DETAILS IN GRAVELLED AREAS	M4
	REVISION		



CLASS 'C'

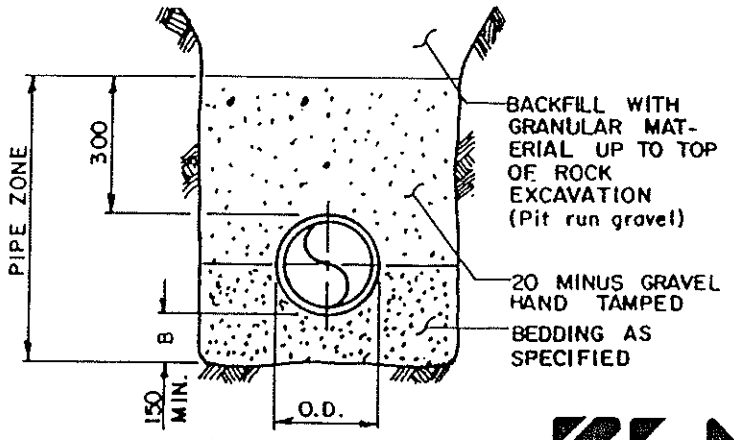


CLASS 'B'



CLASS 'A'

TRENCH DATA	
PIPE SIZE	B (MIN.)
675 or smaller 750 to 1500 1650 and larger	75 100 150
PIPE SIZE	TRENCH WIDTH
750 or smaller 825 to 1200 1350 and over ALL SIZES	O.D. + 600 MAX. O.D. + 750 MAX. O.D. x 1.5 MAX. MIN. O.D. + 400



ROCK TRENCH

KLM ENGINEERING LTD.

DISTRICT OF NEW HAZELTON	DATE JAN. 1988	MISCELLANEOUS SPECIFICATIONS	DWG Nº
	SCALE N.T.S.	TRENCH BEDDING DETAILS	M5
	REVISION		