

15.0 THRUST BLOCKING

Concrete thrust blocking and/or adequate joint restraining devices must be provided at bends, tees, wyes, reducers, plugs, caps, valves, hydrants and blow-offs.

Concrete shall be placed such that the pipe and fitting joints are accessible for repair.

The restraint system must take into account potential future excavations in the vicinity of the watermain. Design calculations must be based on fitting type, water pressure and soil conditions.

16.0 RESERVOIRS

16.1 Preliminary Design

Reservoir design is to include a preliminary design that requires the approval of the Director of Public Works before detailed design begins. Preliminary designs will cover the following issues.

- Material selection - concrete
- Design standards
- Volume
- Shape
- Number of cells
- Geotechnical report on foundation conditions
- Appearance
- A summary of design features including:
 - Sizing
 - Design Elevations
 - Control mechanisms
 - SCADA

16.2 Capacity

Reservoirs are to be designed to suit the particular circumstances. Reservoir capacity is to be calculated by the following formula:

- Total Storage volume = A+B+C
- Where A = Fire Storage (as determined by FUS Guidelines)
- Where B = Equalization Storage (25% of Maximum Day Demand)
- Where C = Emergency Storage (25% of A+B)

Subject to the results of a detailed engineering analysis and approval from the Approving Officer, the requirement for emergency storage (C) may be reduced or eliminated based on consideration of the following:

- Dependability of the water source
- Reliability of the supply system
- Presence of more than one supply source
- Whether the reservoir is part of a large system

- Presence of other reservoir(s) in the system
- Availability of standby power
- The need for adequate circulation of the reservoir to maintain water quality

16.3 Structural Design

The reservoir must be designed in accordance with the latest edition of the BC Building Code and one of the following specialty codes:

- American Concrete Institute (ACI) 350/350R: Code requirements for Environmental Engineering Concrete Structures and commentary.
- Portland Cement Association (PCA): Circular Concrete Tanks Without Pre-stressing.
- ACI 350.31350.3R: Seismic Design of Liquid Containing Concrete Structures and commentary.
- American Water Works Association (AWWA) D110: AWWA Standard For Wire and Strand-Wound Circular Pre-stressed Concrete Water Tanks with Circumferential Tendons.
- AWWAD100: AWWA Standard for Welded Steel Tanks for Water Storage
- AWWAD103: AWWA Standard for Factory-Coated Steel Tanks for Water Storage
- AWWAD121: AWWA Standard for Bolted Above Ground Thermosetting Fibreglass Reinforced Plastic Panel type Tanks for Water Storage

16.4 Design Features

Two cells, each containing one-half the total required volume and capable of being drained and filled independently. A single cell reservoir may be considered under the following circumstances:

- The total volume is less than 4500 m³.
- There is alternative storage available.
- There is an alternative supply source available.
- An alternative storage or supply source is scheduled to be available within five years.

Overflow drain sized to handle the maximum design inflow.

Separate inlet and outlet pipes, located and oriented to provide circulation within the reservoir.

Independent drain outlet at the bottom.

Roof access hatch sized and located for safe and convenient access for personnel, parts, temporary ventilation facilities and cleaning equipment into each cell.

Hatches to be watertight, aluminum, complete with hinges and related hardware, drains, locks and intrusion alarm.

Ventilation pipes or openings sized to handle appropriate intake and exhaust air volumes for filling and draining the reservoir. Include security consideration.

Reservoir floor to slope to drain sump in concrete structures and in steel structures where possible. Drain as low as possible in steel reservoirs.

Drain sump in concrete reservoirs to be a minimum of 1000 mm x 1000 mm x 400 mm. The invert of the drain pipe is to be flush with sump floor. Grating to be installed over sump.

Zoned sub-drains under floor to collect, drain and allow for monitoring of any leakage.

Stairways are to be constructed of stainless steel or aluminum. Interior wall ladder from roof access to floor required. All ladders and stairs to meet Worksafe BC regulations, including attachment points or fall arrest equipment.

All pipework within the reservoir to PVC, stainless steel, fiberglass or steel or ductile iron coated to AWWA standards.

All metal parts within the reservoir, including bolts, nuts, screws, anchors, ladders, etc. to be stainless steel.

Pressure transducer or ultrasonic level controls required for each cell.

Sample lines for at least one sample per 1000 m³ within each cell.

Wash down connection required in each cell, complete with backflow preventer and 65 mm diameter pipe.

Convenient maintenance access required.

Fencing, lighting, locks, alarms and other security facilities to minimize vandalism and prevent water contamination.

16.5 Valve Chambers

Reservoir piping will incorporate a valve chamber with the following features:

- All valves associated with the reservoir operation.
- Entrance at grade, large enough to permit safe removal of largest equipment.
- Lifting beams and hoists where necessary to enable removal of equipment.
- Interior and exterior of all steel piping to be coated to AWWA standards, or be made of stainless steel.
- Floor drains and drainage system.

16.6 Additional Design Features

Additional design features, which may be required subject to system operations details, include the following:

- Sampling ports for inlet and outlet reservoir water.
- Flow measurement and recording for both the inflow and outflow.
- Heat, light and ventilation to District and Worksafe BC standards.
- Level monitoring system and connection to SCADA, if applicable.
- For system consistency, the SCADA design shall be done by the District at the Developer's expense.
- Provision for re-chlorination facilities.

17.0 SERVICE CONNECTIONS

Service connection size is to be calculated on the basis of the designated land use including sprinkler systems and/or on-site hydrants, where applicable. The minimum size is 20 mm.

Each service will have a shut-off located within 300 mm of the property line on the public side. Each connection of 100 mm dia. or larger requires an approved backflow preventer at the property side of the shut-off.

18.0 PUMP STATIONS

18.1 Preliminary Design

Pump station design must include a preliminary design which is to be approved by the District before detailed design proceeds. Preliminary designs will include the following issues.

- Location
- Capacity
- Number and type of pumps
- Preliminary piping layout
- Type and appearance of structure
- Foundation conditions
- Maintenance requirements and access
- Energy requirements
- Standby power
- HVAC
- Controls and monitoring

18.2 Capacity

Pumping capacity is to be designed to suit the particular circumstances. In general, capacity is to meet maximum day demand with the largest pump out of service and balancing storage on line. If balancing storage is not on line, pumping capacity is to meet peak hour demand with the largest pump out of service. Stand-by power is to be provided to allow the greater of maximum day demand plus fire flow or peak hour demand (MDD+FF, or PHD) during a power outage.

18.3 Design Features

Structure, piping and mechanical systems designed in accordance with seismic codes for post-disaster structures.

Located above 200-year flood level or 1.0 m above highest recorded flood elevation.

Reinforced concrete, block work or brick construction designed to incorporate aesthetic considerations.

Access doorways sized for safe and convenient removal and replacement of the largest piece of equipment. Lifting hooks or rails with pulley blocks as required.

Adequate HVAC and lighting.

Standby power, unless fire storage and balancing and/or emergency storage is available without pumping.

Electric motors to be 600 V, 3 phase, premium efficiency, with thermal protection. Lower voltage (208 V, 3 phase) may be considered, depending upon service voltage available from power company.

Motors 100 hp and above to have analog vibration recording and protection.

Air relief discharge and pilot lines to be piped to floor drains.

Housekeeping pads for MCCs.

Hydraulically operated or motorized pump control valves with isolation valves, unless pumps have variable speed drives which control transient pressures.

Flow meters and totalizers.

Spring return "Silent" check valves.

High pressure and surge relief valves with isolation valves, if warranted by system characteristics and transient analysis.

Suction and discharge pressure gauges, with isolation valves, for each pump.

Mechanical pump seals.

Water quality sampling ports.

Interior and exterior of pipework coated to AWWA standards, or use stainless steel.

Pump system to be PLC-controlled, connected to SCADA system and compatible with current software, if applicable.

Hour meters and ammeters for each pump.

Power factor correction, if required by power company.

Noise attenuation to suit the location and District standards.

Equipment to be CSA approved and have minimum one-year guarantee on parts and labour. All equipment must be tested prior to acceptance.

Designer is to provide three copies of a comprehensive Operating and Maintenance Manual.

19.0 PRESSURE REDUCING STATIONS

19.1 Preliminary Design

Design Flows:

- Peak hour demand
- Maximum day demand plus fire flow.
- Continuous, emergency or fire flow operation.

Chamber details:

- Structure and access
- Location
- Controls and monitoring
- HVAC

19.2 Design Features

Minimum chamber size: 3 m x 2 m x 2 m (inside dimensions).

Structure and piping in accordance with Chambers, Reservoir Valve Chambers and Pump Stations sections.

External bypass with closed valve.

Parallel pressure reducing valves sized for peak hour and maximum day plus fire flows.

Isolating valves.

Air release valves.

Basket strainers upstream of each control valve.

Upstream and downstream pressure gauges.

Flow meter.

Interior and exterior of pipework coated to AWWA standards, or use stainless steel.

Forced air ventilation plus heat and light, subject to District review.

External kiosk, if electrical and electronic equipment is included.

PLC-controlled with connection to SCADA system, if applicable, including:

- Discharge and suction pressure transmitters
- Flow transmitter
- Uninterruptible power supply (UPS)
- Operator interface panel.

Designer is to provide three copies of a comprehensive Operating and Maintenance Manual.

20.0 CONNECTION TO EXISTING WATERMAINS

Connection of a new pipe to an existing watermain shall be done by the Applicant under supervision of the District. The Applicant shall be responsible for the costs and supply of all materials required and shall pay the full cost of performing and completing the tie-in. Only the Municipality may operate valves on the existing watermains. Notification for tie-ins shall be made at least one week in advance of the proposed work.

21.0 FLUSHING, TESTING AND DISINFECTION

21.1 General

All cleaning, flushing, pressure and leakage testing, disinfection and final flushing to be done by Contractor.

Perform all tests in presence of Director of Public Works. Notify District 24 h in advance of proposed test.

Where any section of system is constructed with concrete thrust blocks, do not conduct tests until at least five (5) days after placing concrete or two (2) days if high early strength concrete is used.

Obtain District approval prior to discharging flushing water to municipal sewers or drainage ditches.

Comply with MMCD General Conditions, Clause 20.4, Environmental Laws in regard to discharge of flushing water.

Provide District with all required approvals.

21.2 Cleaning and Primary Flushing

Before flushing and pressure testing, ensure waterworks system is completely finished except tie-ins to existing watermains and make arrangements with the District for scheduling of testing and disinfection of mains. Testing and disinfection to be witnessed by Consulting Engineer.

Isolation of existing water system where required will be performed by the District. Do not operate any existing valves without District authorization .

Water may be supplied from District fire hydrants upon application for a Hydrant Use Permit and presentation of valid test certificate for reduced pressure principle backflow prevention device conforming to AWWA C511 .

Remove foreign material from pipe and related appurtenances by flushing with water. Main to be flushed at water velocities as high as can be obtained from available water sources. Minimum velocity to be 0.8 m/s and/or in accordance with AWWA C651. Continue flushing at least until flow from most distant point has reached discharge point and until water discharged is clean and clear.

21.3 Testing Procedure

Upon completion of construction of any section, which shall be defined as that pipeline and appurtenances located between any two adjacent line valves, make section ready for testing.

Before pipe is filled with water, pipe bedding, concreting of all valves and fittings and backfilling to be completed as required in this specification. Fill each section of pipe and allow to remain full of water for a period of at least 24 hours prior to commencement of any pressure tests. Submit pipeline to a test of 1.5 x working pressure applied at highest elevation in each section, with a minimum of 1380 kPa applied at lowest point of test section. Ensure that test pressure does not exceed pipe or thrust restraint design pressures. Maximum allowable leakage rate at test pressure to not exceed 1.25 litres per millimetre diameter of pipe per kilometre per 24 hour period. Minimum duration of test period to be 2 hours. Maximum test pressures should not exceed those specified in CSA 8137.3- Table 9.

Perform pressure and leakage testing of ductile iron piping to AWWA C600 and AWWA M41.

Perform pressure and leakage testing of polyvinyl chloride(PVC) piping to AWWA M23 and AWWA C605.

Perform testing of welded steel piping to AWWA C206; no leakage allowed.

Should any test disclose excessive leakage, repair or replace defect and retest section until specified testing requirement is achieved .

21.4 Disinfection

After the Consulting Engineer has certified that pipes and appurtenances have passed all specified tests, flush and disinfect pipes and appurtenances.

Do not use granular hypochlorite for disinfection of PVC pipe with solvent welded joints, as there is an explosive reaction potential.

Retain water containing not less than 25 mg/L free chlorine in water system for a period of at least 24 h, in accordance with AWWA C651. Submit outline of proposed disinfection procedure accompanied by marked up schematic drawing to the District for approval 48 h in advance of commencement of disinfection.

Allow water from existing distribution system, isolated by reduced pressure principle backflow prevention device or other approved source of supply, to flow at constant, measured rate into newly laid watermain. In absence of a meter, rate may be approximated by methods such as placing Pitot gauge in discharge, measuring time to fill container of known volume, or measuring trajectory of discharge and using formula presented in AWWA C651.

At a point not more than 3 m downstream from beginning of new main, ensure water entering new main receives dose of chlorine fed at constant rate such that water will have not less than 25 mg/L free chlorine. To assure that this concentration is provided, measure chlorine concentration at regular intervals as specified in AWWA C651.

Amount of chlorine required to produce 25 mg/L concentration in 30m of pipe of various sizes is given in following table:

Pipe Size (mm)	100 % Chlorine (kg)	1 % Chlorine Solution (L)
100	0.006	0.61
150	0.014	1.36
200	0.024	2.46
250	0.039	3.86
300	0.054	5.45
400	0.098	9.85

Allow flow of water containing chlorine to continue until entire main, all service connections, extremities and hydrants to be treated are filled with 25 mg/L chlorine solution. To ensure that this concentration has been attained throughout, measure free chlorine residual at a number of points and extremities along main. Retain chlorinated water in main for at least 24 h. During this time operate all valves, curb stops and hydrants in section treated in order to disinfect them thoroughly.

At end of this 24 h period, treated water to contain no less than 10 mg/L free chlorine throughout main. If chlorine content is less than 10 mg/L repeat chlorination procedure until specifications are met.

After completion of chlorination, flush chlorinated water from system, hydrants and services until chlorine concentration in remaining water is less than 0.3 mg/L chlorine residual.

Upon completion of disinfection and flushing, Contractor to remove test and bleed point apparatus and backfill and complete any other work required for placing of waterworks system in service.

SCHEDULE D

Sanitary Sewers - Regulations, Standards and Specifications for Design

1.0 GENERAL

These guidelines are not intended to be a substitute for sound engineering knowledge and experience. Sanitary sewer system designs shall be prepared under the direction of a design professional who has the appropriate experience and is registered with the Association of Professional Engineers and Geoscientists of British Columbia.

Sanitary sewers are intended to convey wastewater only. This includes standard domestic plumbing fixtures, floor drains, approved industrial and commercial wastes and unavoidable infiltration. Sanitary sewer systems are intended to exclude stormwater, roof drains, footing drains and groundwater.

These guidelines apply to community sewage collection systems only. For large land parcels, on-site sewage disposal may be permitted, subject to compliance with the applicable regulation under the Public Health Act.

2.0 RESIDENTIAL PER CAPITA FLOW

Sanitary sewer system design shall be based on an average daily dry weather flow (ADWF) of 500 litres per day per capita (L/d/c).

3.0 NON-RESIDENTIAL FLOW

Average dry weather flows. (ADWF) for non-residential areas shall be based on specific data related to the development or zoning. In the absence of such data, use the above residential per capita flow and the following equivalent population factors:

<u>Land Use</u>	<u>Equivalent Population/Hectare (gross)</u>
Commercial	120 people/ha
Institutional	200 people/ha
Industrial	200 people/ha

For identified commercial and institutional facilities, the average annual daily water demand shown in Figure 2.1 may be used as an estimate of ADWF, subject to District approval.

4.0 PEAKING FACTOR

The peaking factor is the ratio of peak dry weather flow (PDWF) to the average dry weather flow (ADWF). The peaking factor is to be calculated using the design residential population and non-residential equivalent population, with the Harmon formula:

$$PF = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

Where: PF=Peaking Factor

P=Population in thousands

5.0 INFILTRATION/INFLOW

Design flow shall include an infiltration allowance to cover groundwater infiltration and system inflows. For urban, suburban or commercial areas, the allowance shall be based on the gross tributary area and the following:

Infiltration allowance= 0.17 L/s/ha

For low density areas with large lots (>90 m frontage), or spaces between developed areas, the infiltration allowance shall be based on the total sewer system pipe sizes and lengths, including sewer mains, service connections and building sewers, and the following:

Infiltration allowance= 0.17 L/s/ha

6.0 PIPE FLOW CALCULATIONS

6.1 Gravity Flow

Use Manning's formula

$$Q = \frac{AR^{0.667}S^{0.5}}{n}$$

Where: Q = Design flow in m³/s

A = Cross sectional area in m²

R = Hydraulic radius (area/wetted perimeter) in m

S = Slope of hydraulic grade line in m/m

n = Roughness coefficient (= 0.013 for gravity sewers)

6.2 Sanitary Forcemain

Use Hazen-Williams formula

$$Q = 0.285CD^{2.63}S^{0.54}$$

Where: Q = Rate of flow in m³/s

D = Internal pipe diameter in mm

S = Slope of hydraulic grade line in m/m

C = Friction coefficient (= 120 for forcemain sewers)

7.0 MINIMUM VELOCITIES

Gravity sewers: 0.6 m/s.

Forcemains: 0.75 m/s

There is no maximum velocity however consideration must be given to scour problems and the dynamic loading on manholes where flow exceeds 3.0 m/s.

Anchoring must be incorporated where the grade(s) of the sewer is/are 10 % or greater in accordance with MMCD Drawing No. G8.

8.0 MINIMUM GRADES

Minimum grades of gravity sewers are as required to obtain the minimum velocity of 0.60 m/s except for the upstream section of a residential sewer serving a design population of 25 or less in which case the minimum grade is 0.6 %, unless otherwise approved by the District. Recommended minimum grades are listed below.

PIPE DIAMETER (mm)	MINIMUM GRADE (m/100)
100	2.00
150-200	0.50
250-350	0.30
375-450	0.15

Forcemain grades are to be a minimum grade of 0.1 %.

9.0 MINIMUM PIPE DIAMETER

Residential sewers: 200 mm

Industrial: 250 mm

Service Connections: 100 mm

Sewage forcemains: 100 mm

10.0 ALIGNMENT, LOCATIONS AND CORRIDORS

Sanitary sewers must be located within the road right-of-way as noted in the applicable Standard Drawing Typical Cross Section for that road.

When the utility is required to cross private land(s), the right-of-way must be a minimum of 6.0m wide for a single pipe or wider if required to accommodate Worksafe BC side slope requirements.

Sewer main extensions shall extend to and terminate at the furthest property line of the last lot it services.

11.0 CURVED SEWERS

Where permitted by the District, horizontal and vertical curves may be formed using pipe joint deflections as follows:

- Minimum radius = 60 m.
- Constant radius throughout curve.
- Joint deflection not to exceed 75 % of maximum recommended by pipe manufacturer.
- Minimum design velocity= 0.9 m/s.
- Curve locations to be recorded by survey.

Subject to District approval, sewers larger than 600 mm diameter may include deflections formed by mitred bends, with minimum 1.25 m straight sections and maximum 45° mitres.

12.0 MANHOLES

12.1 Locations

Manholes are required at:

- All changes in vertical grade.
- All changes in horizontal direction.
- All changes in main pipe sizes.
- All intersecting sewers.
- All terminal section (for future extensions).
- Downstream end of curved sewers.
- All lot services greater than 100 mm diameter.
- Spacing intervals in conformance with the Table 12.1 below.

PIPE DIAMETER (mm)	MAXIMUM DISTANCE (m)
200 – 375	125
450 – 750	155
900 and larger	185

Table 12.1: Maximum Manhole Spacing

In all cases a manhole is required at the upper end of a sewer for flushing and cleaning.

Sanitary manhole rim elevations in off road areas must be designed to be:

- Above the adjacent storm manhole rim elevation.
- Above the surrounding ground so that infiltration from ponding will not occur.

12.2 Hydraulic Losses Across Manholes

The following criteria must be used:

- The springline of the downstream pipe must not be higher than the springline of the upstream pipe.
- Minimum drop in invert levels across manholes;
 - Straight run – no extra drop required other than slope of pipe.
 - Deflections up to 45° – 25 mm drop max.
 - Deflection 45° to 90° – 50 mm drop min.
- Exterior drop manholes must be installed in accordance with MMCD Standard drawings where invert elevation difference exceeds 600 mm.
- All benching shall be designed to prevent any solid deposition or flow disruption.
- Forcemain discharges shall be directed into the receiving manhole outflow pipe. Manhole benching shall be extended a minimum 200 mm above the forcemain crown. If a manhole drop cannot be avoided, an inside drop pipe is required.

13.0 DEPTH OF COVER

The depth of the main shall be sufficient to provide minimum cover of 2.5 m to top of service piping at the property line.

Sewers shall be of sufficient depth to:

- Permit gravity service connections to basements.
- Prevent freezing. Provide insulation where minimum depth cannot be attained as per MMCD Drawing No. G4.
- Clear other underground utilities.
- Prevent damage from surface loading.

14.0 UTILITY SEPARATION

A minimum horizontal clearance of 3 m must be maintained between the watermain, sanitary sewer and storm main or service, or where this is not possible, the clearance shall be in accordance with the Ministry of Health regulations. All water and sewer joints not consisting of a HDPE weld where the watermain is less than 0.45 m above the sewer or within 3m on the horizontal plane shall be wrapped with "Denso" tape or an approved equivalent.

15.0 SERVICE CONNECTIONS

Service connections must be provided to each lot fronting the main.

Connections to new mains must be made using standard wye fittings. Connections to existing mains must be made using wye saddles.

The standard minimum size for single family residential service connections shall be 100mm.

The size of commercial and multi-family service shall comply with the Provincial Building code.

The minimum depth of a service at the property line must be 1.0 m provided that gravity service to the Minimum Building Elevation is available.

Where rear yard sewers are necessary, due to steep topography, the minimum cover must be 1.0 m provided that gravity service to the Minimum Building elevation is available.

Service connections may be permitted into manholes provided that:

- The connection is not in an adverse direction to the flow in the sewer main.
- The connection enters the manhole so the service crown is no lower than the sewer main crown and each service benched in the manhole.

Unless otherwise approved by the District, connections are to serve all plumbing by gravity. Building elevations shall be established accordingly. Pumped connections may be permitted if requested prior to sewer design and if appropriate covenants are provided.

15.1 Grade

Minimum grade from property line to sewer main:

- 100 mm diameter pipe: 2.0 %
- 150 mm diameter pipe: 0.5 %
- Larger Sizes: Grade based on minimum velocity of 0.60 m/s

15.2 Details

Use standard wye fittings for connections to new mains. For connections to existing mains, use wye saddles or, if approved, insertable tees. The service connection centreline must not be below the sewer main centreline.

Service connections may be permitted into manholes if:

- The connection is not oriented against the flow in the main.
- Manhole hydraulic requirements are met.

Inspection chambers are required on residential connections unless the service is less than 2.5 m long and connects to a manhole.

Control manholes are required on all industrial connections and on commercial connections where required by the District.

Manholes are required on service connections larger than 150 mm diameter.

Connections exceeding 30 m in length shall be treated as mains.

16.0 SANITARY LIFT STATIONS

16.1 General

The use of sanitary lift stations is to be discouraged. Any proposed use of lift stations must receive prior approval from the Director of Public Works. Sanitary lift stations should normally be located within a right-of-way outside the required road dedication.

Sanitary Lift Stations will require a pre-design report.

16.2 Design Criteria

Pumps must be:

- Capable of passing solids up to 75 mm in size.
- Equipped with hour meters.
- Easily removed for maintenance.
- Operate on a 347/600 volt electrical source (pump motors 5 hp and greater to be 600 volt 3 phase type).
- Able to operate alternately and independently of each other.
- Able to meet maximum flow condition with one pump in failure mode.

- Designed so that each pump does not cycle more than four (4) times in one
- Hour under normal operating conditions. For example, in a duplex pump station that is designed to alternate the pump starts, each motor can have a maximum of four (4) starts an hour which could result in a total of eight (8) motor starts per hour for this station.
- Motor cables, power cables, etc. must be continuous from within the pump Station to within the kiosk unless an adequate exterior pull pit and junction box is installed.

Levels to be controlled by ultrasonic level transmitter with emergency high and low level floats.

All auxiliary equipment and control panels must be mounted in a suitable kiosk adjacent to the station. The kiosk must be located a minimum of 3.0 m from the station lid.

The control kiosk must be designed to contain all control and telemetry equipment on the front panel and all power equipment on the rear panel.

Check valves must be ball lift check valves.

All stations require an explosion-proof exhaust fan which can be activated by manual switch, and which meets Worksafe BC requirements for ventilation in a confined space.

The entrances to all stations must be waterproof and be provided with a suitable lock. The access must be a minimum 900 mm x 900 mm in size. The access hatch shall have:

- An aluminum ¼" tread plate.
- A perimeter drain.
- A perimeter scaling gasket.
- A slam lock with an aluminum removable sealing plug and opening tool.
- A flush lifting handle.
- A gas spring assist cylinder.
- A 90 degree hold open arm.
- A flush fitting padlock tang.
- The hatch must be reinforced for 1465 kg/m² (300 lbs/sq.ft). All fasteners to be made of 316 stainless steel.
- The entrance must be above ground level where feasible but in no case more than 300mm above the ground.
- Access into the station must be by an aluminum ladder. The location of the ladder must not interfere with the removal and installation of pump etc. The ladder must be designed to extend and lock at least 600 mm above the station entrance. A platform is to be a fiberglass grating. The access, ladder and platform to meet Worksafe BC standards.

All wiring must be explosion proof, Class 1, Division 2, and electrical design and installation is subject to the acceptance of the Provincial Safety Inspector.

All stations must provide an automatic generator for standby power in case of power failure. Provision for a telemetry system must be included for connection into the district's telemetry system. For small lift stations with an ultimate capacity less than 100 units, emergency storage may be considered in place of standby power. Emergency storage is to be based on eight (8) hours of average day flows.

All equipment must be CSA approved and have at least one year guarantee for parts and labour. The Consulting Engineer is to provide the District with three sets of Operating and Maintenance Manuals. All pumps to be factory tested prior to installation.

A plug valve is required on the influent line and each pump discharge. The plug valves must be outside the station and be complete with square operating nut and nelson box.

If a lift station is authorized by the Director of Public Works to be constructed in an area that may be subject to vehicle loads, the roof and cover of the lift station must be designed to withstand a loading of H-20 (Highways Standard).

Provision(s) must be made for standby pumping from an external source. An adapter flange ("Kamlock") complete with a quick coupling and lockable cap is required.

The area around the lift station and all associated equipment or building must be asphalted. The size and area to be determined by the requirements for maintenance.

The surfaces of all steel components and fiberglass stations must receive at least two coats of two component white epoxy enamel. All concrete stations must be designed and constructed to prevent sulphide attack and include epoxy coated rebar, and the concrete surface must be coated with at least two coats of blue epoxy and then an additional 2 coats of white epoxy.

The wet well bottom must be benched to direct solids into the pump suction. The influent line must be located tangent to the wet well to encourage scouring of the wet well.

The station shall be complete with an Uninterruptable Power Supply (UPS) to serve all alarms and controls.

The pump control panel must incorporate an operator interface (Panelmate or equivalent), and the panel must be complete with a lamp test button.

Separate starter enclosures must be provided for each pump.

PLC control to be based on District standards.

Station communication to be provided via radio transmission compliant with the District's telemetry system, and an antenna must be installed on a suitable mast or pole to ensure reliable transmission.

- An hour meter must be built into the panel for each pump.
- An amp meter must be provided for each pump.
- Minimum storage between the high level alarm and the start of overflow under the more critical of:
 - Minimum one (1) hour in wet well at average wet weather flow.
 - Minimum one (1) hour in wet well and influent pipes at peak wet weather flow.
 - Station to have a magnetic flow meter.
 - Station to allow removal of pumps using hoist truck with a 1.8 m boom. Where vandalism or safety is a concern, perimeter fencing is to be provided. The fence must be made of black chain link.

- Landscaping acceptable to the District is to be provided, including irrigation.
- Noise control may be required as determined by the District
- Minimum barrel size must be 1800 mm (6') in diameter.

17.0 **FORCEMAIN**

In conjunction with sanitary pumping facilities, the following criteria must be noted in the design of forcemain systems. Design computations for forcemains must be made using a C value appropriate for the type of pipe. The Hazen Williams formula identified in Section 6.2 must be used.

17.1 **Velocity**

At the lowest pump delivery rate anticipated to occur at least once per day, a minimum cleansing velocity of 1.0 m/s shall be maintained. Maximum velocity shall not exceed 2.5 m/sec.

17.2 **Air Relief Valves**

An automatic air relief valve must be placed at high points in the forcemain to prevent air locking.

17.3 **Termination**

Forcemains shall enter the gravity sewer system at a point not more than 600mm above the flow line of the receiving manhole. An outside drop pipe must be incorporated.

17.4 **Size**

The minimum size for forcemains is 100 mm in diameter.

17.5 **Materials**

With the exception of valve, the material selected for forcemains must meet the standards specified for watermains and must adapt to local conditions such as character of industrial wastes, soil characteristics, exceptionally heavy loadings, abrasion and similar problems.

Valves used on forcemains shall be plug valves sufficient for long term use in a corrosive environment.

17.6 **Loads and Transient Pressures**

All forcemains must be designed to prevent damage from superimposed loads, or from water hammer or column separation phenomena.

18.0 **CONNECTING TO EXISTING SANITARY MAINS**

Connection of a new pipe to an existing sewer main shall be done by the District unless the existing main has an acceptable provision for a direct extension. The Applicant shall be responsible for all costs related to supply of materials required and making the tie-in. This portion of the work, including details of materials required, shall be clearly indicated on the design drawings. Application for tie-in shall be made one week in advance of the proposed work.

SCHEDULE E

Stormwater Systems - Regulations, Standards and Specifications for Design

1.0 GENERAL

Stormwater System refers to the overall stormwater system plan for the major and minor system and shall be designed based on the principles contained in the Stormwater Planning Guidebook for British Columbia published by BC Ministry of Water, Land and Air Protection dated May 2002.

Storm Drainage System refers to the piped network. Storm Drainage Systems shall be designed, analyzed and approved in accordance with best engineering practices.

Run-off flows from the subdivision must be limited to the 5 year return period pre-development runoff condition.

Consulting Engineers retained by the Owner to design the works and services must consult with the Director of Public Works to determine what existing information may be of assistance to them.

All developments require a storm drainage plan.

The presence of an existing District drainage system does not mean or imply there is adequate capacity to receive the proposed design flows, nor does it indicate that the existing system pattern is acceptable to the District.

Existing facilities which are undersized or inadequate to accept additional drainage must be defined for upgrading to accommodate the appropriate subdivision design flows. Alternative drainage proposals may be considered.

2.0 STORMWATER MANAGEMENT PLAN

The Stormwater Management Plan (SMP) must be provided for all developments that alter the existing site drainage characteristics.

A SMP of the proposed Subdivision or Development must be developed in two phases at the expense of the Owner. The Stormwater Management Plan must be developed or overseen by a Professional Engineer who is registered in the Province of British Columbia and is experienced in hydrologic analysis. The SMP shall be conservative in calculation, coupled with sound engineering judgment. The economic aspects of the design must not be overlooked. Low maintenance and operational simplicity are preferred. Criteria and proposed solutions will be reviewed by the District.

The Owner's Consulting Engineer will provide the District with the technical information, and the District may, at its discretion, undertake the hydrologic analyses by computer model to verify the suitability of the Consulting engineer's design.

It is also the Consulting engineer's responsibility to confirm the extent of the drainage catchments, and the required level of SMP detail, with the District prior to design work commencing.

A comprehensive lot grading plan prepared by the Consulting engineer is required. This requirement may be waived by the District if fewer than three new lots are created and there is no apparent impact on adjacent properties.

The first principle is to retain as many natural storm drainage features as possible.

Regardless of the size of development the District may require a report or grading plan prepared by the Consulting engineer analyzing the existing development and impact on adjacent properties. This plan must illustrate a strategy that addresses both the compatibility of the grading on all lots within the development area and the impact of these strategies on the existing adjacent development area.

Items to be addressed are:

- Pre- and post-development contours.
- Identification of cut and fill areas. Areas of greater than 1 m of fill are to be identified and the Geotechnical Engineer is to provide comments on these areas pertaining to suitability for building construction.
- Building envelopes within the proposed lots.
- Grade elevations at property corners and any other change in grade.
- A typical grading detail identifying general conditions and any special conditions for construction.
- Minimum and maximum main floor elevations for buildings.
- Directional arrows showing proposed drainage flow routes on each lot. Cumulative drainage of two or more properties is to be avoided and where necessary the Consulting engineer is to provide the rationale for this condition as well as propose a means of directing the flows to prevent impact on adjacent lots. This condition may require installation of special Works and Services by the Applicant and encumbrances registered on the lands.
- The Consulting engineer will document any low impact development and source control solutions proposed.
- Existing drainage patterns adjacent to the site.
- Legend identifying all notations.
- Lot numbering as per the final registered plan.

Confirmation of final elevations will be required prior to acceptance of Works and Services. The final grading plan submitted to provide guidance for the development of buildings on the lots may omit pre-development contours and cut/fill notations. Covenants may be registered on lots to ensure compliance with the approved plan.

3.0 MINOR AND MAJOR SYSTEMS

Each drainage system must consider the following stormwater analysis of runoff components:

- The minor system consists of drainage works, pipes and ditches, which convey flows of a five (5) year return frequency, with no pipe surcharging.
- Developments less than five (5) hectares require minor storm system design.
- The major system exceeds the capacity of the minor system and consists of surface runoff paths, roadways and water courses which convey flows of a 100 year return frequency. Major runoff path routing is required wherever surface overland flows are anticipated. Creeks regulated by the Ministry of Environment may require design to a 1:200 year flood.
- Developments larger than five (5) hectares require both minor and major system designs.

4.0 RUNOFF ANALYSIS

4.1 General Approach

The design catchment area shall include the entire area tributary to the storm drainage system. The catchment area shall be shown on the Catchment Area and Storm Drainage Plan and shall be in accordance with Master Stormwater Management Plans developed by the District. Detailed boundaries shall be established by the Consulting Engineer in so far as they affect the proposed subdivision.

4.2 Stormwater Runoff Generation (Hydrology)

The capacity of storm drainage systems through the developments will be designed to accommodate post-development flows above and in the development. All calculations pertinent to the design of the drainage system will be signed and sealed by the Consulting Engineer and submitted to the District.

For developments where the total tributary area is 10 hectares or less, the Rational Method shall be used to compute the peak runoffs.

For developments where the total tributary area is greater than 10 hectares, the Runoff Hydrograph Method will be used to compute the peak runoff. The Runoff Hydrograph Method will also be used for the design of storage facilities with tributary areas greater than 10 hectares.

In all cases the Consulting engineer (in determining the critical design conditions) is to consider the impact of snowmelt on the drainage system.

4.3 Rational Method

This method calculates the peak flow using the equation $Q_T = RAIN$

Where Q_T = Flow in cubic m per second, for a return period T

R = Runoff coefficient (see Table E-1 below)

A = Drainage area in hectares

I_T = Average rainfall intensity in mm/hr for the return period T, during that period of time equal to T_c

N = 0.00278

4.3.1 Runoff Coefficients

Description of Area	% impervious	5/10-year Coefficient	100-year Coefficient
Commercial	90	0.80	0.85
Industrial	90	0.80	0.85
Suburban Residential (lots>0.4 ha)	20	0.35	0.40
Low Density Residential	40	0.50	0.55
Medium Density Residential	65	0.60	0.65
High Density Residential	78	0.70	0.75
Woodlands	5	0.10	0.30
Parks, Playgrounds, Cemeteries;	20	0.25	0.30
Agricultural Land	30	0.30	0.40
Institution; School; Church	80	0.75	0.80

Table E.1 Runoff Coefficients

Note:

- The above table assumes conventional site drainage of directing all surface drainage overland into streets and catch basins. The runoff coefficients account for antecedent wet conditions.
- In the case of mixed land use, a composite runoff coefficient is to be determined.
- The Consulting engineer is to verify the above values meet site specific conditions and if higher values are required.

4.3.2 Drainage (or catchment) Area

The extent of the tributary drainage areas for the storm drainage system being evaluated shall be determined using the natural and/or the proposed contours of the land taking into account future land use in accordance with the OCP.

It is stressed that it is the Consulting Engineer's responsibility to confirm the extent of the drainage areas with the District prior to final design, and to incorporate the previously determined storm planning flows into the overall system.

4.3.3 Time of Concentration (T_c)

In developments where substantial undeveloped areas remain, the contributing drainage area flows and corresponding Time of Concentration shall be checked by trial and error to determine the maximum

peak outflow rate. It is the cumulative sum of all flow times: overland, channel (swale or stream); and/or storm drain.

- **Overland Flow Time:**

Several equations for overland flow time may be used such as; the kinematic wave equation, the airport method, etc. It may be appropriate in fully developed basins as determined by the Consulting engineer, to use the minimum inlet times in the following table:

Development Type	Minimum (minutes)	Maximum (minutes)
Single Family	10	15
Multi-family	8	15
Commercial/Industrial	5	10

The minimum inlet times reflect roof leaders and parking lot drainage (hard surface) being discharged directly into a piped storm system. The maximum inlet times reflect roof leaders and parking lot drainage being discharged onto ground (grass, gravel, swales) and accounting for travel distances and other variables. It is the Consulting engineer's responsibility to verify that the above values are appropriate and provide recommendations to the District for approval where variations are appropriate.

- **Channel Flow Time:**

When the channel characteristics and geometry are known, the preferred method of estimating channel flow time is to divide the channel length by the channel velocity obtained by using the Manning equation, assuming bank full conditions.

- **Storm Drain Flow Time:**

When it is appropriate to separate flow time calculations, such as for urban storm drains, Manning's equation may be used to obtain flow velocities within pipes.

4.3.4 Rainfall data

Intensity- Duration- Frequency data from the Hudson's Hope BCHPA Dam will be used in evaluating and designing drainage infrastructure in the District.

4.3.5 Presentation of Rational Method Computations

The Consulting engineer shall tabulate the design calculations based on Manning's formula for submission with the Stormwater Management Plan.

4.4 Runoff Hydrograph Method

For basins larger than 10 hectares, hydrologic programs will be used for runoff analyses. The Consulting Engineer will obtain acceptance from the District on the selection of the proposed computer program. In view of very limited site specific calibration data available, the selection and proper application of appropriate computer programs shall include a comprehensive review of the program's historical usage/application in other similar urban/urbanizing watersheds. This is primarily the responsibility of

the Consulting Engineer. It is necessary to use computer models that have the capability to adequately represent the hydrologic characteristics of the watershed.

Whenever possible, modelling results shall be calibrated using observed rainfall and flow data from the design watershed or a similar watershed. Sensitivity of the model predictions to variations of key parameters shall be tested and the findings used to develop realistic and conservative models.

Post-development hydrographs shall be generated at key points of the major drainage systems for a 5-year and 100-year design storm with durations of 2, 6, 12, and 24 hours for each development condition. A different range of storm durations may be appropriate, subject to District approval. This will identify the critical storm event to be used in designing the system component. Note that the storm durations that generate the critical peak flow may be different from the durations that generate the critical storage volume. Systems with a number of interconnected ponds or with restricted outlet flow capacity may require analysis for sequential storm events or modelling with a continuous rainfall record.

4.4.1 Presentation of Modeling Results

Modelling results are to be submitted to the District in a report containing at least the following information:

- Plans showing catchment and subcatchment boundaries, slopes, soil conditions, land uses and flow control facilities.
- Name and version of modelling program(s).
- Parameters and simulation assumptions.
- Design storm details.
- Pre-development and post-development hydro graphs.

5.0 SITE AND LOT GRADING

A comprehensive lot grading plan prepared by the Consulting Engineer is required. This requirement may be waived by the Approving Officer if fewer than three new lots are created and there is no apparent impact on adjacent properties.

6.0 MINIMUM BUILDING ELEVATIONS (MBE)

The MBE applies to the elevation of the lowest floor slab in a building or the underside of the floor joists where the lowest floor is constructed over a crawl space. Crawl space is defined as the space between a floor and the underlying ground having a maximum height of 1.2 m to the underside of the joists and not used for the storage of goods or equipment damageable by floodwaters.

The MBE is to be at least 0.60 m above the storm sewer service connection invert and 0.30 m above the major drainage system hydraulic gradeline (HGL).

For sites near a watercourse for which a floodplain elevation has been established, the MBE is 0.30 m above the 200-year return period instantaneous flood elevation.

Detailed designs shall include maximum hydraulic gradelines (HGLs) of the minor and major systems plotted on profiles of the minor system components and compared with minimum building elevations (MBE) to demonstrate flood protection.

7.0 LEVEL OF SERVICE – MINOR SYSTEMS

The minor drainage system consists of pipes and appurtenances sized to convey peak 5-year return period storm runoff by gravity (non-surcharged) flow.

7.1 Minimum and Maximum Velocities

The minimum velocity for pipes flowing full, or half full, must be 1.0 m/s.

The maximum velocity is 3.0 m/s except when entering a stream.

Where drainage discharge enters a natural watercourse or stream the maximum velocity is 1.0 m/s

7.2 Minimum Pipe Diameter

The minimum pipe diameter shall be as shown in Table E.2 below.

DESCRIPTION	MINIMUM PIPE DIAMETER (mm)
Storm Drainage Main Pipe	250
Culverts	375
Catch Basin Leads	200
Leads to Foundation Drains Only	100
Leads to Roof Drains & Foundation Drains	100

Table E.2 Minimum Pipe Diameter

Downstream pipe sizes are not to be reduced unless the downstream pipe is 600 mm diameter or larger and increased grade provides adequate capacity. The maximum reduction is two pipe sizes and the system must be a closed pipe network or be protected with approved inlet structures. The Approving Officer must give approval to this condition.

7.2.1 Manning's Equation

Manning's equation must be used for gravity storm sewer pipe design.

The roughness coefficients for use in Manning's Equation shown in Table E.3 shall be used as a minimum.

PIPE	ROUGHNESS COEFFICIENT (N)
Concrete Pipe	0.013
PVC Pipe	0.011
Corrugated Metal Pipe – Unpaved	0.024 – 0.033
25% Paved	0.021 – 0.024
100% Paved	0.013
OVERLAND FLOW	
Smooth Asphalt	0.012
Asphalt or Concrete Paving	0.014
Packed Clay	0.300
Light Turf	0.200
Dense Turf	0.350
Dense Shrubbery	0.400

Table E.3 Manning's Roughness Coefficients

7.3 Minimum Grade

The minimum pipe grade shall be as shown in Table E.4 below.

PIPE DIAMETER (mm)	MINIMUM PIPE GRADE (m/100m)
100 – 150	2.0
200 – 250	0.60
300 – 375	0.30
400 – 450	0.25
525	0.20
600 – 900	0.15
1050 – Larger	0.10

Table E.4 Minimum Pipe Grade

7.4 Minimum Depth of Cover

Subject to the correct pipe loading criteria the minimum depth of cover must be:

- For storm drains: 1.5 m in traveled areas and 1.0 m elsewhere.
- For culverts: across roads 0.3 m; across driveways 0.2 m.
- For catch basin leads: 0.9 m.

7.5 Alignment and Corridors

Storm sewer mains must be located within the right-of-way. Where this is technically impractical and it is proposed to place storm sewers within private property the Consulting engineer is to provide rationale and analysis for consideration by the Approving Officer.

When the utility is required to cross private land(s), the right-of-way must be sufficient to repair or replace the utility and be a minimum of 3.0 m wide.

7.6 Separation Distance

7.6.1 Horizontal Separation

At least 3 m horizontal separation shall be maintained between a watermain and either a sanitary sewer or a storm sewer. Refer to standard drawings for location.

7.6.2 Vertical Separation

Where a sanitary sewer or storm sewer crosses a watermain, the sewer shall be below the watermain with a minimum clearance of 0.45 m and the joints of the watermain, over a length extending 3 m either side of the sewer main, are to be wrapped with heat shrink plastic or approved equivalent and wrapped with petrolatum tape in accordance with the latest version of the AWWA Standards C217, and C214 or C209.

Where it is not possible to obtain the vertical separation indicated above, and subject to District and Ministry of Health approval, the following details may be used:

- The water pipe joints shall be wrapped as indicated above, and
- The sewer shall be constructed of pressure pipe such as high density polyethylene (HDPE) or PVC with fused joints and pressure tested to assure it is watertight.

7.6.3 Sewers in Common Trench

Storm and sanitary sewers may be installed in a common trench, provided that the design has taken into account:

- interference with service connections,
- stability of the benched portion of the trench,
- conflict with manholes and appurtenances.

The horizontal clearance between sewer pipes shall be no less than 1.0 m and the horizontal clearance between manholes shall be no less than 0.3 m.

7.7 Curved Pipes

Where permitted by the District, horizontal and vertical curves may be formed using pipe joint deflections as follows:

- Minimum radius = 60 m.
- Constant radius throughout curve.
- Joint deflection not to exceed 75 % of maximum recommended by pipe manufacturer.
- Minimum design velocity = 0.9 m/s.
- Curve locations to be recorded by survey.

Subject to District approval, sewers larger than 600 mm diameter may include deflections formed by mitred bends, with minimum 1.25 m straight sections and maximum 45° mitres.

7.8 Manholes

Manholes are required at:

- Changes in vertical grade greater than 1.0 %
- Intersecting storm drains
- Changes in pipe size
- Changes in horizontal direction
- Downstream end of curved storm drains

- Catch basin lead connections
- For service 150 mm diameter or larger

The maximum distance between manholes shall be as shown in the table below.

PIPE DIAMETER (mm)	MAXIMUM DISTANCE (m)
375 and smaller	125
450 to 750	155
900 and larger	185

Table E.5 Maximum Distance Between Manholes

7.8.1 Sump Manholes

Where ditches, swales or other open channels discharge into a storm sewer system, the initial connecting manhole shall be of a sump type unless this provision is provided by the receiving inlet structure.

7.9 Hydraulic Losses in Manholes

The following criteria must be used:

- The crown of the downstream pipe must not be higher than the crown of the upstream pipe.
- Minimum drop in invert levels across manholes:
 - Straight run – no drop required, other than slope of pipe.
 - Deflections up to 45° - 25 mm drop
 - Deflections 45° - 50 mm drop

Drop manholes must be installed in accordance with MMCD Standard Detail Drawing No. S4 where the invert elevation difference exceeds 500 mm. Interior drop manholes are not permitted.

7.10 Service Connections

Each and every legal lot and each unit of a residential duplex shall be provided with a separate service connection.

Unless otherwise approved by the District, connections are to serve the perimeter (foundation) drains of all buildings by gravity. Building elevations shall be established accordingly. Pumped connections may be permitted if requested prior to sewer design and if appropriate covenants are provided.

7.10.1 Size

- Pipe size to accommodate peak design flow.
- Minimum pipe size diameters for service connections are 100mm except for industrial/commercial connections which shall have minimum diameter of 150mm.

7.10.2 Location and Depth

- Connections to large lots are to be located at the lower portion of each lot. For urban developments, location of connection to follow the standard drawings.
- The connection elevation at the property line is to be above the minor system HGL.

- Other depth requirements are as indicated for storm sewer mains.

7.10.3 Grade

Minimum grade from property line to storm sewer main:

- 100mm diameter pipe: 1.5%
- 150mm diameter pipe: 1.0%
- Larger sizes: Grade based on minimum velocity of 0.75 m/s

7.10.4 Details

Use standard wye fittings for connections to new mains. For connections to existing mains, use wye saddles or insertable tees.

Connections exceeding 30m in length will be treated as mains.

- Service connections may be permitted into manholes if:
 - The connection is not oriented against the flow in the main.
 - Manhole hydraulic requirements are met.
 - Manholes are required on service connections larger than 250mm diameter.
- Inspection chambers are required on residential connections unless the service is less than 2.5m long and connect to a manhole.
- Inspection chambers to MMCD standards. Stormwater inspection chamber lids to be green in colour.

7.10.5 Roof Leaders

Unless otherwise approved, roof drains are to discharge to splash pads, not service connections.

7.10.6 Foundation Drains

Unless otherwise approved by the District, connections are to serve the perimeter (foundation) drains of all buildings by gravity. Pumped connections may be permitted if requested prior to design and if appropriate covenants are provided.

7.11 Temporary Cleanouts

Temporary clean outs may be provided at terminal sections of a main provided that:

- Future extension of the main is designed as an overall phased development.
- Clean outs are not considered a permanent structure.

7.12 Catch Basins

Catch basins must be provided at regular intervals along roadways, lanes or walkways and at low point of the B.C. or E.C. (upstream) at curb returns. Interference with crosswalks and wheelchair ramps is not permitted.

Catch basin spacing must be designed to drain a maximum of 500 m² on road grades up to 4% and 400 m² on grades greater than 4%; maximum spacing is to be 150m.

Side inlet rolled type catch basins are required for road grades less than 5%.

Side inlet vertical type catch basins may be used for road grades exceeding 5%.

7.13 French Drains

The use of French drains shall only be permitted where the topography and soil conditions are proven adequate to the acceptance of the District. A soils report will be required to support the design.

7.14 Dry Wells

Drainage dry wells may be allowed where they provide a suitable alternate method of storm water dispersal for parking lots adjacent to apartment and commercial developments. Geotechnical engineering data (i.e. percolation tests, etc.) and design details will be required to support their use.

Where drainage drywells are used as a means for disposal, drainage drywell wall surface areas shall be sized using Darcy's empirical law:

$$Q = AKi$$

Where:

Q = rate of flow in m³/s.

A = cross sectional area of soil through which flow takes place in m².

K = coefficient of permeability in m/s.

i = hydraulic gradient or head loss over a give flow distance, dimensionless.

Coefficients of permeability (K) are as shown in the table below.

TYPICAL SOIL	K VALUE (m/sec)	RELATIVE PERMEABILITY
Coarse gravel	Over 10 ⁻³	Very permeable
Sand, fine sand	10 ⁻³ to 10 ⁻⁵	Medium permeability
Silty sand, dirty sand	10 ⁻⁵ to 10 ⁻⁷	Low permeability
Silt	10 ⁻⁷ to 10 ⁻⁹	Very low permeability
Clay	Less than 10 ⁻⁹	Practically impervious

Upon determination of permeability factor, a safety factor of 2 shall be applied.

Drainage drywells, unless otherwise approved by the District, shall be located in the road boulevard or in other lands dedicated to the District for the purpose of drainage disposal.

The depth of the drywell will vary in accordance with the requirements derived from Darcy's empirical law.

8.0 LEVEL OF SERVICE - MAJOR SYSTEMS

8.1 Surface Flow Routing

Unless the storm sewer system is oversized to accommodate the major flow (i.e. 100 year return period storm), provision for surface flow is required wherever the overland flows in excess of 0.05 cubic metres per second (m³/s) are anticipated. Major flow routing is generally accommodated along roadways, swales and watercourses. These designated flow paths will be protected by restrictive covenants or rights-of-ways and clearly identified in the Stormwater Management Plan.

The quantity of flow to be conveyed by the surface flow path is the total major flow less the capacity of the minor system. The design of the major flow routing will ensure to the satisfaction of the District that no endangering of public safety nor any substantial property damage will occur under the major flow conditions.

8.2 Surface Flow Capacity

Roadways with barrier curbs and gutters can be designed as wide channels to convey major surface flow. The maximum depths of flow will not exceed 150 mm above the gutter line. Flow velocities greater than 2.5 m/s must be approved by the District.

The Consulting Engineer will consider the impact of surface routing on the major flow hydraulic grade line (HGL) of adjacent lateral roads. Existing lateral roads designed with the major HGL below surface may preclude using surface flow routing on the road being designed.

Routing of major surface flow on roads with rollover curbs is discouraged.

The Consulting Engineer will submit calculations to verify that the surface flow is maintained within the road right-of-way and the water elevation at maximum ponding/flow is at least 0.35 metres below the lowest flood construction level (FCL) of adjacent buildings.

The design of the intersections will ensure that the surface flow can continue along the designated path crossing over lateral roads. Similar considerations are required if a change of surface flow direction is required at an intersection.

8.3 Inlet and Outlet Structures

Refer to MMCD Drawings S-13 and S-14 for the design of inlet structures for pipes up to 1200 mm diameter. Pipes larger than 1200 mm diameter and non-circular culverts require specially designed inlet and outlet structures. Outlets having discharge velocities in excess of 1 m/s require riprap and/or energy dissipating structures for erosion control.

Trash racks are required at the inlets and outlets of all pipes over 450 mm in diameter and exceeding 30 m in length (except large culverts in major watercourses). Trash racks may also be required on smaller diameter storm sewers at the discretion of the District.

8.4 Ditches and Culverts

Ditches adjacent to roadways must conform to the following criteria;

- Maximum depth shall be established based on width of right-of-way, slopes and traffic safety criteria.
- Minimum grade is 0.5%.
- Maximum velocity is 1.0 m/s (unlined ditch) – see below also

Ditching, swales or natural drainage courses exceeding 6% require a properly designed ditch cross section that will control erosion taking into account soil type, water flow and velocity. The design shall include geo-fabric, use of layered graded granular material of increasing coarseness and rip rap.

The minimum right-of-way width for a ditch must be 5.0m where the ditch crosses private property. The ditch must be offset in the right-of-way to permit a 3.0m wide access for maintenance vehicles. Additional right-of-way may be required to facilitate the ditch and the access. The top of the ditch adjacent to the property line must be a minimum 1.0m away from the property line.

The design of structures where culverts or ditches form part of the storm system must consider level access to hydrants, transformers and driveways. The culvert must be installed at the same grade as the ditch.

The Standard Drawings for inlet and outlet structures must be used in the design of these facilities.

8.5 Natural Water Courses

All proposals for works affecting natural watercourses must be forwarded (by the Consulting Engineer retained by the Owner to design the Works) to the appropriate Provincial Government Agencies.

8.5.1 Creeks

Natural creeks are integral components of the drainage system and the ecological system. If the process of development or drainage design involves in-stream works, the Consulting Engineer shall refer to the latest version of the "Land Development Guidelines for the Protection of Aquatic Habitat" prepared by the Department of Fisheries and Oceans (DFO) & the B.C. Ministry of Environment (MOE), and Section 9 of the Water Act.

All proposals for works within a creek corridor must be forwarded (by the Consulting Engineer) to the District who will liaise with the Federal and Provincial Government agencies.

9.0 RIGHT OF WAY

Utility right-of-way locations shall be selected to avoid environmentally sensitive areas such as watercourses, wetlands and wildlife migration corridors and forested areas.

Where location of a municipal utility in a statutory right-of-way is authorized by the District, the minimum right-of-way widths are as follows:

- Single Service:
R.O.W. width = twice the depth from surface to the crown of the pipe [4.5 m minimum width]
- Two services within the same trench:

R.O.W. width = twice the depth from surface to the crown of the deeper pipe [5.5 m minimum width]

- Two or more services adjacent to one another but in separate trenches:

R.O.W. width= cumulative widths for single services PLUS any difference to provide the required separation [6 m minimum width]

When the service is within a road allowance, and the distance from the property line to the centre of the service is less than one half of the width indicated above for a single service, the difference shall be provided as right-of-way on the adjacent property.

In all cases, the width of rights-of-way shall be sufficient to permit an open excavation with side slopes in accordance with the Worksafe BC regulations, without impacting on or endangering adjacent structures.

Where required, sanitary trunk and interceptor sewers shall have rights-of-way wide enough for future widening and/or twinning. The width of the right-of-way shall be the required separation between pipe centrelines plus 2 times the depth to the crown of the deeper sewer.

The designer shall provide cross sections indicating the minimum safe distances to adjacent building footings based on a safe angle of repose from the limits of the excavation.

Where a utility is located within a right-of-way, and valves, valve chambers, manholes, or other appurtenances which require maintenance are located within the right-of-way, provide road access from a public road. The maintenance access must be sufficiently wide and structurally adequate to support the maintenance vehicles for which the access is intended.

10.0 RUNOFF CONTROLS

10.1 Detention of Storm Runoff

Where possible, stormwater runoff is to be directed to a regional detention system (whether existing or proposed) in an effort to maximize the tributary area of the regional detention systems. Where an engineering investigation concludes that connection to a regional system is not practical in the long term, independent drainage systems with direct drainage discharge to creek systems may be permitted, provided in all cases that water quality protection measures are provided to the approval of the District. Local stormwater detention will generally be required in such cases.

10.1.1 Wet Detention Ponds

Wet detention ponds, complete with a permanent low level pool, are the preferred method of stormwater detention, however, for small development parcels, where engineering studies have determined that wet detention ponds are not feasible, dry detention ponds, pipe-based, stormwater detention systems may be considered, but only if approved by the District.

In general, wet detention pond designs shall maximize habitat and structural complexity in order to fully utilize the benefits offered by the wet detention pond while avoiding undesirable habitats with few

species resulting from simple wet detention pond designs. Aesthetics and multiple-use aspects shall be emphasized throughout the design.

All vegetation within the low level pool, pond and surrounding buffer shall conform to the detention pond landscaping criteria set out in this section.

The surface area of the permanent low level pool shall represent at least 1% of the total developed area.

The wet detention pond and outlet structure shall be designed such that the designed post-development discharge rate of the pond outflow does not exceed runoff levels generated by a pre-development 2 year storm event. If development is located within the boundary of a District approved stormwater or drainage plan, refer to the appropriate plan for approved discharge rates.

Primary spillway shall be designed to accommodate the post-development run-off generated by a 1:10 year storm event and an emergency spillway shall be designed to accommodate the post-development run-off generated by a 1:100 year storm event. The discharge path from the wet detention pond to the receiving environment shall be adequately protected from erosion.

The depth of the permanent low level pool shall be maintained between 0.6 m and 1.2 m.

The maximum depth of water during storm events shall not exceed 2.5 m.

A minimum freeboard of 0.6 m shall be provided above the designed maximum water level.

The wet detention pond shape combined with meandering channels in the permanent low level pool shall maximize the distance between the inlet and the outlet.

The wet detention pond walls shall be constructed with a minimum interior side slope of 4 (horizontal) to 1 (vertical) and a minimum exterior side slope of 3 (horizontal) to 1 (vertical).

The top of the wet detention pond bank shall be a minimum width of 3.0 m.

A pre-treatment sump is to be provided at the inlet to the wet detention pond.

An oil/water separator structure or equivalent source control treatment set of BMPs such as infiltration swales, pervious pavements, or rain gardens is to be installed upstream of the pond inlet.

The flow control structure is to be constructed with a removable orifice plate sized to restrict flows to the pre-development 1:2 year storm event, and a riser sized to handle the post-development 1:100 year storm event.

The flow control structure shall be located within a lockable manhole positioned within the embankment for purpose of maintenance, access, safety and aesthetics. The design of the outfall structure shall be determined based on the exit velocity of stormwater runoff from the wet detention pond.

Safety is to be provided by managing the contours of the wet detention pond to eliminate drop-offs and other hazards and by discouraging access to the permanent low level pool with appropriate vegetation on the safety bench in accordance with the detention pond landscaping criteria and Section 8. The

safety bench, located at the toe of the side-slopes leading to the permanent low level pool, is to be 2 m wide with a maximum slope of 3% and is required around the entire perimeter of the wet detention pond. Where safety benches cannot be accommodated, fencing may be considered, subject to the approval of the District.

A minimum of 4 signs shall be installed around the perimeter of the wet detention pond with the following wording:

DANGER!

Water levels are subject to sudden change

Please KEEP OUT

For information, call the District of Hudson's Hope - Operations Department

250-783-9901

A buffer strip of at least 7.5 m measured from the inside of the top bank is to be provided around the entire perimeter of the wet detention pond.

A minimum distance of 12 m shall be maintained between the inside of the top bank and any structure.

Where possible, the wet detention pond's perimeter shall be maintained as a forested buffer. In cases where retention of forest is not feasible, the buffer is to be landscaped in accordance with the detention pond landscaping criteria below with preference to native species.

An access tract or road sufficient to accommodate maintenance vehicles shall be provided from the public right-of-way to the outlet structure.

Pedestrian trails constructed to District standards may be included where applicable and desired, subject to District approval.

10.1.2 Detention Pond Landscaping Criteria

Where feasible, plantings shall consist of native plants.

All planting areas that are above permanent wetland pool shall be supplied with an automatic irrigation system. Planting and soils design shall anticipate that the irrigation system will be shut off approximately 3 years after planting, once the plants are established.

Upon completion of basic excavation of the wet detention pond, topsoil / wetland mulch amendments are to be incorporated. 0.30 m - 0.15 m of topsoil and/or wetland mulch is to be added to all depth zones.

Grade to final elevations - after mulch and/or topsoil has been placed. All areas surrounding pond shall be hydro seeded using a wet mix or other similar seed mix.

Provide standing time for wet pond - leave pond area for six to nine months to allow pond to experience storm flows. Details of the aquatic portion of the detention pond landscaping plan can be finalized using data collected during this time.

All landscape/re-vegetation work in pond and surrounding areas must be performed by a competent landscape contractor, preferably experienced in aquatic/wetland re-vegetation.

10.2 Erosion and Sediment Control

The Consulting Engineer will be required to demonstrate how work will be undertaken and completed so as to prevent the release of silt, raw concrete and concrete leachate, and other deleterious substances into any ditch, storm drain, watercourse or ravine. Construction and excavation wastes, overburden soil or other deleterious substances must be disposed of or placed in such a manner as to prevent their entry into any water course, ravine, storm drain system, or restrictive covenant area.

Should siltation or erosion controls be required, details of the proposed works are to be included in the approved drawings and must be installed as part of the works.

All siltation control devices must be situated to provide ready access for cleaning and maintenance.

Proposed siltation control structures must be maintained throughout the course of construction and to the end of the maintenance period (Final Acceptance). Changes in the design of the structure will be required if the proposed structure is found to be inadequate.

11.0 STORM WATER SOURCE CONTROL

Stormwater source control shall be incorporated into subdivision and lot development to meet the requirements of stormwater management plans developed by the District for various watershed areas, and the requirements below.

Selection of stormwater source controls shall be made with regard to the topography, water table, soil or rock infiltration capacity, and downstream slope stability hazards. Stormwater source control use and sizing shall be customized by the Consulting engineer for each development, subject to the following general guidelines and the approval of the District:

- All unpaved landscape areas shall have:
 - organic matter content of 15% dry weight in planting beds and 8% in turf areas;
 - depth of 300 mm for turf;
 - depth of 450 mm for shrubs/trees;
 - depth of 300 mm around and below the root ball of all trees;
 - pH from 6.0 to 8.0 or matching that of the original undisturbed soil;
 - subsoils scarified to a depth of minimum 100 mm with some topsoil being incorporated into the subsoil; and
 - planting beds mulched with a minimum of 50 mm of organic material. The surface shall be vegetated or re-vegetated. Immediately before seeding or planting, the surface shall be cultivated to remove surface crusting, and compacted areas that do not exhibit free drainage shall be scarified.

- Narrow paved areas, such as streets, driveways or walkways, shall be sloped to drain onto adjacent unpaved landscape areas designed as infiltration facilities in accordance with the guidelines below, to encourage runoff from these areas to infiltrate into the soil.
- Maximum ponding depth of infiltration areas shall be 150mm. All infiltration areas shall drain away from buildings, and shall have a provision for draining within 48 hours to the 5 year return period drainage system, and shall have an overflow to the 100 return period year flow path.
- The surface of unpaved landscape areas shall be designed for positive drainage away from pavements and buildings. Slopes of 1% to 3% are desirable to encourage infiltration of small rainfalls while facilitating drainage of large storms.
- Infiltration-based stormwater source controls shall not be used in the following conditions:
 - Areas within 30m of a slope that is steeper than 3 (horizontal) to 1 (vertical) and higher than 6m, or other unstable slopes.
 - Areas where the post-development wet season groundwater table is less than 0.6m below the base of infiltration trenches.
 - Areas where existing dwellings do not have foundation drains.
- In all developments other than those listed in 3.8.3(b)(v), infiltration-based stormwater source controls with an overflow to the District storm drain system are required, except when a Professional Engineer with experience in geotechnical engineering identifies conditions that would preclude the use of infiltration practices, with written recommendations to the approval of the District Required practices are:
 - Infiltration Swales and/or Rain Gardens with reservoir and underdrain shall be installed as required and with District approval.
 - Whereas the reservoir and underdrain are generally required, the underdrain and/or reservoir may be deleted in cases where a report by a professional engineer with experience in geotechnical engineering provides on-site infiltration test results that indicate that subsurface infiltration rates are adequate to allow absorption of one half the Mean Annual Rainfall (MAR) within the drainage area of the stormwater source control. In such cases the geotechnical engineering report shall recommend the appropriate detail.
 - All utility crossings of infiltration-based stormwater source controls shall have trench dam installed as necessary to stop infiltration water from flowing down the utility trench to downstream basements or crawl spaces.
- Permeable pavers shall be allowed with the District's approval in appropriate areas.

12.0 TESTING REQUIREMENTS

12.1 Flushing and Cleaning

All cleaning, flushing, pressure and leakage testing, disinfection and final flushing to be done by Contractor.

Perform all tests in presence of Consulting Engineer. Advance notification of 24 hours is required prior to performing test.

Where any section of system is constructed with concrete thrust blocks, tests are not to be conducted until at least five (5) days after placing concrete or two (2) days if high early strength concrete is used.

Obtain District approval prior to discharging flushing water to municipal sewers or drainage ditches.

Comply with MMCD General Conditions, Clause 20.4, Environmental Laws in regard to discharge of flushing water.

Provide District with all required approvals.

SCHEDULE F

Street Lighting, Electrical, Communications Wiring, Cablevision and Gas Distribution System - Regulations, Standards and Specifications for Installation

1.0 GENERAL

The electrical and communications systems must be designed and installed at the Owner's expense, in accordance with the requirements of the appropriate utility company standards and in accordance with all applicable Municipal codes and regulations, Provincial Statutes, regulations and/or standards.

It is standard practice that electrical design plans are prepared prior to the design coordination with the other utility companies. (Telephone, Cable, Gas).

Details of design such as vertical and horizontal location of service boxes, size and type of conduits, kiosk dimensions and ducting and all wiring details shall be as per specifications and drawings provided in this Bylaw, and the appropriate telephone and cable utilities.

Where overhead distribution is permitted, pole and anchor locations must be approved by the Director of Public Works and any other affected utility company. Care must be taken to avoid aerial trespass, or conflicts with all other utility infrastructure.

Plans and agreements for rights of way for anchors, pad-mounted transformers, etc., must be provided and registered prior to construction.

Where the proposed subdivision is to be served by a gas distribution system, the location of such a system shall be designed by the gas company and shall be approved by the District and the Provincial Gas Inspector prior to the construction and installation of such a system. The system or extension shall be installed following installation of sewer and watermains. Rehabilitation of boulevards shall be the responsibility of the Applicant.

Materials and installation details shall be specified by the affected utility company.

2.0 STREET LIGHTING

2.1 Luminance Levels

Luminance refers to the average light intensity reflected off the roadway measured in candelas per square metre (cd/m^2). Uniformity ratios and veiling luminance are also included in the design criteria.

The luminance design method is suitable for most roadway classifications, particularly major roads, freeways and parkways. Luminance levels shall follow the guidelines laid out in the most current edition of the IESNA Lighting Handbook.

2.2 Light Pole Spacing

Luminaires shall be located on one side of the road where the pavement width is 12.0 m or less.

Luminaires shall be located on both sides of the road in either a staggered or opposite pattern where the pavement width is greater than 12.0 m.

In general, spacing of luminaire shall be based on the road classification and as follows:

2.2.1 Arterial Roads

Opposite or staggered, both sides of the road, 45 m.

2.2.2 Commercial & Industrial Collector roads

Opposite or staggered, both sides of the road, + or – 45 m, located within 0.3 m of a projection of the property line.

2.2.3 Residential Collector Roads

Spaced on side of the road, + or – 45 m, located within 0.3 m of a projection of the property line.

2.2.4 Local Roads

Spaced one side of the road, + or – 90 m, located within 0.3 m of a projection of the property line.

2.2.5 Cul-de-sac Bulbs

Placement may vary dependent on the layout of the adjacent properties and is subject to the approval of the Director of Public Works.

2.2.6 Walkways

Spaced one side of the walkway at 30 m.

2.2.7 Intersections

Illumination levels differ for different classifications of roadways and where these roads meet, a transition area shall be incorporated. The road with the lower illumination level shall have a gradual increase in illumination level until the higher level is reached.

2.2.8 Curves

Luminaires shall be located on the inside of a curve where possible, to avoid potential conflict with vehicles over running the curve.

On curves the luminaire spacing shall be reduced by 55 % on the insides of bends and by 70 % on the outside of bends to ensure uniformity of illumination.

2.3 Luminaires, Poles, Wattages and Light Source

Luminaire types:

- All road classification areas Davit type c/w LED cobra head luminaire to meet or exceed the Philips LUMEC RoadFocus Fixture.
- All post top lighting to meet or exceed an LED Classic T Philips LUMEC TownGuide fixture.
- All decorative lighting shall be of the LED type.
- Parking lots to be Davit Type LED cobra head luminaire.

2.4 Lighting Calculations

Lighting system design shall be completed using a current computer model which uses RP-8 calculation methods. Suitable computer programs include LUMEN MICRO, and AGI32.

Manual calculations may be approved by the District for small, simple or rural systems.

Design levels of illumination as per Table below.

ROADWAY CLASSIFICATION	LAND USE					
	URBAN COMMERCIAL/ INDUSTRIAL		URBAN RESIDENTIAL		RURAL	
	Lux	Uniformity	Lux	Uniformity	Lux	Uniformity
Arterial	17	3:1	13	3:1	9	3:1
Collector	12	4:1	9	4:1	6	4:1
Local	9	6:1	7	6:1	4	6:1
Walkway	20	6:1	12	6:1	6	6:1
Parking Lot	20	3:1	12	6:1	12	6:1

Table F-1 – Illumination Design

All conduits must be designed and installed at a minimum cover of 0.75 m and in accordance with the appropriate utility company standards.

2.5 Service Equipment

Roadway lighting systems are typically serviced from a 120/240 Volt single phase 3 wire system. Alternately, 120/208 Volt 3 phase 4 wire or 347/600 Volt systems may be used if necessary and if approved by the District.

Power is generally supplied by the power company through an unmetered service when servicing only streetlights and traffic signals. Where tree lights and pole receptacles are included, the power company may require a metered service.

Where new lighting systems are replacing existing lights on power poles, submit a list of the poles from which lights are to be removed.

Unmetered services are to have a maximum 60 Amp 2 or 3 Pole main breaker in a service base in accordance with MMCD standard detail drawings and specifications. A 100 Amp service is required where a traffic signal is also being serviced.

Services are to be underground dip type.

Power distribution requirements include:

- Wiring to be installed in Rigid PVC conduit; minimum 32 MTD (metric trade designator).
- Wiring to be stranded copper with RW90 insulation.
- Wiring to be colour coded per Canadian Electrical Code (CEC).

- Conduit burial depth to be per the CEC and MMCD standard drawings.
- A 78 MTD conduit may be required for future communication needs; confirm with the District

SCHEDULE G

Submissions and Approvals – Standards for Preparation

1.0 GENERAL

This section addresses submission and approval requirements with respect to pre-design reports, engineered drawings, and record drawings. Typically, a subdivision will require a pre-design report including conceptual drawings, engineered drawings based on the approved pre-design report, and record drawings at construction completion.

2.0 PRE-DESIGN REPORT SUBMISSION REQUIREMENTS

A pre-design report (three (3) copies) is required for all subdivisions of five parcels or more.

The pre-design report must be submitted bearing the seal and signature of a design professional that has the appropriate experience and is registered with the Association of Professional Engineers and Geoscientists of British Columbia.

The pre-design report must cover at minimum, the following:

2.1 General

Impact statement regarding adjacent lands and as required, soil stability, erosion control, or environmental issues.

Pre-design requirements shall be extended beyond the development limits to a distance which enables the District to ensure that future extensions will meet the requirements and shall be not less than 60 metres.

The pre-design report shall assess how existing infrastructure will be affected by the demands placed on it by the proposed subdivision or development.

2.2 Existing Site Conditions

The pre-design report shall provide information regarding the existing land use, the existing infrastructure (roadways, water, sanitary sewer, storm sewer, and utilities), and the geotechnical conditions.

2.3 Water System

The pre-design report is to include an overall conceptual plan showing the proposed water system and how it connects to existing infrastructure.

The pre-design report shall analyze the proposed water system under Peak Hour Demand, and Maximum Day Demand plus Fire Flow requirements. Calculations must be made in accordance with Schedule "C", Water Systems. The system shall be analyzed for fire flow demand, maximum velocity and maximum and minimum pressures.

2.4 Sanitary Sewer System

The pre-design report is to include an overall conceptual plan showing the proposed sanitary sewer system and how it connects to existing infrastructure.

2.5 Storm Sewer System

The pre-design report shall include the proposed sanitary sewer design calculations which will take into account the peak flow and infiltration flow, maximum and minimum velocities, pipe size and grade.

The pre-design report shall include storm drainage tributary area plans and storm sewer calculations for major and minor storm conditions. Calculations must be made in accordance with Schedule "E", Storm Drainage.

The storm sewer section of the pre-design report shall also address the following:

- Stormwater Treatment Devices:
 - Source point treatment.
 - End of pipe treatment.
 - Sediment removal.
 - Hydrocarbon removal.
 - On-site disposal methods.

- Overland Flows:
 - Overland flow paths.
 - Maximum velocity.
 - Erosion protection and control.
 - Detention/retention facilities.

- Outfalls:
 - High water table.
 - Erosion protection.
 - Sediment control.
 - Permit requirements.
 - Review impacts of 100 year storm event.

2.6 Transportation

The pre-design report is to include an overall conceptual transportation network plan showing the proposed transportation network and how it connects to the existing network.

The transportation section of the pre-design report shall also address the following:

- Roads:
 - Traffic loads.
 - Road Classification.
 - Design speed.
 - Sub-surface soil conditions.
 - Road structure.
 - Road cross section.

- Boulevard details including trees.
- Horizontal and vertical alignment.
- Drainage.
- Pedestrians:
 - Sidewalks.
 - Pathways.
 - Nature trails.
 - Links to existing network.

2.7 Utility Services:

The pre-design report shall provide details with respect to the general location of all utilities, including gas, electrical street lighting, telephone and cable television. The utility services shall be shown on an overall conceptual utility services plan.

3.0 PRE-DESIGN REPORT SUBMISSION AND APPROVAL PROCESS

The Approving Officer will distribute the pre-design report to the Director of Public Works for review and comment.

The Approving Officer will solicit verbal comments from the Fire Chief, consolidate the comments from other departments and reply back to the Developer in writing within 30 days.

The Developer may request a meeting with the Approving Officer to discuss the comments.

The Developer is to revise the pre-design report to address the comments returned from the District. Three (3) copies of the revised pre-design report are to be submitted to the Approving Officer. The Approving Officer will review the revised pre-design report to ensure it complies with the previously issued comments.

Once satisfied that all issues have been addressed, the Approving Officer will provide written approval of the pre-design report.

4.0 ENGINEERED DRAWING SUBMISSION REQUIREMENT

The pre-design report must be approved prior to submission of engineered design drawings.

All engineered design drawings being submitted for approval shall bear the seal and signature of a design professional that has the appropriate experience and is registered with the Association of Professional Engineers and Geoscientists of British Columbia. Three (3) copies are required for each submission.

Detailed "Required Drawing Items" shall be in compliance with the engineering design and record drawing submission check list that follows in Table xx.

AutoCAD shall be used for design drawings. The digital file (AutoCAD DWG format) is to be included with the submission of the hard copy drawings.

5.0 ENGINEERED DRAWING APPROVALS

Three (3) copies of the engineered drawings are to be submitted to the Approving Officer. The Approving Officer will distribute the engineered drawings to the Director of Public Works for review and comment.

The Approving Officer will solicit verbal comments from the Fire Chief, consolidate the comments from other departments and reply back to the Developer in writing within 30 days. A set of redline markup drawings showing the requested changes to the design will also be provided with the written comments.

The Developer may request a meeting with the Approving Officer to discuss the comments.

The Developer is to revise the engineered drawings to address the comments returned from the District. Three (3) copies of the revised engineered drawings are to be submitted to the Approving Officer. The Approving Officer will review the revised engineered drawings to ensure compliance with the previous issued comments.

Once satisfied that all issues have been addressed, the Approving Officer will circulate the drawings to the Director of Public Works for signature and approval of the drawings. Final signature and approval will be by the Approving Officer.

6.0 RECORD DRAWING SUBMISSION REQUIREMENTS

All record drawings being submitted for approval shall bear the seal and signature of a design professional that has the appropriate experience and is registered with the Association of Professional Engineers and Geoscientists of British Columbia. Record drawings are to be submitted by the Consultant and approved by the Approving Officer prior to the issuance of a Construction Completion Certificate.

AutoCAD shall be used for record drawings. The digital file (AutoCAD DWG format) is to be included with the submission of the hard copy drawings.

Once approved, the drawings will be stamped "Approved Record Drawing".

7.0 DRAWING STANDARDS

Sheet Size: Precut sheets to be 594 mm x 841 mm. (A-1 sheet size).

Grid Standards: 2 mm x 10 mm as shown on sample sheet.

Lettering: Lettering is to an open style of Vertical Gothic (e.g. Leroy or AutoCAD-Romans).

Scales:

- Overall drawing scale: 1:1000

- Plan view scale: 1:500
- Profile view horizontal scale: 1:500
- Profile view vertical scale: 1:50

Sheet Border: Border line width to be 1.0 mm. Top and bottom border to be 67mm respectively from edge of sheet. Left and right border to be 100 mm from edge of sheet.

Title Block: Located in the lower right hand corner of the sheet (87 mm x 165 mm). Title block shall describe the contents of the drawing (e.g. key plan, roadworks, etc.) and shall clearly indicate the location of the works by the road name(s) and/or legal description.

7.1 Sheet Layout:

Maintain a minimum clearance of 20 mm between the TOP PLAN VIEW and the UTILITY PLAN VIEW.

Place north arrow close to the TOP PLAN VIEW and to the right hand side of the sheet point either towards the top of the page or towards the left hand edge.

Show control distances and offset location dimensions in metres and elevations to 3 decimal places.

Show pipe sizes in mm as per A.S.T.M. specifications using 1" = 25 mm.

Existing imperial dimensions except for pipe sizes are to be soft converted to metric using the Factor: 1 inch (1" = 25.4 mm or 1 foot (1') = 0.3084 m.

7.2 Engineered Drawing Checklist

Table xx will be used by the District to check engineered design drawings.

Required Drawing Items	Yes	No	N/A	Comments
Drawings				
Cover Sheet				
Composite Plan				
Road (Plan/Profile)				
Water (Plan/Profile)				
Storm Drainage (Plan/Profile)				
Sanitary Sewer (Plan/Profile)				
Lot Grading Plan				
Storm Management Plan (catchment area/overland flow)				
Erosion and Sediment Control Plan				
Street Light Plan				
Street Signs, Markings and Traffic				
Traffic Control/Flow Plan				
Construction Details				
Road Cross-Sections				

General Drawing Requirements				
All sheets signed and sealed by P.Eng.				
Drawing Scale 1:500				
Standard A1 sheet size with Title Block				
Conforms to Preliminary Layout				
Plan/Profile Drawings with Grid				
North Arrow and Geodetic Datum				
Manholes identified by Numbers on Plan and Profile				
Survey Monument Location and				
Composite Plan				
Lot and Plan Number, Road Names				
All Sanitary, Storm and Water Works				
Lamp Standards and Utility Poles				
Power and Communication				
Natural Gas				
Curb & Gutter, Sidewalks				
Integrated Survey Monuments				
Right-Of-Ways, Easements				
Natural Features (creeks etc.)				
Road Design				
Centreline Chainage to be indicated at				
Offset of Existing and Proposed Utilities				
Road Width from FOC to FOC				
Bicycle Lanes				
Curb & Gutter – type and Offset (FOC to				
Curb Return Radii and Profiles with Spot				
Sidewalks, Wheelchair Ramps, Driveway Letdowns				
Existing Driveways, Sidewalks, Curbs, Culverts, Utility Poles				
Existing Fences, Trees, Ditches, Streams, Natural Features				
Boulevard Landscaping, Irrigation				
Luminaire/Pole Locations				
Manhole and Catch Basin Locations				
Water Valve Box Locations				
Traffic Signs/Road Markings				
Original Surface Profile at Centre Line and Property Line				
Design Profile of Centre Line and Gutter				
Walkways, Fencing, Stairs, Railings				
Spot Elevations Through Cul-De-Sacs and Intersections				

Horizontal Sight Distance				
Horizontal Curve Data:				
- Centreline Radius				
- Chainage, BC, EC, PI				
Delta Angle, Tangent Length Arc Length				
Vertical Curve Data:				
- Chainage at BVC, EVC, PVI, Low				
- Elevations at BVC, EVC, PVI, Low				
- Length of Vertical Curve				
- 'K' Values				
Cross Sections:				
- 20m intervals for New Road				
- 10m Intervals for Widening Existing				
- Grades of Boulevards to Right-Of-Way				
- Original and Design Grades with Cut and Fill				
- Driveways				
Super Elevation:				
- Chainage Beginning and End				
- Chainage Full Length of Super				
Storm Drainage				
Original and Final Ground Surface				
Pipe Profile, Depth, Length, Size, Material				
Elevations at all Utility Crossings and				
Manhole and Rim Elevations and Inverts				
Service Connection Grades and Inverts at Property Line				
Open Channel, Ditch, Rip Rap – Profiles and Cross Sections				
Location of Existing Utilities				
Ditch and Pipe Flow Directional Arrows				
Pipe Offsets from Property Line				
Manhole and Drywell Identification				
Inverts of All Pipes Entering and Exiting				
Catch Basin Locations				
Intake and Outfall Locations and Details				
Sanitary Sewer				
Original and Ground Surface Profile				

Pipe Profile, Depth, Length, Size, Material				
Elevations of all Utility Crossings and				
Manhole Rim Elevations and Inverts				
Service Connection Grades and Inverts at Property Line				
Location of Existing Utilities				
Pipe Flow Directional Arrows				
Pipe Offsets from Property Lines and				
Watermains				
Manhole Identification Numbers				
Inverts of All Pipes Entering and Exiting				
Water				
Original and Final Ground Surface				
Pipe Profile, Depth, Length, Size, Material				
Elevations at all Utility Crossings and				
Service Locations, Size, Depths at				
Location of Existing Utilities				
Offsets From Property Lines and Sewer				
Fitting Details				
Valves, Curb Stops, Blow-Offs, Hydrants, Air Valve Locations				
Storm Water Management				
Location Plan – Site and Watershed				
Development Area Highlighted				
Contours of Existing Ground (1m <20%;				
Major Flood Route – 100 Year Storm				
Detention Pond Detail				
Major Cut and Fill Areas (shaded)				
Area (m ²) of Development and Total				
Sub-Catchment Area Boundaries – Coefficients and Areas				
Pipe System Calculations, Size, Grade, Minor/Major Flow				
Directional Arrows of Flow				
Erosion and Sediment Control				
Control Detail at Existing and Proposed				
Control Details in Swales and Gullies				
Control Detail onto Adjacent Properties				

Control of Soil Loss and Movement				
Siltation Control Pond Details				
Lot Grading Plan				
Site Area and 30m Beyond				
Contours of Existing Ground (1m <20%,				
Existing and Proposed Elevations – Each Corner of Lots				
Swales and Major Flood Routing				
Directional Flow Arrows on streets and				
Easements and Right-Of-Ways				
Catch Basin Locations and Top of Grate				
Minimum Building Elevations (MBE) on				
Proposed Ground Elevations at Building				
Building Envelope and Typical Lot				

SCHEDULE H

Subdivision Servicing Agreement

**DISTRICT OF HUDSON'S HOPE
SUBDIVISION SERVICING AGREEMENT**

THIS AGREEMENT dated for reference the ___ day of _____, 20__.

BETWEEN:

DISTRICT OF HUDSON'S HOPE
P.O. Box 330
9904 Dudley Drive
Hudson's Hope, B.C.
V0C 1V0

(the "District")

OF THE FIRST PART

AND:

_____(Inc. No. _____)

(the "Owner")

OF THE SECOND PART

WHEREAS:

- A. The Owner is the registered owner of land within Hudson's Hope, B.C., legally described as:

Parcel Identifier: _____

(the "Land").

- B. The Owner has applied to subdivide the Land in accordance with a proposed plan of subdivision, a reduced copy of which is attached as Schedule "A" to this Agreement, and pursuant to Section 940 of the *Local Government Act*, the Owner has requested approval of the subdivision plan prior to the construction and provision of the works and services which are required in relation to the proposed subdivision.

- C. The Owner has agreed to construct and provide certain works and services as required by the Approving Officer of the District and the District's Subdivision and Development Servicing Bylaw, in accordance with the drawings, standards and specifications annexed to this Agreement and in accordance with the applicable policies of the District's Council.
- D. The Owner has agreed to provide re-vegetation and landscaping work in accordance with the landscaping plans referred to in Schedule "C" to this Agreement.
- E. The Owner has agreed to provide security for completion of the works and services, including landscaping.

THEREFORE in consideration of \$1.00 paid to the Owner by the District and other good and valuable consideration, receipt and sufficiency of which are acknowledged, the Owner covenants and agrees with the District as follows:

INTERPRETATION

1. In this Agreement:

"Construction Completion Certificate" means written certification by the Consulting Engineer and accepted by the Approving Officer or Director of Public Works that the Works have been tested and are complete except for minor Deficiencies, such that the Works are usable for their intended purpose.

"Construction Security" means the total amount of the security deposited by the Owner for completion of the Works and fulfilment of this Agreement, pursuant to section 6 of this Agreement.

"Consulting Engineer" means a Professional Engineer who is retained by the Owner for a purpose referred to in this Agreement and who is qualified to practice in British Columbia for that purpose.

"Deficiencies" means those portions of the Works which are not completed to the required standard at the date of issuance of the Construction Completion Certificate.

"Deficiency Security" is defined in section 15.

"Development" includes the provision of the Works, including the completion of all aspects of the improvement of the Land and adjacent highways with utilities, landscaping and supporting services.

"Approving Officer" means the person appointed by the Council as Approving Officer and includes the Director of Public Works and any other municipal employee designated by the Approving Officer.

under section 26.

"Letter of Credit" is defined in section 6(a)(ii).

"Municipal Representatives" is defined in section 28.

"Servicing Plans" means the design drawings and other plans for the Works, including landscaping plans, approved in writing by the Approving Officer and appended to or listed in Schedule "C" to this Agreement.

"Subdivision Plan" means the proposed plan of subdivision reproduced in Schedule "A" to this Agreement.

"Subdivision and Development Servicing Bylaw" means the subdivision and development servicing bylaw enacted by the Council of the District under Section 938 of the *Local Government Act*, as in effect on the date of this Agreement, being _____ Bylaw No. 848, 2015.

"Warranty Period" means the period which expires either one year after the date of issuance of the Construction Completion Certificate or upon completion of all Deficiencies, whichever occurs later, subject to section 23 of this Agreement.

"Warranty Security" is defined in section 17.

"Works" means the works and services to be provided, performed and constructed by the Owner as required by the Approving Officer of the District, the bylaws of the District or as otherwise required under statutory authority, and without limitation, the Works include all the construction shown or referred to in the Servicing Plans, utilities and connections to be constructed on and off the Land, landscaping, environmental protection measures, provision of plans and registration of Land Title Office documents and plans.

COMMENCEMENT OF CONSTRUCTION

2. At the latest, the Owner must begin installation and construction of the Works within _____ of the date of approval of the Subdivision Plan by the Approving Officer.

TIME FOR COMPLETION

3. The Owner shall, at the Owner's cost, substantially complete the Works and obtain acceptance of the Construction Completion Certificate within one year of the date of approval of the Subdivision Plan.

OWNER'S OBLIGATIONS

4. In undertaking the Works, the Owner shall:

- (a) construct, install and complete maintain the Works in accordance with the Subdivision and Development Servicing Bylaw and this Agreement and in particular, the standards in section 8;
- (b) without limiting clause (a), construct, install and maintain the Works in compliance with all environmental legislation and in such a manner that the Owner does not discharge or permit the discharge of any contaminant, and any contamination shall be promptly removed in conformance with the *Environmental Management Act*;
- (c) strictly adhere to the Servicing Plans and obtain the prior written approval of the Approving Officer for any changes to the approved plans for the Works;
- (d) not engage any employee or contractor in the construction of the Works who, in the reasonable opinion of the Approving Officer, is unfit, incapable or unskilled; and
- (e) ensure that a competent superintendent is on site at all times during the construction and installation of the Works.

ESSENTIAL SERVICES

- 5. At all times after any building construction has begun on any parcel within the proposed subdivision, the Owner shall ensure that every parcel where building construction is underway is provided with:
 - (a) highway access which is sufficient for fire trucks and other emergency vehicles; and
 - (b) water service which is sufficient for fire fighting purposes.

CONSTRUCTION SECURITY

- 6.
 - (a) As the security for the Owner's obligation to construct and install the Works (the "**Construction Security**"), the Owner has deposited with the District:
 - (i) a certified cheque in the amount of \$_____; or
 - (ii) an irrevocable letter of credit meeting the requirements of Schedule "D", in the amount of \$_____ (the "**Letter of Credit**")

calculated in accordance with the calculations attached as part of Schedule "B".
 - (b) the Owner shall ensure that any Letter of Credit is replaced or renewed not less than 14 days prior to any expiry date of the Letter of Credit.
 - (c) The District may draw upon the Letter of Credit and may hold or use the

proceeds in accordance with this Agreement.

- (d) The Owner acknowledges that the District is not required to pay interest to the Owner on cash provided as Construction Security unless the cash is held in an interest-bearing account.
- (e) The amount of the Construction Security may be reduced at any time in the District's discretion in accordance with the degree of completion of the Works, with the written approval of the Approving Officer.
- (f) If the Works are not completed within the time allowed by section 3, the District may without notice undertake and complete the Works, or any part, at the cost of the Owner, and for that purpose may expend the Construction Security in whole or in part.
- (g) The District may undertake the Works either by itself or by contractors employed by it. The District shall be under no obligation to complete the Works and may undertake the Works in whole or in part, in the District's discretion as to extent and timing of completion.
- (h) If there are insufficient monies included in the Construction Security to complete the Works the Owner shall pay the amount of the insufficiency to the District forthwith upon receipt of the District's invoice for that amount, whether or not the District has then completed the balance of the Works.
- (i) If the District undertakes all or part of the Works, the cost of the Works which is payable by the Owner shall include the District's actual costs of construction plus the costs of engineering, supervision, legal, contract administration, tendering, survey, other professional services, interest and all other out-of-pocket costs reasonably required for completion of the Works, plus a 15% administration fee to reflect District staffing and internal costs.
- (j) If the District incurs any costs in correcting any breach of the Owner's obligations under this Agreement (including breaches other than non-completion of the Works) and those costs are not paid by the Owner within 30 days of receipt of the District's invoice, the District may recover those costs from the Construction Security, in accordance with subsection (i).
- (k) If the Owner completes the Works or if the District's costs towards the Works are less than the amount of the Construction Security, then the Construction Security or the unused part of it shall be returned to the Owner by the District, without interest, subject to the District's retention of security for Deficiencies under section 16 and security for the Warranty Period under section 17.
- (l) Any return of Construction Security shall be made to the Owner, despite any change in the ownership of the Land.

(m) Notwithstanding anything in this Agreement, the Owner agrees that:

- (i) if the Owner should be adjudged bankrupt, or makes a general assignment for the benefit of creditors, or if a receiver is appointed for the Owner, the District may, without prejudice to any other right or remedy the District may have, immediately draw down on the Construction Security held by it under this Agreement and use the funds for the purpose of completing the Works in accordance with this Agreement; and
- (ii) if the Owner intends to seek protection from its creditors under any statute, including the *Companies Creditors Arrangement Act*, the Owner will give the District at least five (5) days written notice of its intention to do so and agrees that the ability of the District to draw down on the Construction Security held by it under this Agreement and use the funds for the purpose of completing the Works in accordance with this Agreement shall not be affected by the creditor protection;

and for certainty, this section applies to the security held by the District under sections 16 and 17 of this Agreement.

ENTRY ON LAND

7. The Owner authorizes the District, its agents and contractors to enter upon the Land at any time as may be necessary or convenient for the carrying out of this Agreement, including without limitation for the purpose of inspecting or undertaking the Works.

STANDARDS OF WORK

8. The Works shall be provided and constructed:
- (a) in compliance with this Agreement;
 - (b) in compliance with the Subdivision Servicing Bylaw and all other applicable statutes, regulations, orders, codes, laws, bylaws, permits, resolutions and other enactments;
 - (i) to a standard which is sufficient for their intended purpose and in accordance with generally accepted engineering practice; and
 - (ii) to the satisfaction of the Approving Officer.

CORRECTION OF WORKS

9. If the District considers at any time that the Works are in any way defective or do not operate in a satisfactory manner, the District may require the Works to be corrected and Owner shall, at its own expense, modify and reconstruct the Works immediately so that

the Works are fully operative and function in accordance with the required standards.

NOTICE OF WORK ON HIGHWAY

10. The Owner shall not begin the construction of any portion of the Works on a highway, park or other municipal property without advising the Approving Officer at least five business days before beginning that portion of the Works, and the Owner must subsequently follow all instructions of the Approving Officer as to traffic control, public safety and other matters.

DEBRIS REMOVAL

11. The Owner shall promptly remove any material or debris during the course of constructing the Works, but in the event that any material or debris is left upon any highway, park or other property during or after the construction of the Works, the District may remove the material or debris at the expense of the Owner and recover the cost from the Construction Security.

TESTING OF THE WORKS

12. The Owner shall give advance written notice to the District of testing of the Works to be performed by the Consulting Engineer, and the Owner acknowledges the District may witness the testing, and in any case, the Owner shall provide a written copy of the Consulting Engineer's test results to the District.

OWNER'S CONSULTING ENGINEER

- 13.
- (a) The Owner confirms that the Works have been designed by a Consulting Engineer.
 - (b) The Owner acknowledges that the District has relied on cost estimates prepared by one or more Consulting Engineers in establishing the amount of the Construction Security, which cost estimates are attached in Schedule "B", and that the Owner has so advised the Consulting Engineers of the District's reliance prior to submission of those estimates to the District by the Owner.
 - (c) At all times during the construction and provision of the Works, the Owner shall retain one or more Consulting Engineers to oversee the completion of the Works.
 - (d) Any explanations, orders, instructions, directions and requests given by the District to the Consulting Engineer shall be deemed to have been given to the Owner.
 - (e) Upon completion of the Works and prior to issuance of the Construction Completion Certificate, the Owner's Consulting Engineer shall certify in writing that the Works have

been constructed in accordance with the approved plans for the Works and the other requirements of this Agreement.

CALCULATION OF DEFICIENCY SECURITY

15. The Owner must cause its Consulting Engineer to estimate the cost to rectify Deficiencies in the Works existing at the time of preparation of the Construction Completion Certificate and the time required to rectify each Deficiency, and the amount of deficiency security required is twice that estimated cost (the "**Deficiency Security**").

DEFICIENCY SECURITY

16. Prior to the District's acceptance of the Construction Completion Certificate, the Owner shall deposit with the District the Deficiency Security by certified cheque or by letter of credit meeting the requirements of Schedule "D", as security for the Owner's obligations to rectify Deficiencies.

WARRANTY SECURITY

17. Prior to the District's acceptance of the Construction Completion Certificate, the Owner shall deposit with the District by certified cheque or by letter of credit meeting the requirements of Schedule "D", the amount of \$_____ (being 10% of the Construction Security) as security for performance of the Owner's warranty obligations under section 22 (the "**Warranty Security**").

CONSTRUCTION COMPLETION CERTIFICATE

18. Upon completion of the Works to Substantial Completion, the Owner shall deliver to the District a certificate (the "**Construction Completion Certificate**") issued by the Owner's Consulting Engineer that the Works have reached Substantial Completion, which Certificate must also certify in writing that the Works have been constructed in accordance with the Servicing Plans and this Agreement.

DISTRICT ACCEPTANCE OF SUBSTANTIAL COMPLETION

19. Upon:
- (a) the District's receipt of the Construction Completion Certificate signed and sealed by the Owner's Consulting Engineer and satisfactory to the Approving Officer;
 - (b) completion of the Works to the satisfaction of the District;
 - (c) payment to the District of any amount owing under this Agreement;
 - (d) delivery by the Owner to the District of the Maintenance Security;
 - (e) delivery by the Owner to the District of the Deficiency Security;
 - (f) delivery by the Owner to the District of the record drawings under section 14; and

- (g) granting to the District of the statutory rights of way required by section 34;
the District will issue a letter of acceptance of Substantial Completion.

DEFICIENCY COMMITMENTS

- 20. The Owner shall remedy every Deficiency and if the Owner fails to remedy any Deficiency within the time estimated by the Consulting Engineer under section 15, the District may use the Deficiency Security for that purpose.
- 21. Upon correction of the Deficiencies, whether by the Owner or by the District, the District will return the Deficiency Security or portion remaining, if any, to the Owner.

WARRANTY COMMITMENTS

- 22. The Owner shall forthwith remedy any defects in the Works appearing within the Warranty Period (excluding defects caused by reasonable wear and tear, negligence of the District and acts of God) and any resulting damage to other works or property.
- 23. If the Warranty Period expires on a date between November 1 and April 30, it shall be extended to May 1.
- 24. During the Warranty Period, the District shall operate and maintain those parts of the Works which are within a highway, municipal easement or municipal statutory right of way. Any costs attributable to any Deficiency or defect in the Works or failure of the Works to operate normally shall be the responsibility of the Owner.
- 25. If the Owner fails to correct any defect in or failure of the Works or pay to the District costs attributable to any of those matters, the District may use the Warranty Security provided for that purpose and section 6 of this Agreement shall apply to that work and that security to the extent applicable but with all necessary changes.

FINAL ACCEPTANCE CERTIFICATE

- 26. After the expiry of the Warranty Period, the Owner shall cause its Consulting Engineer to inspect the Works, and the Approving Officer may choose to observe that final inspection, and the Owner shall deliver to the District a certificate (the “**Final Performance Certificate**”) issued by the Owner’s Consulting Engineer that the Works are fully functioning and operational in accordance with the Servicing Plans and this Agreement.

DISTRICT ACCEPTANCE OF FINAL ACCEPTANCE CERTIFICATE

- 27. Upon:

- (a) the District's receipt of the Final Acceptance Certificate signed and sealed by the Owner's Consulting Engineer and satisfactory to the Approving Officer;
- (b) payment to the District of any amount owing under this Agreement;

the District will:

- (c) issue a letter of acceptance of the Final Acceptance Certificate;
- (d) return the Warranty Security or portion remaining, if any, to the Owner.

INDEMNIFICATION

28. The Owner shall indemnify and save harmless the District, and its officers, employees, Council members, contractors and agents (the "**Municipal Representatives**") from and against all claims, actions, proceedings, damages, fees, costs, liabilities, remediation of contamination costs, expenses (including actual fees of professional advisors), fines, penalties and other harm of any kind whatsoever, despite negligence on the part of the District and/or any of the Municipal Representatives, and whether related to death, bodily injury, property loss, property damage, property contamination, or consequential loss or damage, suffered or incurred by the District and/or any of the Municipal Representatives at any time, directly or indirectly, arising from, resulting from, connected with or related to:
- (a) any breach or default of the Owner under this Agreement;
 - (b) any incident or occurrence on or about the Land or other location of the Works related to this Agreement ; or
 - (c) any wrongful act, omission or negligence of the Owner or its members, shareholders, directors, officers, employees, agents, volunteers, contractors, subcontractors, tenants, lessees, licensees, customers, invitees or others for whom it is responsible in law;
 - (d) damage to any property during the construction or provision or maintenance of the Works;
 - (e) liens, non-payment for labour or materials, Workers' Compensation assessments, employment insurance, federal or provincial tax, or union dues check off; or
 - (f) the construction or provision, maintenance or repair of the Works by the Owner, including defects in the Works and non-repair of the Works.
29. This indemnity survives the expiry or other termination of this Agreement, except this indemnity does not require the Owner to be responsible for maintenance of the Works beyond the Warranty Period.

INSURANCE

30. The Owner shall take out and maintain at all times from commencement of construction and installation of the Works until the Approving Officer issues a Certificate of Acceptance:
- (a) comprehensive general liability insurance against claims for bodily injury (including death) and property damage or loss arising from its carrying out the construction and installation of the Works (including failure to properly carry out or negligence in carrying out the Works), with the District as an additional insured, in an amount of not less than \$5,000,000.00 combined single limit per claim and with a per claim deductible of not more than \$5,000.00; and
 - (b) builder's risk insurance, insuring the Works against loss or damage to the full replacement cost of the Works, and if the District elects to complete the Works as provided in this Agreement, the Owner is conclusively considered to have assigned the benefit of that insurance, and all proceeds of it, to the District.
31. The Owner must provide the Approving Officer with proof in writing of insurance before commencing the Works and at other reasonable times during the term of this Agreement. The insurance must contain a provision requiring the insurer to give the District 30 days prior written notice before any alteration or cancellation of the policy is effective.

GRANT OF STATUTORY RIGHTS OF WAY

32. The Owner shall, prior to the District's acceptance of the Certificate of Substantial Completion, grant to the District, in the District's standard form of agreement, and cause to be registered, in prior to all charges except those accepted by the District, statutory rights of way for all portions of the Works located on privately-owned lands which the District determines are to be owned, maintained and repaired by the District, and the Owner shall be responsible for all associated surveying and land title registration costs.

OWNER'S RISK

33. The Owner acknowledges and agrees that the Owner relies exclusively on its own expertise, the Owner's Consulting Engineers and contractors and that the District does

not, by its approvals, inspections or acceptance of the Works, warrant or represent that the Works are in compliance with any enactment or warrant the quality, fitness for purpose, adequacy or safety of the Works. The Owner further acknowledges and agrees that all approvals and inspections of the Works by the District are for the sole benefit of the District and shall in no way relieve the Owner from constructing and installing the Works in strict compliance with this Agreement.

NO REPRESENTATIONS

34. The Owner acknowledges that the District has made no representations, covenants, warranties, guarantees, promises or agreements with the Owner with regard to the subject matter of this Agreement, other than those expressly made in this Agreement. This Agreement is the entire agreement between the parties regarding its subject-matter.

MUNICIPAL PROPERTY IN WORKS

35. Upon the District's acceptance of the Certificate of Substantial Completion, the Works specified in the Certificate shall become the property of the District, free and clear of any claim by the Owner or any person claiming through the Owner, without payment of any compensation or consideration EXCEPT Works on private land (including common property of a strata corporation) unless those Works become the property of the District under a statutory right of way or other agreement with the District.

TERMINOLOGY

36. Wherever the singular or the masculine are used in this Agreement, they shall be interpreted as meaning the plural or the feminine or body corporate where the context requires.

ASSIGNMENT

37. The Owner's obligations and rights under this Agreement shall not be assigned without the written consent of the District, such consent not to be unreasonably withheld, provided though the Owner may not assign this Agreement in part, the assignee must be the owner of the Land, the assignee must provide the District with replacement Construction, Deficiency or Warranty Security, the assignee must agree in writing with the District to assume all the Owner's obligations under this Agreement, and the Owner shall pay the District an assignment consent fee of \$1000.00. If this Agreement is so assigned, the Owner is released from its obligations under this Agreement in respect of matters arising after the assignment date. If the Owner transfers the Land without assigning this Agreement to the transferee, the Owner nonetheless remains bound by all promises within this Agreement.

BINDING EFFECT

38. This agreement shall enure to the benefit of and be binding upon the parties hereto, their respective heirs, executors, administrators, successors and permitted assigns. Subject to

the terms of an approved assignment under section 39, the Owner's obligations and rights

under this Agreement shall continue in effect notwithstanding any transfer of title to all or part of the Land.

SALE OF LAND

39. In the event that the Owner proposes to transfer any part of the Land where a portion of the Works is to be located, prior to the transfer the Owner shall obtain the transferee's written consent to entry by the District on that part of the Land, for the purposes of this Agreement.

TIME OF THE ESSENCE

40. Time is of the essence of this Agreement.

FORCE MAJEURE

41. All obligations of the parties shall be suspended so long as the performance of such obligation is prevented, in whole or in part, by reason of labour dispute, fire, act of God, unusual delay by common carriers, earthquake, act of the elements, riot, civil commotion or inability to obtain necessary materials on the open market, and the period in which any party is required to perform any such obligation is extended for the period of such suspension. The impact of the Owner's financial circumstances upon the Owner's ability to perform this Agreement does not suspend the Owner's obligations under this Agreement. For the Owner to be entitled to rely on the time suspension in this section, the Owner must give prompt notice to the District of the reason the Owner claims to be entitled to a time suspension and the Owner must obtain the District's approval for the reason and duration of the time suspension.

NO WAIVER

42. An alleged waiver by the District of any breach by the Owner of this Agreement is effective only if it is an express waiver in writing of the breach in respect of which the waiver is asserted. A waiver by the District of a breach by the Owner of this Agreement does not operate as a waiver of any other breach of this Agreement.

NO EFFECT ON LAWS OR POWERS

43. This Agreement does not:
- (a) affect or limit the discretion, rights, duties or powers of the District under any enactment or at common law, including in relation to the use or subdivision of the Land;
 - (b) affect or limit any enactment relating to the use or subdivision of the Land; or
 - (c) relieve the Owner from complying with any enactment, including in relation to the use or subdivision of the Land.

SEVERABILITY

44. If any provision of this Agreement is held to be unenforceable by a court, that provision shall be severed from the remainder of this Agreement and the remainder shall continue in effect.

AMENDMENTS

45. No amendment to this Agreement shall be effective unless it is made in writing and is duly executed on behalf of both parties.

ACKNOWLEDGMENT

46. The Owner acknowledges having read and fully understood all the terms and conditions of this Agreement and confirms that this Agreement has been entered voluntarily.

JOINT AND SEVERAL LIABILITY

47. If at any time more than one person (as defined in the *Interpretation Act* (British Columbia) comprises the Owner, each of those persons will be jointly and severally liable for all of the obligations of the Owner under this Agreement.

NOTICES

48. Any notice or other communication given under this Agreement shall be in writing and either delivered by hand or sent by facsimile transmission (and in either case shall be deemed to be received when delivered) or mailed by prepared registered mail in any Canada Post Office (and if so shall be deemed to be delivered on the sixth (6th) business day following such mailing, except that, in the event of interruption of mail service notice shall be deemed to be delivered only when actually received by the party to whom it is addressed), so long as the notice is addressed as follows:

to the Owner at the address on the face page of this Agreement or
Fax number: _____

and to the District at:

District of Hudson's Hope
PO Box 330
9904 Dudley Drive
Hudson's Hope, B.C.
V0C 1V0

Attention: Approving Officer
Fax number: (250) 783-5741

or to such other address as a party from time to time notifies the other party in writing.

NO PUBLIC LAW DUTY

49. Wherever in this Agreement the District is required or entitled to exercise any discretion in the granting of consent or approval, or is entitled to make any determination, take any action or exercise any contractual right or remedy, the District may do so in accordance with the provisions of this Agreement and no public law duty, whether arising from the principles of procedural fairness or the rules of natural justice, shall have any application.

GOVERNING LAW

50. This Agreement will be governed and construed in accordance with the laws in force in the Province of British Columbia.

HEADINGS

51. The headings appearing in this Agreement have been inserted for reference and as a matter of convenience and in no way define, limit or enlarge the scope or meaning of this Agreement or any provision of it.

INTERPRETATION

52. Wherever the singular or masculine or neuter is used in this Agreement, the same shall be construed as meaning the plural, the feminine or body corporate where the context or the parties so require.

OWNER'S REPRESENTATIONS AND WARRANTIES

53. The Owner represents and warrants to the District that it has the capacity to enter into this Agreement and fulfill its obligations under it:
- (a) all necessary corporate actions and proceedings have been taken by the Owner to authorize its entry into and performance of this Agreement;
 - (b) upon execution and delivery on behalf of the Owner, this Agreement constitutes a valid and binding contractual obligation of the Owner;
 - (c) neither the execution, delivery or performance of this Agreement shall breach any other agreement or obligation or cause the Owner to be in default of any other agreement or obligation, respecting the Land; and
 - (d) the Owner has the corporate capacity and authority to enter into and perform this Agreement.

RIGHTS CUMULATIVE

54. Nothing contained or implied herein prejudices or affects the District's rights and powers in the exercise of its functions pursuant to the *Local Government Act* or the *Community*

Charter or its rights and powers under any public and private statutes, bylaws, orders and regulations to the extent the same are applicable to the Land, all of which may be fully and effectively exercised in relation to the Land as if this Agreement had not been executed by the Owner.

RELATIONSHIP

55. This Agreement is not intended to create a partnership, joint venture or agency between or among the Owner and the District.

FURTHER ASSURANCES

56. The Owner shall, on the request of the District, execute and deliver or cause to be executed and delivered, all such further transfers, agreements, documents, instruments, easements, statutory rights of way, deeds and assurances, and do and perform or cause to be done and performed, all such acts and things as may be, in the opinion of the District, necessary to give full effect to the intent of this Agreement.

ENTIRE AGREEMENT

57. This Agreement is the entire agreement between the parties regarding its subject-matter.

SCHEDULES

58. The following schedules are annexed to and form part of this Agreement:

Schedule "A" – Reduced Copy of Subdivision Plan Schedule
"B" – Cost Estimates and Calculation of Security Schedule
"C" – Servicing Plans (including Landscaping Plans) Schedule
"D" – Requirements for Letter of Credit

IN WITNESS WHEREOF the parties have executed this Agreement on the dates set out below. DATED the ___ day of __, 20___

THE CORPORATE SEAL OF THE DISTRICT OF HUDSON'S HOPE was affixed in the presence of: _____ Mayor _____ Corporate Officer

C/S

where Owner is a corporation]

DATED the ___ day of _____, 20___

THE CORPORATE SEAL OF _____ was affixed in the presence of: _____ Authorized Signatory _____ Authorized Signatory

C/S

OR

[where Owner is an individual]

DATED the ___ day of _____, 20___

Executed by the Owner in the presence of: _____ Witness Signature _____ Name of Witness _____ Address

Owner

Schedule "A"

Reduced Copy of Subdivision Plan

Schedule "B"

Cost Estimates and Calculation of Security

Schedule "C"

Servicing Plans (Including landscaping Plans)

[list plans, including name of engineer and landscape architect, date, version number]

Schedule "D"

LETTER OF CREDIT REQUIREMENTS

- The letter of credit must be an irrevocable, unconditional, standby letter of credit.
- The letter of credit must be issued by a Canadian chartered bank with a branch in Hudson's Hope, B.C. at which the letter of credit can be cashed.
- The letter of credit must be payable at the time of presentation.
- The letter of credit must not require any documentation to be presented in order for it to be cashed.
- The letter of credit must allow partial draws.
- The letter of credit must be valid for at least one year and be automatically-renewing.
- The letter of credit must provide for at least 30 days written notice to the District before cancellation.
- The letter of credit must otherwise meet the requirements of the District.

Schedule I

Statutory Right-of-Way Document

THIS AGREEMENT is dated for reference the _____ day of , 20 _____ .
BETWEEN:

(the "Grantor")

OF THE FIRST PART

AND:

(the "District")

OF THE SECOND PART

WHEREAS:

- a) The Grantor is the registered owner in fee simple of land within the District of Hudson's Hope, legally described as:

Parcel Identifier:

Lot _____, Block _____, District Lot _____, _____ District, Plan _____ (the "Lands")

- b) To facilitate the establishment, construction, operation, maintenance, repair, extension, addition, alteration, protection or improvement of one or more systems of:

- a) sewer works and related fixtures and equipment for the collection, conveyance and disposal of sewage, (and/or)
b) drainage works and related fixtures and equipment for the impounding, conveying and discharging of surface and other waters, (and/or)
c) water works and related fixtures and equipment for the collection, storage and distribution of water,
(collectively the "[Sewer Works/Drainage Works/Water Works]")

the Grantor has agreed to grant a statutory right-of-way to the District.

- c) The statutory right-of-way is necessary for the operation and maintenance of the District's undertaking.

NOW THEREFORE in consideration of \$1.00 paid by the District to the Grantor (the receipt and sufficiency whereof is acknowledged) and in consideration of the terms herein:

1. THE GRANTOR:

- 1) Grants in perpetuity unto the District, the full, free and uninterrupted right to lay down, install, construct, entrench, maintain, inspect, alter, remove, replace, bury, use, protect and otherwise establish and operate one or more systems of:
a) Sewer Works for the collection, conveyance and disposal of sewage;

- b) Drainage Works for the impounding, conveying and discharging of surface and other waters;
- c) Water Works for the collection, storage and distribution of water;

in, upon, under and across that part or parts of the Lands as shown outlined in heavy black on the [Explanatory/Reference]Plan of a portion of Lot____, Block____, District Lot____,____ District, Plan____ deposited in the Land Title Office under section 99(1)(e) of the Land Title Act and certified correct on the [date], by the [name of surveyor], B.C.L.S. (the “Right of Way Area”).

- 2) Agrees that for the purposes of section 1(1), the District by its employees, agents, workers, contractors and licensees is entitled at all times to enter the Lands with or without machinery, vehicles, equipment or materials and to remove soil and clear trees or other obstruction, as may be necessary or convenient in relation to the [Sewer/Drainage/Water] Works.
- 3) Will not erect, place, install, or maintain any building, structure, mobile home, concrete, asphalt or other surfacing, pipe, wire or other conduit on, over, or under any portion of the Right-of-Way Area that interferes with, damages, or obstructs access to, or is likely to cause harm to the [Sewer/Drainage/Water] Works.
- 4) Will not do nor knowingly permit to be done anything which will interfere with or injure the [Sewer/Drainage/Water] Works. and in particular will not carry out any blasting on or adjacent to the Right-of-Way area without prior consent in writing of the District, provided that such consent shall not be unreasonably withheld.
- 5) Will not substantially diminish the soil cover over any of the [Sewer/Drainage/Water] Works. installed in the Right-of-Way Area and in particular, without limiting the generality of the foregoing, will not construct open drains or ditches along or across any of the [Sewer/Drainage/Water] Works.
- 6) Will upon reasonable request and at the cost of the District do and execute all further lawful acts, deeds and assurances for the better assuring unto the District of the rights hereby granted.

2. THE DISTRICT:

- 1) Will not bury any debris or rubbish of any kind in excavation or backfill and will remove shoring and like temporary structures as backfilling proceeds.
- 2) Will thoroughly clean the Lands of all rubbish and construction debris created or placed thereon by the District.
- 3) Will, as soon as weather and soil conditions permit, and so often as it may exercise its right of entry to the Lands, replace the surface soil as nearly as may be reasonably possible to the same condition as it was prior to such entry, in order to restore the natural drainage to such lands, provided however, that nothing herein contained shall require the District to restore any trees or other surface growth, but the District shall leave such lands in a condition which will not inhibit natural regeneration of such growth.
- 4) Will, as far as reasonably possible, carry out all work in a proper and workerlike manner so as to do as little injury to the Lands as possible.

- 5) Will make good, at its own expense, all damage or disturbances which may be caused to the surface soil of the Lands in the exercise of its rights hereunder.
3. THE PARTIES AGREE as follows:
- 1) Notwithstanding any rule of law or equity to the contrary, the [Sewer/Drainage/Water] Works within the Right-of-Way Area shall remain the property of the District and may be removed in whole or in part by the District.
 - 2) In the event that the District abandons the [Sewer/Drainage/Water] Works or any part thereof, the District may with the consent of the Grantor, leave the whole or any part of the [Sewer/Drainage/Water] Works in place and will, at its expense, file the required documentation to release this Agreement and any related charge against the title to the Lands in the Nelson Land Title Office.
 - 3) No part of the title in fee simple to the Lands shall be vested in the District under this Agreement and the Grantor may fully use and enjoy all of the Lands subject only to the rights and restrictions herein.
 - 4) The covenants herein shall run with the land and none of the covenants herein shall be personal or binding upon the Grantor, save and except during the Grantor's ownership of the Lands.
 - 5) If at the date hereof the Grantor is not the sole registered owner of the Lands, this Agreement shall nevertheless bind the Grantor to the full extent of its interest in fee simple, and this Agreement shall extend to any after acquired interest.
 - 6) This Agreement shall enure to the benefit of and be binding upon the parties and their respective heirs, administrators, executors, successors, and assigns.
 - 7) This Agreement is a Statutory Right-of-Way as provided for in section 214 of the Land Title Act of British Columbia.

IN WITNESS WHEREOF the parties have *[caused their hand and seal and/or caused their corporate seal(s)]* to be affixed in the presence of their duly authorized officers as of the day and year first above written.

The Corporate Seal of *[the Grantor]*
Was hereunto affixed in the presence of:

Authorized Signatory

Authorized Signatory

SIGNED, SEALED and DELIVERED by
[name of Grantor] in the presence of:

Name

Address

Occupation

The Corporate Seal of the *District of Hudson's Hope*
was hereunto affixed
in the presence of:

Mayor

Clerk

SCHEDULE J

Confirmation of Professional Assurance and Certificates

The District of Hudson's Hope

PO Box 330

9904 Dudley Drive

Hudson's Hope BC V0C 1V0

Attention: Director of Public Works

Re:

(Description and Address of Project)

This is to advise that I am a Professional Engineer licensed to practice in the Province of British Columbia and was retained by the Owner to undertake and coordinate all field reviews and inspections required with respect to this project and took all steps as regulated under The Engineers and Geoscientists Act of British Columbia and required by good practices and by the definition of "field reviews" hereinafter set forth in order to issue the following certification.

As used herein, "field reviews" shall mean such reviews of the work at the project site and at fabrication locations where applicable as the Professional Engineer, in their professional discretion, considered to be necessary in order to ascertain that the work substantially conformed in all material aspects to the plans and drawings accepted by the District.

The following aspects have been reviewed by me or under by direction and have been found to comply with the engineering drawings and plans submitted and accepted by the Manager of Operations.

1) Storm Drainage System including, but not restricted to, the following:

- the location, alignment, size and grade of all pipes and culverts;
- the spacing of manholes and catchbasins;
- the construction of drywells;
- the completion of erosion control measures;
- materials used for pipe bedding and backfilling of trenches;
- workmanship in the construction and installation of all materials.
- materials used for pipes, culverts, manholes, catchbasins, pipe and fitting joints, service connections;

2) Sanitary Sewer System including, but not restricted to, the following:

- location, alignment, size and grade of all pipes;
- spacing of manholes and catchbasins;
- materials used for pipes, manholes, pipe and fitting joints, service connections;
- materials used for pipe bedding and backfilling of trenches;
- workmanship in the construction and installation of all materials.

3) Water Distribution System including, but not restricted to, the following:

- location, alignment, size and grade of all pipes;
- spacing of hydrants and valves;
- construction of pumping stations and reservoirs;

1.0 **CONSTRUCTION COMPLETION CERTIFICATE**

Date: _____

Owner: _____

Consulting Engineer: _____

To Whom it may concern:

Re: _____

This is to certify that to the best of our knowledge all works and services in connection with the above noted project were completed as of _____ in accordance with the approved engineering and as- built drawings including inspections, testing, and acceptance as per Subdivision and Development Servicing Bylaw No. 248, 2015.

This does not exempt the Owner from any further requirements or agreement responsibilities which may come to the knowledge of the District during the one year maintenance project.

Based on the above construction completion date, the maintenance period shall extend to _____ and the 10% bond in the amount of \$ _____ will be confirmed for release on this date, in compliance with issuance of a Final Acceptance Certificate.

Consulting Engineer

Professional Seal

Approving Officer or Director of Public Works

Cc: Director of Public Works

2.0 FINAL ACCEPTANCE CERTIFICATE

Date: _____

Owner: _____

Consulting Engineer: _____

Contractor: _____

Subdivision: _____

Property Identification: _____

Legal Description: _____

To Whom it may concern:

Re: _____

The works required as a condition of subdivision approval – specifically [sanitary sewerage, watermains, hot mix asphalt pavement, etc.] – as set out in the subdivision servicing agreement entered into between the owner and the District on [date]– have been certified by [name of owner’s engineer], P. Eng. of [name of engineering firm, if applicable] as being constructed and installed in accordance with the requirements of Subdivision and Development Servicing Bylaw No. xxx of the District of Hudson’s Hope and are more particularly illustrated on the “Record” drawing(s) number.

The maintenance period expired on [date]

This certificate confirms acceptance by the District of the works and authorizes the release to the owner of the security, together with any earned interest.

Dated this _____ day of _____, 20_____.

Consulting Engineer

Professional Seal

Approving Officer or Director of Public Works

Cc: Director of Public Works

3.0 QUALITY CONTROL AND ASSURANCE FORM

TO: The District of Hudson's Hope

I or We

Owner: Name: _____

Address: _____

Consulting Engineer: Name: _____

Address: _____

For Project: _____

Agree to supply the District of Hudson's Hope on behalf of the Owner, the professional services to certify compliance with the approved engineered drawings and Subdivision Servicing Bylaw No. 248, 2015.

- 1. Engineering Designs and Drawing Approvals
 - Calculations to support Design Criteria
- 2. Estimated or Tendered Construction Costs
 - Security Deposit Requirements
 - Inspection and Contingency Deposits Required
- 3. Site Inspections and Quality Testing with Approved Drawings and Bylaw
 - Compliance with Engineered Designs and Specifications
- 4. Record Drawings and Testing Records
 - Infrastructure Plan & Profile, Location & Grade
 - Lot Servicing Records Locations & Depths
- 5. Construction Completion Certificates
 - Maintenance Bond Requirements

Date: _____

Owner (Signature)

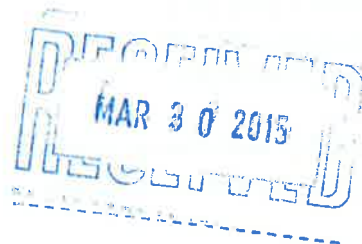
Engineering Consultant (Signature)



OFFICE OF THE MAYOR

March 18, 2015

The Honourable Bill Bennett
Minister of Energy and Mines
P.O. Box 9069
Stn. Prov. Govt.
Victoria, BC
V8W 9E2



Dear Minister Bennett,

Re: Site C decision moratorium request

Please accept this letter on behalf of Mayor and Council of Fort St. James. On February 25, 2015, our Council adopted a unanimous resolution requesting the Province of BC to place a one-year moratorium on decisions regarding Site C. We are aware that since that date, the Province has announced its approval of the Site C project. We urge the Province of BC to refer this project to the British Columbia Utilities Commission prior to moving forward with the project, as recommended by your Joint Review Panel.

Our residents are faithful ratepayers to BC Hydro and the Province. We pay some of the highest shipping rates for energy in our area, despite our close geographic proximity to major energy-generation projects such as the W.A.C. Bennett Dam, the Peace Canyon Dam, and others. We share concerns with others in the province that development of Site C will increase the taxpayers' burden without resulting in improved utility rates. Additionally, our municipality and region have been told countless times that the Province do not have the dollars needed to upgrade severely aging infrastructure in our area, due to the Province's deficit.

To justify such a costly infrastructure project during a time of fiscal restraint, we would like to see a long term financing plan from the Province and projections of what financial impacts of this project may have on our rates and ratepayers. We feel this is a relevant request, given that the province frequently asks us for such detailed projections when we desire to undertake infrastructure projects.

Furthermore, we would like to know that the Province is taking a methodological and well thought-out approach to this project, answering the many concerns of its residents prior to project implementation.

Thank you for your consideration,

Rob MacDougall
Mayor



April 2, 2015

Mayor Gwen Johansson
District of Hudson's Hope
9904 Dudley Drive
Hudson's Hope, BC V0C 1V0
Non-transferable

Subject: Invitation to breakfast hosted by Pacific NorthWest LNG, TransCanada PipeLines Limited and Progress Energy Canada Ltd.

Dear Mayor Gwen Johansson:

On behalf of Pacific NorthWest LNG, TransCanada PipeLines Limited, and Progress Energy Canada Ltd., it is our pleasure to invite you to attend our hosted breakfast on Friday May 8, 2015 during this year's NCLGA Conference and AGM in Prince George, B.C. We look forward to seeing you during this important week of meetings and events involving local government and municipalities from across northern B.C.

As you know, liquefied natural gas (LNG) has emerged as an exciting opportunity for British Columbians. Pacific NorthWest LNG is proposing to build a world-class LNG facility on Lelu Island in Port Edward, near Prince Rupert, B.C. The proposed facility would liquefy and export natural gas produced by Progress Energy Canada in northeastern B.C. The gas would be transported to the facility by the proposed Prince Rupert Gas Transmission pipeline, which is to be owned and operated by TransCanada PipeLines Limited. All of our companies are committed to generating new economic and social benefits for the local communities, First Nations, British Columbia and Canada in a safe and sustainable manner.

Along with some of our colleagues, we look forward to hosting you for breakfast. We will each provide a brief update on our projects and look forward to answering your questions. Here are the details for the breakfast:

Date: Friday, May 8, 2015
Time: 7:00am
Location: Nechako Room, Coast Inn of the North, Prince George BC
RSVP: Julie Bourdon at jbouardon@progressenergy.com or 403-539-1633 by Wednesday, April 20th, 2015

We hope that you are able to join us.

Sincerely,

Tessa Gill
Head, Corporate and Stakeholder Relations
Pacific NorthWest LNG

John Dunn
Vice President, Prince Rupert Gas Transmission Project
TransCanada PipeLines Limited

Steve Dunk
Manager, Environment and Regulatory
Progress Energy Canada Ltd.



Legion 

www.legionbcyukon.ca

**British Columbia / Yukon Command
The Royal Canadian Legion**

“Military Service Recognition Book”

Dear Sir/Madam:

Thank you for your interest in the **BC/Yukon Command / The Royal Canadian Legion**, representing **British Columbia** and the **Yukon’s Veterans**. Please accept this written request for your support, as per our recent telephone conversation.

Our **BC/Yukon Command Legion** is very proud to be printing **10,000 copies** of our Annual **“Military Service Recognition Book”**, scheduled for release by Remembrance Day 2015, to help identify and recognize many of the brave **Veterans** of British Columbia and the Yukon who served our Country so well during times of great conflict. This annual publication goes a long way to help the Legion in our job as the **“Keepers of Remembrance”**, so that none of us forget the selfless contributions made by our **Veterans**.

We would like to have your organization’s support for this Remembrance project by sponsoring an advertisement space in our **“Military Service Recognition Book.”** Proceeds raised from this important project will allow us to fund the printing of this unique publication and will also help our Command to improve our services to **Veterans** and the more than 150 communities that we serve throughout British Columbia and the Yukon. The Legion is recognized as one of Canada’s largest **“Community Service”** organizations, and we are an integral part of the communities we serve. This project ensures the Legion’s continued success in providing these very worthwhile services.

Please find enclosed a rate sheet for your review, along with a detailed list of some of the many community activities in our **154 Branches and 100 Ladies Auxiliaries** in the **BC/Yukon Command**. Whatever you are able to contribute to this worthwhile endeavor would be greatly appreciated. For further information please contact **BC/Yukon Command Office** toll free at **1-866-354-6277**.

Thank you for your consideration and/or support.

Sincerely,



**Angus Stanfield
President**



Legion

www.legionbcyukon.ca

British Columbia / Yukon Command The Royal Canadian Legion

“Military Service Recognition Book”

Advertising Prices

<u>Ad Size</u>	<u>Cost</u>	<u>GST</u>	<u>Total</u>
Full Colour Outside Back Cover	\$1,795.24 +	\$89.76 =	\$1,885.00
Inside Front/Back Cover (Full Colour)	\$1,595.24 +	\$79.76 =	\$1,675.00
Full Colour 2-Page Spread	\$2,990.48 +	\$149.52 =	\$3,140.00
Full Page (Full Colour)	\$1,495.24 +	\$74.76 =	\$1,570.00
Full Page	\$1,000.00 +	\$50.00 =	\$1,050.00
½ Page (Full Colour)	\$866.67 +	\$43.33 =	\$910.00
½ Page	\$595.24 +	\$29.76 =	\$625.00
¼ Page (Full Colour)	\$538.10 +	\$26.90 =	\$565.00
¼ Page	\$423.81 +	\$21.19 =	\$445.00
1/10 Page (Business Card-Full Colour)	\$295.24 +	\$14.76 =	\$310.00
1/10 Page (Business Card)	\$247.62 +	\$12.38 =	\$260.00

G.S.T. Registration # R10 793 3913

All typesetting and layout charges are included in the above prices.

A complimentary copy of this year's publication will be received by all advertisers purchasing space of 1/10 page and up, along with a Certificate of Appreciation from the BC/Yukon Command.



PLEASE MAKE CHEQUE PAYABLE TO:
BC/Yukon Command
The Royal Canadian Legion
(BC/Y RCL)
(Campaign Office)
P O Box 5555
Vancouver, BC V6B 4B5





**HUDSON'S
HOPE**
PLAYGROUND OF THE PEACE

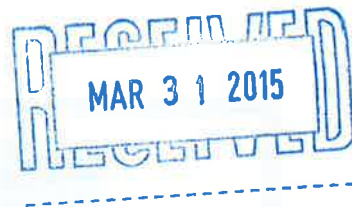
Box 330, 9904 Dudley Drive, Hudson's Hope, BC V0C 1V0
Telephone: 250-783-9901 Fax: 250-783-5741

On behalf of the Mayor, Council, and the citizens of Hudson's Hope
we are pleased to honour the commitment and service shown by our
veterans and are reminded of their selfless contributions every day.

Thank you for all you have done.

Darlene Todd
PO Box 566
Charlie Lake, BC
VOC 1H0

March 27, 2015



Mayor Gwen Johansson
District of Hudson's Hope
PO Box 330
Hudson's Hope, BC
VOC 1V0

Dear Mayor Johansson & Town Councillors:

My parents, James (Tex) & Margaret MacKeigan's ashes are buried in the same plot at the cemetery in Hudson's Hope. At the moment, we do have a flat marker for Mom, but our family is wishing to change it out to a joint marker. The marker for Mom is set in cement that is at least 3-4" on all sides (which is bigger than the new marker we would like to get). Attached is a photo.

My issue is that the marker we would like to get is 36" x 18", so that we could get both names & dates on it. Upon speaking with Johanna Dupuis at the District office, she said there now is a bylaw that the markers cannot be more than 30" x 20". I mentioned to her that there are 2 urns in that plot and that there are much bigger markers in the cemetery and it is not like it would be crowding the other markers around it. I am wondering what the reasoning behind this bylaw is and I think that as long as it is not overtaking the plot space – it should be allowed.

Our parents lived in Hudson's Hope for over 45 years and were a big part of the community; being supportive for several clubs and events, plus even being on council.

Please take my request into consideration and let me know if we can go ahead with our order. You can email me – dartodd4@gmail.com or call 250-827-3910 or by mail at above address. Many thanks in advance.

Kind regards,

Darlene Todd



March 31, 2015

Mr. Robert Earl Baker
P.O. Box 710
Hudson's Hope, BC V0C 1V0

Re: Preliminary Layout Approval for Proposed Subdivision of:

Parcel Identifier: 014-789-761
Block C District Lot 1203 Peace River District, Except Plan 19874
("Parent Parcel")

Our file # PLA 014-789-761a

Re: Proposed Subdivision Preliminary Layout Review Letter – Lot 1203, Block C

I am in receipt of your application for preliminary layout review of the proposed subdivision of Lot 1203, Block C. The District of Hudson's Hope has conducted a preliminary review of the subdivision application for Lot 1203, Block C. It has been considered and this letter summarizes the additional information which must be provided and the conditions that must be satisfied before final approval of the subdivisions plan will be considered. Although I have sought to list all outstanding items, this letter does not constitute an approval and any matters which I have overlooked or matters which arise after the date of this letter may result in the proposed subdivision being refused.

This statement of conditions which must be met in order to obtain approval of subdivision is issued as a convenience to the applicant and is not a guarantee of subdivision approval. If any other information comes to light before an application is made for subdivision under the *Land Title Act* or subdivision plans are approved, these statements may be reconsidered and altered. It is also noted that approval of any subdivision will be subject to compliance with all legislation and regulations.

This letter is to advise that I am prepared to approve the proposed subdivision of the Parent Parcel according to the sketch plan attached as Appendix A to this letter, subject to fulfilment of the subdivision and permit conditions outlined below.

You should be aware that until the subdivision is approved and registered, it may be subject to relevant changes to a bylaw, regulation, procedure, policy or practice or other requirements brought to my attention. Approval of the subdivision will be subject to compliance with all relevant legislation and regulations at that time.

This letter of preliminary approval is based on the plan and information provided with your application.

Statement of Conditions

Please provide the following information:

1. Indication as to the proposed zoning (will it remain the same "RU2 Rural Agricultural" or change);

APPENDIX A



BRITISH COLUMBIA
Online Cadastre

Legend

- Land Act Survey Parcels
 - Integrated Cadastral Fabric
 - First Nations Treaty Lands -
 - FIRST_NATION_NAME
 - Huu-yaht First Nations
 - Ka:yu:'k'ih/Che:k'it's'ath' First Nations
 - Nisgaha Nation
 - Toquaht Nation
 - Sawwassen First Nation
 - Uchucklesaht Tribe
 - Uchueliet First Nation
- (1:20,000) Water - Lake, Reservoir
Themed
- FCODE
- Mina - Ts'ihin Band
- 0 0.06 0.12 km
- 1:3,070

Copyright/Disclaimer

The material contained in this web site is owned by the Government of British Columbia and protected by copyright law. It may not be reproduced or redistributed without the prior written permission of the Province of British Columbia. To request permission to reproduce all or part of the material on this web site please complete the Copyright Permission Request Form which can be accessed through the Copyright Information Page.

CAUTION: Maps obtained using this site are not designed to assist in navigation. These maps may be generalized and may not reflect current conditions. Uncharted hazards may exist. DO NOT USE THESE MAPS FOR NAVIGATIONAL PURPOSES.

Datum: NAD83
Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



THE DISTRICT OF HUDSON'S HOPE

REPORT TO: Mayor Johansson & Council
DATE: April 8, 2015
FROM: Nicole Gilliss, Councillor
SUBJECT: Appointment of Acting CAO

Regarding: appointment of acting CAO during absences Of CAO.

I would like to propose that we, council, make a policy that says council appoint an acting CAO during times when our CAO is away.

-I recommend it could be a person from the management team.

-And I recommend we give an interim pay raise to the acting CAO while they are in the role.

This policy and practice I think will allow a member of management some professional skill development and it allows business as usual to go forward during the absence of our CAO, and for very practical reasons it is always a good idea to have more than one person know issues, developments, and be able to advise and lead.

Nicole Gilliss
(250) 783-1076