DISTRICT OF PEACHLAND
SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW NO. 2395

TABLE OF CONTENTS

TABLE OF SCHEDULES A-D

TABLE OF SCHEDULES 1-11

DISTRICT OF PEACHLAND
SUBDIVISION, DEVELOPMENT AND SERVICING BYLAW NO. 2395

A bylaw to regulate and require the provision of works and services in respect to the subdivision and development of land within the Corporation of the District of Peachland.

WHEREAS pursuant to the *Local Government Act*, a local government may by bylaw, regulate and require the provision of works and services for the subdivision or development of land;

NOW THEREFORE the Council of the District of Peachland, in open meeting, enacts as follows:

PART 1 INTRODUCTION

1.1 Short Title

This bylaw may be cited as the "District of Peachland Subdivision, Development and Servicing Bylaw No. 2395".

1.2 Repeal

District of Peachland Subdivision and Development Servicing Bylaw No. 1956, as amended, is repealed.

PART 2 INTERPRETATION

2.1 Purpose

The purpose of this bylaw is to establish standards for *Works and Services* which must be *constructed* and installed to service any *Subdivision* or *Development* of lands within the District of Peachland.

2.2 Definitions

"Application for Building Permit" means the information, documents, agreements, covenants and *fees* required under this bylaw for a *development*.

"Application for Subdivision" means the information, documents, agreements, covenants and *fees* required for a *subdivision* under this bylaw.

"Approval, Final" means the *Approving Officer's* affixation of his or her signature to the *subdivision* plan pursuant to the *Land Title Act*.

"Approving Officer" means the person appointed by the *District* as the *Approving Officer* under the *Land Title Act*, and includes his or her lawful designate.

"Benefiting Lands" means lands, other than lands that are the subject of the *Owner's Application for Subdivision* or *Application for Development*, that are capable of being connected to or serviced by *Excess or Extended Services* and are identified as such in a *Latecomer Agreement*.

"Building Bylaw" means the *District Building Bylaw*, as amended or replaced from time to time.

"*Building Inspector*" means the person appointed by the *District* as the *Building Inspector* under the *Building Bylaw*, and includes his or her lawful designate.

"Building Permit" means permission or authorization, in writing, by the *Building Inspector* to perform work regulated by the *Building Bylaw* and the *British Columbia Building Code*.

"Certificate of Acceptance" means a certificate issued by the *District* verifying that all conditions of this bylaw have been met by the *Owner*.

"Certificate to Proceed with Construction" means a notice issued by the *Approving Officer* authorizing the *Owner* to proceed with construction of the *Works and Services.*

"Certificate of Substantial Completion" means a certificate issued by the *Consulting Engineer*, certifying that *Substantial Completion* of all of the *Works and Services* has been achieved.

"Certificate of Total Completion" means a certificate issued by the *Consulting Engineer*, certifying that *Total Completion* of all of the *Works and Services* has been achieved.

"*Certified Irrigation Designer*" means an individual certified by the Irrigation Industry of British Columbia.

"*Chief Administrative Officer*" means the Chief Administrative Officer of the *District,* or designate.

"*Community Drainage System"* means a system of works owned, operated and maintained by the Ministry of Transportation and Infrastructure or the *District*, designed and constructed to control the collection, conveyance and disposal of surface and other water.

"*Community Sewer System"* means a sanitary sewer or a system of sewage disposal works which is owned, operated and maintained by the *District*.

"Community Water System" means a system of waterworks which includes the water distribution and treatment facilities which are owned, operated or maintained by the *District*.

"Construct" or *"Construction"* means build, erect, install, repair, alter, add, enlarge, move, locate, re-locate, re-construct, upgrade, demolish, remove, excavate, or shore.

"Consulting Engineer" means a *Professional Engineer* retained by the *Owner* to work on its behalf.

"Contract Documents" means the contract documents between the *Owner* and its contractor in connection with the Construction of *Works and Services*.

"*Council*" means the Municipal Council of the Corporation of the District of Peachland.

"*Cul-de-sac*" means a *highway* with only one point of intersection with another and which terminates in a vehicular turning area.

"Day" means calendar day.

"Design Drawings" means the drawings identifying the *Works and Services* requirements of this bylaw, provided by the *Owner* and submitted to the *District* pursuant to an *Application for Subdivision*.

"Develop" or "Development" means any construction, alteration or repair of a building that requires a *building permit* under the *Building Bylaw*.

"District" means the District of Peachland.

"Dwelling, Duplex" means a residential building containing two *dwelling units* neither of which contains a *secondary suite* nor a residential flex unit.

"Dwelling, Multiple Unit Residential" means a *dwelling unit* contained within a Multiple-Unit residential building.

"Dwelling, Secondary" means a building used or designed as a self-contained *dwelling unit* located on a *lot* with another single detached dwelling.

"Dwelling, Single Detached" means any detached building containing one *dwelling unit* occupied or intended to be occupied as a permanent or long term residence or, where permitted by the *Zoning Bylaw*, one *dwelling unit* and a *secondary suite*.

"Dwelling Unit" means a group of rooms used as separate living quarters, with one kitchen, sleeping and washroom facilities provided within the *dwelling unit* for the exclusive use of a household.

"Excess or Extended Services" means those *Works and Services* in respect of:

a) a portion of a *Highway* system that will provide access to *Benefiting Lands*; and

b) a portion of a water, sewage or drainage system that will serve *Benefiting Lands*.

"Estimated Cost of Works and Services" means an estimate prepared by the *Consulting Engineer* that itemizes the fair market value of the *Work and Services* and which includes the value of all professional *Fees* for design, approvals, *Construction* period services and *Record Drawings.*

"Fees" means those *fees* payable to the *District* in connection with the *Subdivision* or *Development* of land, as prescribed by the *District's* Development Approval Procedures and *Fees* Bylaw, as amended or replaced from time to time.

"Frontage" means the common boundary shared by the front *lot* line of a *lot* and a street excluding a *lane* or walkway.

"Functional Servicing Report" means a report that evaluates the effects of a proposed change in land use, subdivision or development on the *District's* municipal infrastructure and the suitability of any proposed (private) onsite servicing to support the proposed use. *Functional Servicing Reports* are typically required at the time of application for rezoning, development permit and *building permit* or at time of detailed design for *subdivision*.

"Garden Suite" means a secondary dwelling contained within an accessory building other than a mobile home.

"Hard Surfacing" means a durable ground surface, constructed of cast-in-place concrete, brick or concrete unit pavers, turf stone, stone, asphalt or similar materials but excluding gravel and clay.

"Highway" includes a street, *road*, *lane*, bridge, viaduct, walkway and any other way open to public use, but does not include an easement on private property.

"Highway Reservation Agreement" means an agreement between the *Owner* and the *District*, in the form prescribed by the *District,* as referred to in the *Local Government Act*.

"*Lane*" means a *highway* more than 3m but not greater than 8m in width, intended to provide secondary access to *Lots* of land. A *lane* is not to be considered a partial street.

"Latecomer" means an *Owner* of *Benefiting Lands* who wishes to connect to or use *Excess* or *Extended Services* prior to the expiration of a *Latecomer Agreement* to which the *Benefiting Lands* are subject, provided that a *Latecomer* who makes an *Application for Subdivision*, or an *Application for Development,* with respect to the *Benefiting Lands*, will also be considered an "*Owner*" of a *Lot* or proposed *Lot* for the purpose of this bylaw.

"Latecomer Agreement" means an agreement between the *Owner* and the *District*, in the form prescribed by the *District,* as referred to in the *Local Government Act*.

"Latecomer Charges" means those charges determined and imposed by the *District* and as defined by the *Latecomer Agreement*.

"*Lot*" means a parcel of land, including Crown Land, which is legally defined either by registered plan or description.

"Maintenance Bond" means:

a) a deposit in the form of cash or a certified cheque provided for the *Maintenance Period*, or

b) an unconditional irrevocable standby letter of credit in a form satisfactory to the *District,* expiring no earlier than one year from the date of issuance and providing for a right of renewal unless the bond or letter of credit is perpetual, issued to the *District* by a branch of a chartered bank, credit union or trust company.

"*Maintenance Period*" means:

a) the period of one year from the date on which all obligations of the *Owner* and its *Consulting Engineer(s)* have been performed.

b) with respect to *Works and Services* that appear to be incomplete, defective or deficient during the *Maintenance Period* referred to in either (a) above, the period of one year from the date on which such *Works and Services* are completed or corrected.

"Manufactured Home Park" means any *lot*, upon which two (2) or more manufactured homes are installed or placed for residential occupancy.

"MMCD" means the most current edition of the Master Municipal Construction Documents.

"Medical Health Officer" means the official appointed under the Health Act who has jurisdiction over the area in which the *subdivision* is located.

"Multiple-Unit Residential Building" means a building which contains three (3) or more *dwelling units*.

"OCP" means the District of Peachland Official Community Plan as amended or replaced from time to time.

"Off-site Works and Services" means *Works and Services* that are located outside the *lot* being subdivided or developed and are directly attributable to the *Subdivision* or *Development* and that will be owned and maintained by the *District* following issuance of the *Certificate of Total Completion.*

"On-site Works and Services" means *Works and Services* that are located on the *lot* being subdivided or developed, generally referring to *Works and Services* constructed by the owner as part of the *subdivision* that may be owned and maintained by the District following issuance of the *Certificate of Total Completion*.

"Owner" means the registered Owner of an estate in fee simple, or his agent authorized in writing, and includes:

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

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

c) the holder or occupier of land held in the manner as referenced in the *Local Government Act*.

"Owner/Consulting Engineering Confirmation" means a confirmation letter from the Owner and the *Consulting Engineering* Firm, in the form prescribed by the District.

"Panhandle Lot" means any *lot* which gains *highway* frontage through the use of a narrow strip of land providing sufficient width for vehicular access.

"*Preliminary Layout Review Letter*" means a letter from the *Approving Officer* to the *Owner* advising of the *Approving Officer*'s response to the Application for Subdivision.

"Professional Engineer" means an individual who is registered with the Association of Professional Engineers and Geoscientists of the Province of British Columbia as a professional engineer under the British Columbia *Professional Governance Act.*

"Public Access Route" means *Public Land* located between or beside *lots* that will provide a connection between public roads or between public roads and open space or parks behind the *lots* fronting the public *road*.

"Public Land" means land owned by the *Owner*, Crown or *District* and land that, after *subdivision approval* or title transfer, will be owned by the Crown or the *District*. *Public Land* may include, but is not limited to: boulevards, medians, traffic circles, stormwater management facilities, public access routes, natural open spaces and parks.

"Record Drawings" means drawings prepared by and certified by the *Consulting Engineer* that record the location, properties and details of all *Works and Services*.

"Road" means the portion of a *highway* to be used for vehicular traffic movement.

"Road Construction Permit" means a permit issued by the *District* in connection with an application by an *Owner* to *Construct Works and Services* on, in or under a *Highway* or *District* lands, or to encroach upon a *Highway* or *District* lands in *Constructing Works and Services* on the *Owner*'s lands.

"Secondary Suite" means one (1) or more habitable rooms within a single detached dwelling, used as a separate dwelling, with self-contained sleeping, living, cooking, and sanitary facilities, and direct access to the exterior, without passing through any part of the principal single detached *dwelling unit*.

"Service Application" means an application made by the *Owner* to connect to the *District*'s *Works and Services*, in the form prescribed by the *District*.

"Servicing Agreement" means an agreement between the *Owner* and the *District* to *construct* and install the required *Works and Services*, as enabled under section 509 of the Local Government Act.

"Statutory Right-of-Way Agreement" means an agreement between the *Owner* and the *District*, in the form prescribed by the *District*, as referred to in the *Land Title Act*.

"Subdivide" or "Subdivision" means:

a) the division of land into two or more *Lots* whether by plan, apt descriptive words, or otherwise;

b) the consolidation of *Lots* into one *Lot* by plan; or

c) the creation of a *Highway* or a portion of a *Highway* by plan.

d) a boundary adjustment between two *Lots*.

"Subdivision Approval" means the execution by the *Approving Officer* of a plan of *Subdivision*.

"Substantial Completion" means the stage of completion of all the *Works and Services* when the *Works and Services* are ready to be used for their intended purpose or the total of the incomplete, defective and deficient work can be completed at an estimated cost of no more than three percent (3%) of the total value of the work, as determined by the *Approving Officer*.

"Surveyor" means a person currently licensed to practice by, and is in good standing with, the Association of British Columbia Land *Surveyors.*

"Total Completion" means when all *Works and Services*, including all incomplete, defective or deficient *Works and Services* that were apparent when the Certificate of *Substantial Completion* was issued have been completed or corrected, as certified by the *Consulting Engineer* and verified by the *District*.

"Watercourse" means any natural or artificial stream, river, creek, ditch channel, canal, conduit, culvert, drain, waterway, gully or ravine in which water flows in a definite direction or course, either continuously or intermittently, and has a definite channel, bed and banks and includes an area adjacent thereto subject to inundation by reason of overflow or flood water.

"Works and Services": includes site grading, *Highways*, sidewalks, boulevards, boulevard crossings, transit bays, street lighting, wiring, water distribution systems, fire hydrants, sewage collection and disposal systems, drainage collection and disposal systems, engineering, record drawings and such other infrastructure or systems as may be provided within the *District* from time to time.

"Zone" means the *zones* identified and defined in *District* of Peachland *Zoning Bylaw*.

"Zone Amending Bylaw" means the bylaw passed by the *District*, following an application by the *Owner* in connection with the *Subdivision* or Development of the *Owner*'s lands, to amend the *District* of Peachland *Zoning Bylaw*.

"Zoning Bylaw" means the *District* of Peachland *Zoning Bylaw*, as amended or replaced from time to time.

2.3 Standards of Measure

Any equivalent imperial units of measure shown, in parenthesis, after metric units in any schedule to this bylaw are for information purposes only and do not form part of this bylaw.

2.4 Severability

If any Part, Section, Paragraph or phrase of this bylaw is for any reason held to be invalid by the decision of a Court of competent jurisdiction, such decision will not affect the validity of the remaining portions of this bylaw.

2.5 Schedule

The following schedules are attached to and form part of this bylaw.

Schedule A – Works and Services Requirements

Schedule B – Submissions and Approvals

Schedule C – Roadway Classification Map

Schedule D – Hillside Development Design Criteria

Schedule 1 – Roads

Schedule 2 – Storm Drainage

Schedule 3 – Water

Schedule 4 – Sanitary Sewer

Schedule 5 – Street Lighting

Schedule 6 – Retaining Walls and Alterations

Schedule 7 – Landscaping

Schedule 8 – Quality Control and Assurance

Schedule 9 – Supplemental Specifications to MMCD

Schedule 10 – Standard Drawings

Schedule 11 – Engineering Drawing Submissions

2.6 Master Municipal Construction Document (*MMCD*)

All *Works and Services* shall be completed in accordance with the following portions of Volume II of the *MMCD* 2019 Edition of the Master Municipal Construction Document, which shall form part of this bylaw, unless specifically modified herein.

- Specifications – Division 01, 03, 26, and 31 to 34 inclusive
- Standard Detail Drawings

2.7 Applicability

This bylaw applies to all lands within the area incorporated as the *District* of Peachland.

PART 3 MINIMUM HIGHWAY FRONTAGE

3.1 *Council* delegates to the *Approving Officer* the power to exempt a *Lot*, other than a panhandle *Lot*, from the minimum *Frontage* requirement under the Local Government Act.

3.2 Where the *Owner* seeks to vary the minimum *Frontage* or *Lot* width by more than 10 percent, a development variance permit must be obtained from *Council.*

PART 4 CONNECTION TO COMMUNITY SYSTEMS

4.1 Connection to the Community Water System

All water distribution or fire hydrant systems provided in accordance with this bylaw shall be connected to the *Community Water System*.

4.2 Connection to the Community Sewer System

All sanitary sewage collection systems provided in accordance with this bylaw shall be connected to the *Community Sewer System*.

4.3 Connection to the Community Drainage System

All drainage collection systems provided in accordance with this bylaw shall be connected to the *Community Drainage System*.

PART 5 SERVICING REQUIREMENTS FOR SUBDIVISIONS AND DEVELOPMENTS

5.1 Prior to *Subdivision Approval* or issuance of a *Building Permit*, the *Subdivision* or *Development* must be provided with *On-site Works and Services* within the *Subdivision* or on the *Lot* being developed as prescribed in this Bylaw.

5.2 *Council* delegates to the *Approving Officer* the authority to:

a) Determine what *Off-Site Works and Services* are directly attributable to *subdivision* or development and are accordingly required in any particular case;

b) Determine what *Excess or Extended Services* are required in connection with a *Subdivision* or *Development*;

c) Determine whether the cost of those *Excess or Extended Services* are excessive such that the municipality cannot pay for those costs;

d) Identify the benefiting properties in relation to *Excess or Extended Services*; and

e) Determine what proportion of the costs associated with the *Excess or Extended Services* is associated with each benefiting property.

5.3 Prior to *Subdivision Approval* or issuance of a *Building Permit*, the *Subdivision* or Development must be provided with *Off-Site Works and Services* as determined by the *Approving Officer*.

5.4 The *Approving Officer* may require the *Owner* to provide to the *District*, cash in lieu of the required *Works and Services*. The amount of cash in lieu shall be approved by the *Approving Officer* but shall not exceed 110% of the value of the design, *construction*, and installation of the required *Works and Services*. The *Consulting Engineer* may be required to prepare and submit the *Estimated Cost of Works and Services* to assist the *Approving Officer* in his/her evaluation.

5.5 All *Works and Services* required as per Section 5.1 and Section 5.3 shall be provided to the standards prescribed in the Schedules of this bylaw.

5.6 The *Owner* shall, as a condition of *Subdivision Approval* or the issuance of a *Building Permit* provide an extension of, or improvements to, the *District*'s *Works and Services* within that portion of the *highway* immediately adjacent to the lands being subdivided or developed across the entire *frontage* of the parcel, in accordance with standards prescribed in the Schedules of this bylaw.

5.7 Where permitted on-site water supply and on-site sewage disposal systems shall be in accordance with applicable Interior Health requirements and provincial regulations.

5.8 Exemptions

Despite Section 5.1 and Section 5.3, the *Works and Services* requirements of this bylaw do not apply to a *Subdivision* which creates only:

a) a *Highway* dedication;

b) park land;

c) a *Lot* for the installation of public utilities and related structures equipment; or

d) a consolidation or a *lot* line adjustment, in which the number of buildable *lots* is not increased.

Despite section 5.1 and section 5.3 *Works and Services* requirements of this Bylaw do not apply in the case of *Building Permit* applications for:

a) Residential accessory buildings;

b) Additions to single detached dwellings or duplexes; and

c) New *construction* of single detached dwellings or duplexes.

PART 6 FEES AND SECURITY

6.1 Fees and Payment of Charges

Final approval of the *Subdivision,* issuance of the *Certificate to Proceed with Construction*, issuance of a *Preliminary Layout Review Letter*, issuance of a *Road Construction Permit*, or issuance of *Building Permit,* as the case may be, will not be issued by the *District* until all applicable *fees* and charges have been paid.

6.2 Development Approval Fees

The *Owner* shall pay all engineering and legal *fees* as well as outside consulting costs incurred by the *District* relating to the *subdivision* and servicing of the land, including detailed review and approval of the *Design Drawings*, monitoring the installation of the *Works and Services*, and the costs of connecting the *Works and Services* to the *District's* existing infrastructure.

Prior to issuance of the *Certificate to Proceed with Construction*, the *Owner* shall pay to the District an amount equal to three (3.0%) of the estimated cost to *construct* the *Works and Services* as approved by the *District.*

6.3 Early Subdivision Approval

Despite Section 5.1 and Section 5.3, the *Owner* may obtain early *Subdivision Approval* prior to the provision of *On-Site Works and Services* and *Off-Site Works and Services* if the *Owner* provides security in accordance with Section 6.4, and enters into a *Servicing Agreement* with the *District,* and registers a Section 219 Restrictive Covenant over all proposed *lots* preventing issuance of a *building permit* until the *District* has issued a *Certificate of Substantial Completion.*

6.4 Works and Services Security

Issuance of a *Certificate to Proceed with Construction* shall not be granted unless the *Owner* enters into a *Servicing Agreement* and pays to the *District* a security in an amount equal to one hundred and twenty five percent (125%), plus ten percent (10%) for Engineering, of the *Consulting Engineer's Estimate of the Cost* of the *Off-Site Works and Services* required for the proposed *Subdivision* or *Development* to meet the requirements of this bylaw. *Final Approval* will not be granted until the *District* has issued a *Certificate of Substantial Completion.*

The *Owner* shall be responsible for the actual cost of the *Works* and *Services* regardless of the adequacy of the security deposited with the *District*.

6.5 Maintenance Security

The *District* shall:

a) Return the security required pursuant to Section 6.4 of this bylaw, less ten percent (10%) to cover deficiencies during the one-year *Maintenance Period*.

b) Establish the date of commencement of the one year *Maintenance Period*.

c) Shall advise the *Owner* of the terms of the one year *Maintenance Period*.

All *Works and Services* required to be *constructed* or provided pursuant to the provisions of this bylaw shall remain the sole responsibility of the *Owner* until a *Certificate of Acceptance* has been issued by the *District.* The *Owner* shall maintain the works and repair or replace any defective works during the one year *Maintenance Period*. Should the *Owner* fail to maintain, repair or replace said works, the *District* may undertake such maintenance, repairs or replacement using the ten percent (10%) security provided for herein.

The *Maintenance Period* shall not commence until:

a) *Substantial Completion* of the Works and Services has been achieved.

b) The *Record Drawings* have been submitted by the *Owner* and approved by the *Approving Officer.*

Should the *Maintenance Period* commence between the period November 1 and March 31, the *Approving Officer* may require the *Maintenance Period* be extended so that it terminates on April 1 following the one year anniversary of the commencement date of the *Maintenance Period.*

PART 7 GENERAL PROVISIONS

7.1 Project Supervision and Certification

All *Consulting Engineers* that are required as a condition of this Bylaw shall be on-site during the period(s) of *constructio*n of all works falling within their particular field of expertise. The *Consulting Engineer* responsible for the respective works shall, upon satisfactory completion of said works, provide the *District* with their written certification that they were, in fact, on-site during the period of *construction* of the works and that said works were installed meeting the requirements of this bylaw.

7.2 Rights-of-Way and Easements

7.3.1 *Works and Services constructed* and installed under this bylaw must be located within dedicated *highways* or within statutory rights-of-way granted by the *Owner* in favour of the *District* or other agencies having jurisdiction.

7.3.2 Where *Works and Services* are not required to be *constructed* or installed under this Bylaw, the *District* may require rights-of-way to be granted by the *Owner* in favour of the *District* to allow for the eventual *construction* or installation of a system of water, sewer, or drainage works.

7.3.3 Where the *Owner* is required to grant rights-of-way to the *District*, the *Owner* must register the rights-of-way in the Land Title Office. The terms of the rights-of-way documentation are subject to the approval of the *Approving Officer* prior to registration.

7.3.4 Upon registration of the rights of way and before release of any security being held by the *District*, the *Owner* must submit a copy of the registered rights-of-way plan and agreement to the *District*.

7.3.5 All costs pertaining to the acquisition, surveying and registration of all rights-of-ways shall be at the expense of the *Owner*.

7.3 Consulting Engineer

The *Owner*, at its expense, shall retain a *Consulting Engineer* to design, inspect, test and certify all *Works and Services*.

7.4 Cost of Services

All *Works* and S*ervices* required by this bylaw shall be *constructed* at the expense of the *Owner*.

7.5 Latecomer

7.5.1 Where the *Owner* is required by the *District* to provide *excess* or *extended services*, the *Owner* is entitled to receive *latecomer charges* in accordance with:

a) The Local Government Act, and;

b) The *latecomer* policy of the District, where applicable, and;

c) The *latecomer agreement* in a form acceptable by the *Approving Officer*.

7.5.2 The *Approving Officer* shall require the *Owner* to provide appropriate documentation and associated costs respecting potential *latecomer* eligible properties. The issuance of a *Certificate to Proceed with Construction* shall be withheld until receipt of the said information.

7.5.3 The interest rate applicable to *latecomer charges* as per the *Local Government Act* shall be calculated by the *District* at the time the *latecomer* agreement is signed, and shall be set by Bylaw and reviewed by *Council* from time to time.

7.6 Transfer of Ownership

Works and Services constructed and installed under this bylaw become the property of the *District* or the agency having jurisdiction, subject to no encumbrances, on issuance of the *Certificate of Acceptance*.

7.7 Stop Work Order

The *Approving Officer* or the *Building Inspector* may order:

a) a person who contravenes this bylaw to comply with the bylaw within a time limit specified in the order;

b) a person to stop *construction* on the work, or any part thereof, if such work is proceeding in contravention of this bylaw.

7.8 Record Drawings

The *Owner* must submit *Record Drawings* following the completion of the *Works and Services* and prior to issuance of a *Certificate of Total Completion*. All *Record Drawings* and submitted reports must bear the *Consulting Engineer's* Permit to Practice Number in accordance with provincial regulations.

If the *Owner* wishes to receive *Subdivision Approval* prior to submission of required *Record Drawings*, tests results, service cards, inspection reports, video reports, maintenance and operations manuals, and professional certifications, such *Approval* may be granted at the sole discretion of the *Approving Officer*, subject to a deficiency holdback in an amount set by the *Approving Officer* pursuant to this bylaw.

PART 8 ENFORCEMENT

8.1 The *Approving Officer*, *Building Inspector*, or such other person as he may designate, may enter at all reasonable times upon the lands for which an *Application for Development* or for *Subdivision* has been made, for the purpose of administering or enforcing this bylaw. No person shall prevent or obstruct any such official from the carrying out of these duties under this bylaw.

8.2 Violation

a) It is an offence for any person to cause, suffer, or permit the *subdivision* of land in contravention of this bylaw or otherwise to contravene or fail to comply with this bylaw.

b) It is an offence for any person to prevent or obstruct, or attempt to prevent or obstruct the authorized entry of the *Approving Officer* or other appointed employee, authorized under this bylaw.

8.3 Penalties

Every person who violates a provision of this bylaw commits an offense and is liable upon summary conviction to a penalty not exceeding ten thousand dollars ($10,000) and costs of prosecution. Every day of violation constitutes a separate offense.

8.4 Remedial Powers

Council may authorize the demolition, the removal, or the bringing up to standard of any *Works and Services* in whole or in part, that are in contravention of this bylaw.

PART 9 EFFECTIVE DATE

9.1 This bylaw shall come into force and take effect upon the final reading and adoption thereof.

READ A FIRST TIME this _____ day of _____, 2023.

READ A SECOND TIME this _____ day of _____, 2023.

READ A THIRD TIME this _____ day of _____, 2023.

FINALLY RECONSIDERED AND ADOPTED this _____ day of _____, 2023.

_____ _____

Mayor Corporate Officer

I HEREBY CERTIFY THIS TO BE A TRUE COPY OF THE DISTRICT OF PEACHLAND SUBDIVISION, DEVELOPMENT & SERVICING BYLAW NO. 2395 AS OF _____, 2023.

_____ _____

Date Corporate Officer

SCHEDULE A
LEVEL OF SERVICE

Schedule A – Level of Service

KEY SHEET

CODE	DESCRIPTION
WTR	*Community water system*. In *subdivisions* which are to be provided with a *community water system*, each Parcel being developed must be supplied by a water distribution system, including service connections and with adequate fire flow and protection, to be designed in accordance with the standards prescribed by the *District*.
WELL	Where a *community water system* is not available a proven water supply located on each parcel is permitted.
SEP	Where a *community sewer system* is not available an on-site sewage disposal system is permitted that complies with the Sewerage System Regulation under the Public Health Act.
SWR	Community sanitary sewer system.
DITCH	Drainage collection and disposal system by open ditches and culverts.
STM	Closed drainage collection and disposal system (i.e. a system other than open ditches).
SL	Street lighting throughout the *subdivision*.
SLI	Street lighting at street intersections only.
SW	Sidewalk (one or both sides of the roadway).
OH	Overhead electrical and communication wiring.
UG	Underground electrical and communication wiring.
Rx	Use corresponding *road* standard as set out in standard drawings.
0/1/2	sidewalks on 0, 1, or 2 sides of *road* – corresponds to *road* standards set out in standard drawings.

Schedule A – Level of Service

	UTILITIES (3) (refer to Key Sheet)					ROADS (3) (refer to Standard Drawings)	
Zone	**Water**	**Sewer**	**Drain**	**Wiring(4)**	**Lighting(1)**	**Roads**	**Sidewalks(2)**
R-1	WTR	SWR	STM/DITCH	OH/UG	SL/SLI	R1-R10	0/1/2
RC-1	WTR	SWR	STM	OH/UG	SL	R1-R10	1/2
R-2	WTR	SWR	STM/DITCH	OH/UG	SL/SLI	R1-R10	0/1/2
RM-1	WTR	SWR	STM/DITCH	OH/UG	SL/SLI	R1-R10	0/1/2
RM-2	WTR	SWR	STM	OH/UG	SL	R1-R10	1/2
RM-3	WTR	SWR	STM	OH/UG	SL	R1-R10	1/2
RM-4	WTR	SWR	STM	OH/UG	SL	R1-R10	1/2
RR-1	WTR	SWR/SEP	STM/DITCH	OH	SLI	R1/R5/R7	0/1
RR-2	WTR	SWR/SEP	STM/DITCH	OH	SLI	R1/R5/R7	0/1
A-1	WTR/WELL	SWR/SEP	DITCH	OH	SLI	R1/R5/R7	0/1
A-2	WTR/WELL	SWR/SEP	DITCH	OH	SLI	R1/R5/R7	0/1
CR-x	WTR	SWR	STM	UG	SL	R2-R4/R6/R8-R10	1/2
C-2	WTR	SWR	STM	UG	SL	R2-R4/R6/R8	1/2
C-3	WTR	SWR	STM/DITCH	UG	SL	R2-R4/R6/R8-R10	1/2
C-4	WTR	SWR	STM	UG	SL	R2-R4/R6/R8	1/2
C-5	WTR	SWR	STM	UG	SL	R2-R4/R6/R8	1/2
C-9	WTR	SWR	STM/DITCH	UG	SL	R2-R4/R6/R8	1/2
I-1	WTR/WELL	SWR/SEP	STM/DITCH	OH/UG	SL/SLI	R1-R5	0/1
P-1	WTR	SWR/SEP	STM/DITCH	OH/UG	SL/SLI	R1-R10	0/1
P-2	WTR	SWR/SEP	STM/DITCH	OH/UG	SL/SLI	R1-R10	0/1
CD-x	WTR	SWR	STM	UG	SL	R1-R4/R6/R8-R10	1/2

Notes:

(1) Level of street lighting service requirements may be reduced by the *Approving Officer* (e.g. from SL to SLI) within a rural *road* cross-section.

(2) Level of sidewalk service requirements may be reduced by the *Approving Officer* (e.g. from 1 side of the *road* to 0) within a rural *road* cross-section.

(3) Utilities and road upgrades are to extend the entire length and all property frontages.

(4) Or as otherwise specified by BC Hydro.

SCHEDULE B
SUBMISSIONS AND APPROVALS

Schedule B – Submissions and Approvals

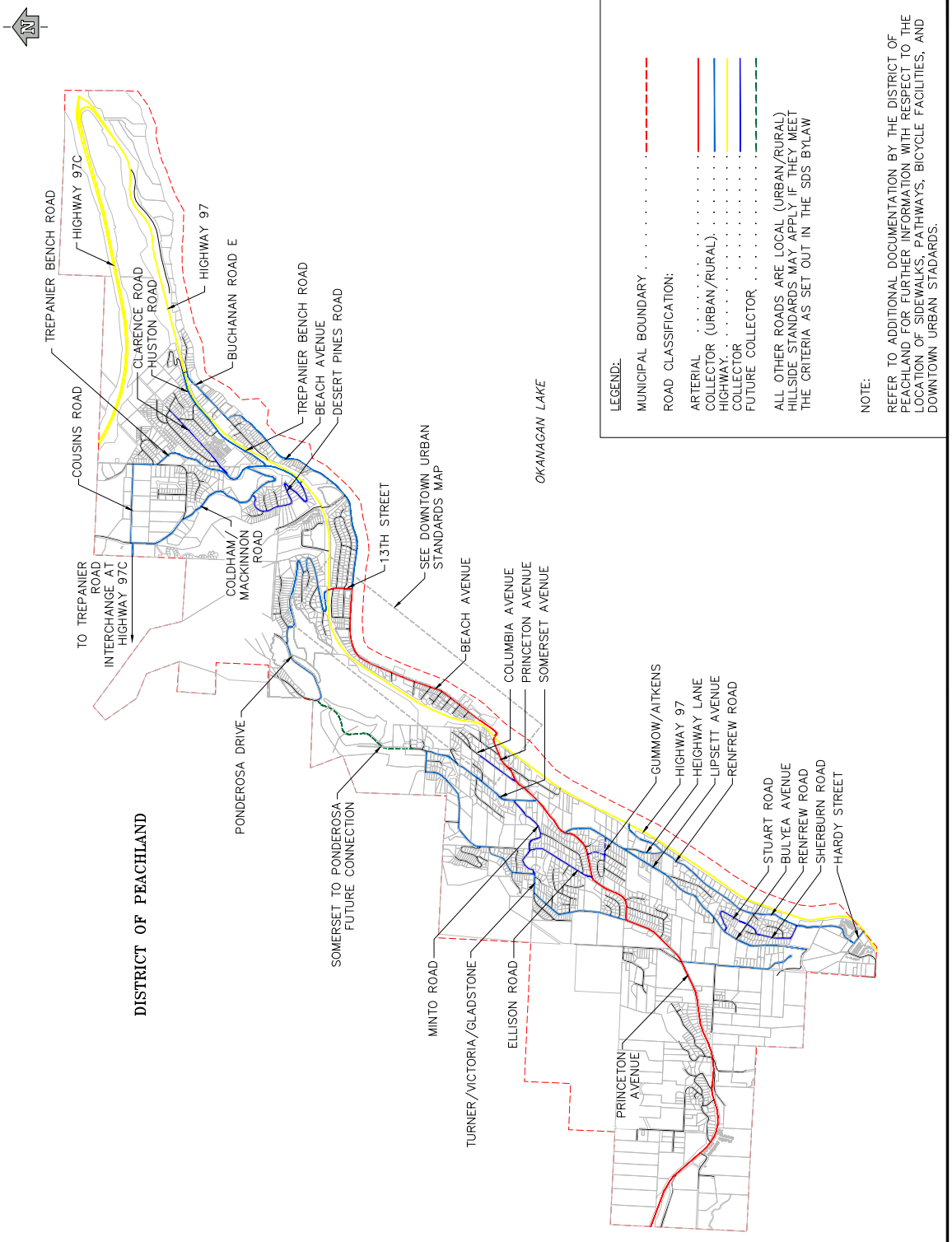
Removed from bylaw

SCHEDULE C
ROADWAY CLASSIFICATION MAP

Schedule C – Roadway Classification Map

THE CORPORATION OF THE
DISTRICT OF PEACHLAND

ROADWAY CLASSIFICATION MAP



ROADWAY CLASSIFICATIONS

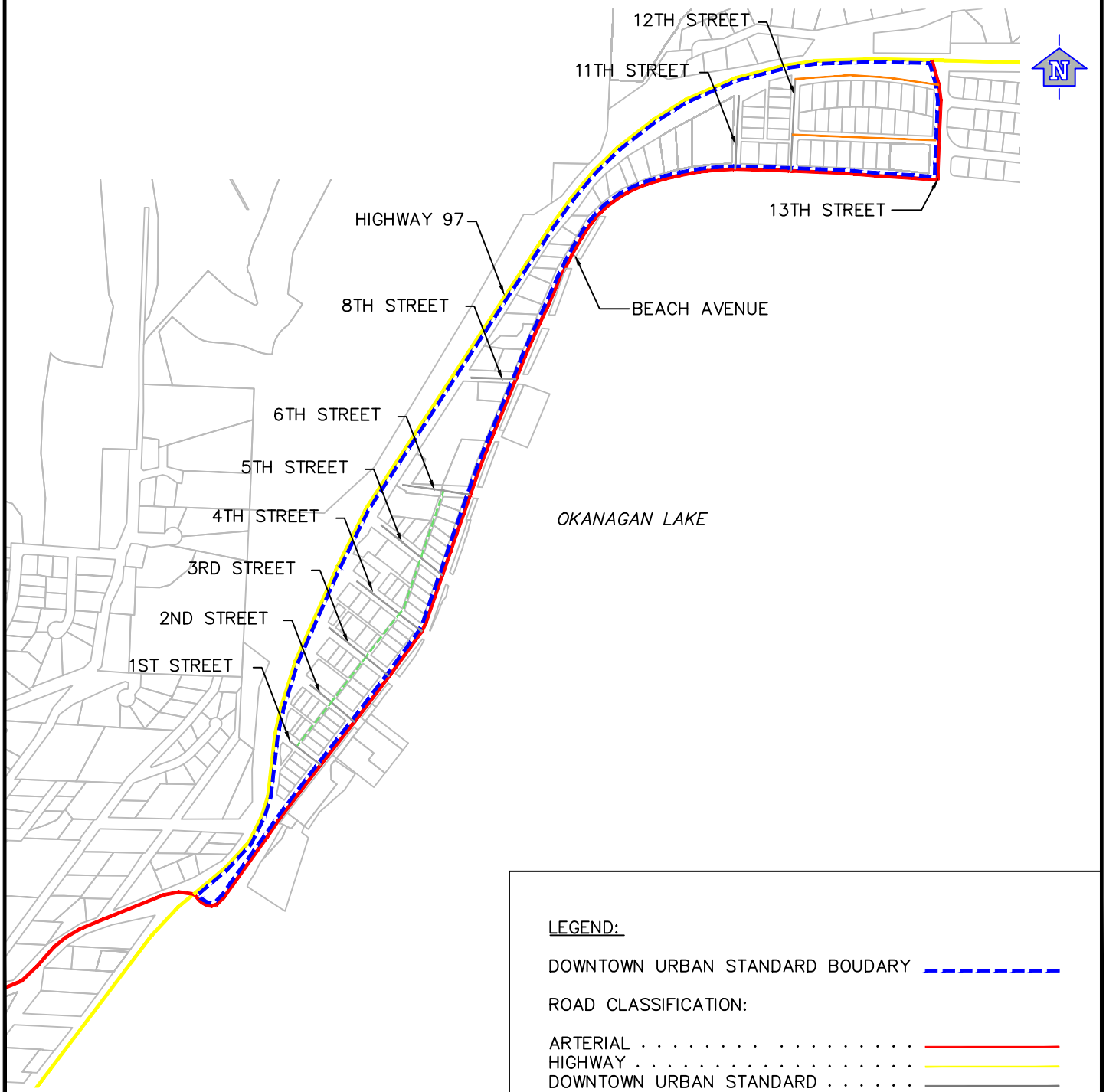
SCALE: NOT TO SCALE

REVISED: OCTOBER 2022

DRAWING NO: SCHEDULE C

THE CORPORATION OF THE
DISTRICT OF PEACHLAND

DOWNTOWN URBAN STANDARD MAP



LEGEND:

DOWNTOWN URBAN STANDARD BOUDARY

ROAD CLASSIFICATION:

ARTERIAL
HIGHWAY
DOWNTOWN URBAN STANDARD
LOCAL STANDARD
LANE STANDARD

SCHEDULE D
HILLSIDE DEVELOPMENT DESIGN CRITERIA

Schedule D – Hillside Development Design Criteria

1.0 GENERAL

1.1 This section applies to all properties which are 0.5 hectares or greater in size, and where 10% or greater of the parent property contains steep slopes. Steep slopes are defined as lands that have a natural slope angle of 20% or greater for a minimum horizontal distance of 10 meters, or adjacent areas where existing or potential sloughing or stability warrants concern.

1.2 In steep slope areas where it is impossible to conform to the Design Criteria as set out in Schedules 1 to 11 of this bylaw, the *Approving Officer* may approve *Subdivision* or *Development* required works or services which vary the conventional design criteria required by Schedules 1- 11.

1.3 Before agreeing to vary any part of Schedule 1-11, the Approving Officer must be satisfied that the variance is warranted due to the topographical constraint involved and the varied criteria is presented and acceptable as good engineering practice, environmentally sound, and does not adversely affect transportation or public safety.

1.4 *Subdivision* and site design should respond to the unique circumstances of each site, avoiding significant disruption of the natural terrain (tree cover and natural vegetation) as much as possible. Creation of deep scars, highly visible cut and fill excavations, and the deposit of side casting material along sloped edges should be avoided.

1.5 Natural open space *development* is more appropriate for environmentally or geo-technically sensitive areas of the hillside. Public dedication of these lands is preferred, the *Approving Officer* may consider no-build/no disturb covenants or land trusts on these lands, where *subdivision* is to occur.

1.6 *Development* must take place on lands containing less than 30% natural grade, with the exception of small pockets of land along with more gentle slopes that a maximum of 10% of the terrain required for a building envelope can be altered.

1.7 *Subdivision* or *developments* in steep slope areas require a *District Development* Permit.

2.0 HILLSIDE DESIGN REPORT

2.1 The *Consulting Engineer* is expected to use innovative design techniques that minimize impacts to future land owners, maintenance and sensitive steep slopes and natural drainage areas.

2.2 The *Consulting Engineer* is expected to minimize the total amount of cut and or fill and its environment and visual impact when designing and developing a site.

2.3 Detailed geotechnical, slope stability, hazard assessments and hydrogeological reports shall be required as part of the hillside design report and shall be submitted prior to

approval of a *Subdivision* or *Development*. In addition to Schedules 1-11, the pre-design report for steep slope areas will also have to address specifically and provide recommendations for:

a) Slope Stability concerns. The *District*'s 'Initial Hillside *Development* Sensitivity Ranking', prepared by Golder and Associates, March 2 2009, has delineated initial investigation intensity *zones*, identified as G1 to G5. In areas ranked G3 to G5, the *Approving Officer* may require a more intensive investigation than outlined in this schedule.

b) A *lot* grading and drainage management plan that mitigates the potential impacts onsite and downstream. The drainage management plan shall include at a minimum the following:

   (i) Existing and proposed topography.

   (ii) Key cross sections showing cuts and fills related to building sites, roads, and retaining walls.

   (iii) Erosion and sedimentation control and protection.

   (iv) Pre and post *development* hydrogeological conditions.

   (v) Stormwater quality and treatment.

   (vi) Protection of natural drainage patterns or water course.

   (vii) Drainage control around future buildings and between upper and lower *lots*.

   (viii) Control and discharge of roof and footing drainage.

c) Underground infrastructure pipe bedding, trench backfill and mechanical restraints.

d) Roadwork structure, tack coat requirements and guard rail requirements.

e) Driveway access concerns.

f) Building code structural or foundation requirements.

g) Restrictions on irrigation and removal of vegetation.

h) Environmental impact assessment.

i) Assessment of upgradient and downgradient conditions.

j) A list of requirements on a *lot* by *lot* basis pertaining to covenants that may be required.

k) Land Clearing and Tree Retention and Removal plans.

l) Urban Wildfire Protection Plan.

2.4 Each *Parcel* created by *Subdivision* must have a buildable site with a building envelope, setbacks and driveways shown on the conceptual drawing.

3.0 ROADS

3.1 Vertical Alignment

3.1.1 Engineered design grades shall be as per Table 10.0 - Hillside *Development* Standards Table of this section.

3.1.2 Alternate access routes must be incorporated to ensure emergency or maintenance vehicular access.

3.2 Horizontal Alignment

3.2.1 Only where surveyed topography determines that lesser radii must be used, the radii may be reduced as per Table 10.2 with approval from the *Approving Officer* with potentially the addition of speed reduction and warning signs. Designs providing reduced *cul-de-sac* radii or hammerhead configurations may also be considered.

3.2.2 The requirement for guard rail installation will be on the basis of warrant analysis as per the Transportation Association of Canada Geometric Design Guide for Canadian Roads.

3.3 Roadway Cross Sections

3.3.1 Roadway cross sections may be reduced in width as illustrated in Standard Drawings SD-R9 and SD-R10 and as shown in Table 10.0 of this section.

3.3.2 Roadway cross sections may be further reduced in width if parking is to be located on private *lots* or if special pull out parking areas are established in strategic positions.

3.3.3 Boulevard grades in *excess* of 2% may be designed to a point 1.0m from the back of sidewalk or curb (where no sidewalk present) where on-street parking is provided and to a point 2.4m back where parking is adjacent to the street, behind the curb, as long as it can be demonstrated that the depth of bury on underground utilities will not be negatively impacted and there is sufficient space for snow storage.

3.3.4 In areas where the boulevard grade exceeds 2% the *Approving Officer* may require the developer to undertake boulevard slope stabilization and planting.

3.3.5 In no case shall the grade from the property line to the back of sidewalk, back of curb or back of ditch be less than 1%.

3.3.6 The *Approving Officer* may consider alternative utility offsets within *road* section.

3.3.7 Level access and clearance of 1.3m around fire hydrants, transformers, and vaults must be established.

3.4 Road Lane Grade Separation (Split-*Road* Section)

3.4.1 Cross-sectional separated grade (one way) *lanes* are a design option to minimize excessive cut/fill slopes, protection of large trees, improve property access or allowance for gravity sewer connections for down slope *lots* to the street.

3.4.2 Center median cross-section slopes shall be protected from erosion and designed to be maintenance free.

3.4.3 Utility offsets shall be established within the down slope *road* section with storm mains and sanitary mains in common trench.

3.5 Intersection Grades/Site Clearances

3.5.1 Through street maximum grade is 8%. The *Approving Officer* may consider increases due to topographic constraints.

3.5.2 Cut/fill slopes, vegetation planting, retaining wall structures and parking, shall be designed to protect all site distances.

4.0 STORM DRAINAGE

4.1 Catchbasin grates on *road* grades exceeding 6% shall slope into (opposite) the downhill *road* grade to catch surface flows.

4.2 High side gutter elevation shall be 75mm above the catchbasin grate.

4.3 Ditching, swales or natural drainage courses exceeding 6% require a ditch cross section that will control erosion taking into account soil type, water flow and velocity.

4.4 Roof leaders and foundations drains shall be discharged to a closed drainage system.

5.0 WATER

4.1 Water system pressure *zone* boundaries should be designed to ensure fire fighting pressures in the high side of the *lots.*

6.0 UTILITY CORRIDORS

6.1 Side yard and rear yard utility corridors shall only be approved if they are included in a right-of-way that restricts the *construction* of permanent structures (excluding fences) and requires that the cost of removing and reconstructing fences and landscaping placed within the easement are the responsibility of the property owner.

6.2 The width of the underground utility corridor shall consider depth of bury, access, separation from private structures and long term operation and maintenance.

6.3 Utility service and transformer boxes, which need to be at *road* grade, would require suitable grading and retaining structures.

7.0 RETAINING WALLS/STAIRWAYS

7.1 Any retaining or landscape structure across a boulevard or median required to maintain surface utilities at *road* grade or to facilitate split *road* sections shall be designed to protect the location and depth of all underground utilities.

8.0 DRIVEWAY ACCESS

8.1 Reciprocal driveway access can be a design option for a maximum of 3 *lots* where the grade of the access is not greater than 15%.

8.2 Individual driveways should:

1. Have a grade of not more than 20%. If this is not achievable, 2 readily accessible off-*road* parking stalls shall be provided on the property.
2. On down slope driveways, the driveway grade for the first 3.5m length from property line shall not be greater than 7%.

8.3 In any case, if the maximum driveway slopes cannot meet non-hillside driveway standards, a Restrictive Covenant must be registered.

8.4 In areas with severe vertical curves, driveway locations may have to be restricted to maintain proper sight lines and stopping sight distance.

9.0 SITE RESTORATION

9.1 Disturbed area within the *road* right-of-way or on disturbed areas of the site that are not within formal landscaped areas or building envelopes shall be restored to a natural condition or to a condition that will prevent erosion prior to Substantial Performance being issued or final occupancy in the case of a *Building Permit* application.

9.2 Restoration practices shall be specifically tailored to address the type and degree of disturbance and the specific conditions of the site. The design shall be completed in accordance with Schedule 7- Landscaping, where possible.

10.0 HILLSIDE DEVELOPMENT STANDARDS TABLE

STREET TYPE	CONDITION[1]	DESIGN SPEED	MAX. GRADE	ROW WIDTH	PAVEMENT WIDTH (m)[2]	PARKING	CURB & GUTTER	SIDEWALK[3]	STREET TREES
LOCAL STREET									
Development fronts both sides	A	40	12	14	6.0	above curb both sides	rollover	1	optional
Development fronts one side	B	40	12	12	6.0	above curb both sides	rollover	1	optional
No Development fronting	C	40	12	10	6.0	none permitted	barrier	1	optional
COLLECTOR STREET									
Development fronts both sides	A	50	10 [(7)]	18	8.6	above curb both sides	rollover	2	2 sides
Development fronts one side	B	50	10 [(7)]	15	8.6	above curb both sides	rollover	1	2 sides
No Development fronting	C	50	10 [(7)]	14	8.6	none permitted	barrier	1	2 sides
HILLSIDE EMERGENCY VEHICLE ACCESS		**20**	**15**	**4.5**	**4.5**				

Footnotes:

1. Condition refers to Standard Drawings SD-R9 and SD-R10.
2. Pavement width measured from face of curb.
3. Sidewalks shall terminate at a destination or connect with another sidewalk or pathway. The numbers indicates whether sidewalk is required on either one or both sides of the street.
4. Sidewalks are not required on local streets in steep slope areas unless they are required to provide connectivity to schools, parks, commercial areas or lands beyond.
5. Roadway cross sections may be further reduced in width if parking is to be established at strategic locations.
6. Split *road* section *lane* widths require 3.0 m traveled *lane* plus 2.5 m parking or cycling width.
7. Collector Streets maximum grades may be increased to 12% where necessary due to topographic constraints. Where approved, grades exceeding 10% shall be topographically surveyed at the developer's expense, to verify final *road* grades, prior to final *subdivision approval*.

Table 10.2 - Alignment Design Criteria

1. Horizontal Curve Radii

Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Roadway				
normal crown (-2%)	260m	165m	90m	45m
2% superelevation	205m	120m	65m	30m
4% superelevation	150m	80m	45m	22m
6% superelevation	120m	-	-	-
Through Intersections	200m	120m	70m	40m

2. Superelevation

Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Maximum Superelevation	6%	4%	4%	4%
Maximum Superelevation at Intersection	4%	4%	4%	4%

3. Superelevation Transition Lengths

Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Transition Lengths (2 /4-lane roadways)[1]				
normal crown to +2%	24m / 36m	22m / 34m	20m	20m
normal crown to +4%	38m / 54m	33m / 50m	30m	30m
normal crown to +6%	48m / 72m	-	-	-
Min Tangent Length between reversing				
2% superelevation (2 / 4-lane roadways)[2]	15m / 22m	13m / 20m	12m	12m
4% superelevation	28m / 42m	26m / 40m	24m	22m
6% superelevation	42m / 64m	-	-	-

1. Values for transition lengths include tangent runout applied at the same rate as superelevation runoff.

2. 60% of superelevation runoff occurs on the tangent approach and 40% on the curve, resulting in a minimum length of tangent between reversing curves of 120% of the siperelevation runoff length.

4. Gradients

Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Minimum Grade	0.5%	0.5%	0.5%	0.5%
Maximum Grades				
on horizontal tangents	8%[1]	10%[2]	12%	12%
on minimum radius horizontal curves[3]	8%	9%	10%	10%
Grades Through Intersections				
with design speed on major road	8%	8%	8%	-
approach distance for major road[4]	15 / 5 m [5]	5m	0m	-
with design speed on minor road	5%[6]	5%	6%	6%
approach distance for minor road[7]	20m	15m	5m	5m

1. Under special curcumstances, grades up to 10% may be permitted.

2. Under special circumstances, grades up to 12% may be permitted.

3. Applies where radius is less than 1.5 times minimum allowable radius.

4. Minimum distance back from the gutter line of the minor road that the specified grade may not be exceeded.

5. Distances for design road approach to intersection with collector road / local road.

6. 4% desirable.

7. Minimum distance back from the gutter line of the major road that the specified grade may not be exceeded.

Table 10.2 (continued) - Alignment Design Criteria

5. Vertical Curve K Values

Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Minimum Crest	15	8	4	2
Minimum Sag	10	7	4	2
Crest / Sag on approach to stop condition	4	3	2	2
K values listed assume that new roadways will be illuminated				

6. Stopping Sight Distances

Criteria		60 km/h	50 km/h	40 km/h	30 km/h
Down grades:	12%	109m	78m	52m	34m
	9%	101m	73m	50m	32m
	6%	94m	69m	48m	31m
	3%	89m	66m	46m	30m
	0%	85m	63m	45m	30m
Up grades:	3%	81m	61m	44m	29m
	6%	78m	59m	42m	29m
	9%	76m	57m	41m	28m
	12%	73m	56m	40m	28m

7. Decision Sight Distance

Minimum decision sight distance for 60 km/h: 175m - 235m.

1. Note that decision sight distance applies only to multi-lane roads at intersections.

2. The range of values recognizes the variation in complexity that occurs at various sites. For less complex situation, values towards the lower end of the range are appropriate and for more complexity, values at the upper end are used.

SCHEDULE 1

ROADS

DESIGN STANDARDS

Schedule 1. ROADS

1.0 ROADS

1.1 General

The *Approving Officer* shall consider the sufficiency and suitability of the proposed *Road* system, the arrangement, width, grade and location of all *Roads* in relation to existing and planned *Roads*, to topographical features, to public convenience and safety, and to the proposed uses of the land to be served by such *Roads*.

The arrangement of *Roads* in a *Subdivision* shall either:

a) provide for the continuation or appropriate projection of existing *Roads* in surrounding areas; or

b) where topographic or other conditions make continuation or projection of existing *Roads* impractical, provide an adequate and suitable roadway system having regard to the uses of the land to be served.

The dimensions, locations and standard of all *Roads* in a proposed *Subdivision* shall conform substantially to the Official Community Plan and the *Road* Network Plan.

Local residential *Roads* shall be aligned so that their use by through traffic will be discouraged.

Developments may require *Frontage Roads*, double *Frontage Lots*, deep *Lots* with rear service *Lane*s, or such other treatment as may be necessary in the public interest for the adequate protection of residential properties and to afford separation of through and local traffic.

The *Approving Officer* may require an independent Traffic Impact Study to determine the requirements or warrants for traffic control at accesses off major roads and deceleration and acceleration turning *lanes* to minimize impacts to safety and disruption to traffic.

The *Consulting Engineer* shall provide a report that includes all pertinent information related to the design, scheduling and *Construction* of the roadway.

1.2 Road Classification

The existing roadway classifications within the *District* are summarized in Tables 1.1 and 1.2, and are described as follows:

- **Arterial Roadway** – An arterial *Road* has the primary function of carrying through traffic from one area to another with as little interference as possible from adjacent land uses. An arterial *Road* may provide direct access to *Lot* as a secondary function when alternate access is not available.

- **Collector Roadway** – A collector *Road* has the primary function of distributing traffic between arterial, other collector and local *Roads* within an area. A collector *Road* may also provide direct access to properties.
- **Local Roadway** – A local *Road* has the primary function of providing direct access to properties. Local *Roads* normally connect to other local *Roads* or to collector *Roads*.

Arterial, collector and local roadway classifications have been further divided into urban and rural classifications within this bylaw. Other *Road* network components include:

- **Lanes** – A *Lane* is a roadway with the primary function of providing land access, typically at the rear of abutting properties. *Lanes* are not intended to carry through traffic. For properties fronting collector or arterial *Roads*, rear *Lanes* can eliminate the need for front driveways.
- **Walkways and Pathways** – Walkways and pathways are paths which follow routes independent from motor vehicle roadways, sidewalks and bike *Lanes*.

The roadway classifications are summarized in Table 1.1.

A map illustrating the *District*'s roadway classification can be found in Schedule C.

1.3 Road Cross-Section Details

The standard roadway cross-sections shall be as shown on the Standard Drawings and detailed in Table 1.1.

Note that the objectives of the standard *Road* cross-sections as detailed in Table 1.1 and the Standard Drawings are the clear and intended goals on all roadways within the *District* of Peachland. It is recognized, however, that ambient conditions may require variance from these standards in existing and substantially Developed areas, where provisions to accommodate the required roadway modifications may not have been anticipated. A variance to these standards may be considered by the *Approving Officer*. Variances may also be considered for unique situations such as access *Roads* or steep hillside *Roads*.

Table 1.1: Roadway Cross-Section Details								
Facility Classification	Right-of-Way (metres)	*Road* Width (metres)	*Lane* Width (metres)	Parking	Shoulder	Curb Type	Sidewalks	Bicycle Facilities
WALKWAYS AND PATHWAYS								
Walkway	3.0	3.0	N/A	N/A	N/A	N/A	N/A	N/A
Multi-Use Pathway	5.0	4.0	N/A	N/A	0.5 m gravel	N/A	N/A	Shared
LANES								
Commercial	6.0	6.0	2 x 3.0	N/A	N/A	N/A	N/A	N/A
LOCAL ROADWAYS								
Urban	18.0	7.0	2 x 3.5	N/A(4)	N/A	Rollover	1.5 m (1) one side	N/A
Rural	18.0	6.0	2 x 3.0	Yes(2)	1.5 m gravel(3)	N/A	N/A	N/A
COLLECTOR ROADWAYS								
Urban	18.0	8.6	2 x 4.3	N/A(4)	N/A	Barrier	1.8 m one side	Shared
Rural	18.0	8.6	2 x 4.3	N/A(4)	1.5 m gravel(3)	N/A	N/A	Shared
ARTERIAL ROADWAYS								
Princeton Avenue	20.0	8.5	1 x 5.20 1 x 4.30	N/A	N/A	Barrier	1.8 m one side Optional two sides	1-1.5m (Uphill) 1-Shared (Downhill)
Beach Avenue	20.0 – 25.0	12.0	2 x 6.0	Shared	N/A	Barrier	1.5m one side 3.0m waterfront walkway	Shared

(1) Except *Cul-de-sacs*

(2) Permitted, requires 1.0m paved shoulder

(3) Optional 1.0m paved with 0.5m gravel shoulder (one side)

(4) May be permitted with addition of 1.4m paved surface each side (site-specific conditions)

Where roadway cuts or fill sections extend beyond the right-of-way widths noted in Table 1.1, the right-of way shall be widened accordingly.

All rock cut, escarpments or retaining structures shall be equipped with protective railings or fencing.

1.4 Road Design Criteria

All *Road* classifications and designations for vertical and horizontal alignment elements shall be designed utilizing the designated design speeds contained in Table 1.2, and in compliance with the most current edition of the *Transportation Association of Canada - Geometric Design Guide for Canadian Roads. Road* design criteria to be referenced from this document include super elevation, centreline radius, maximum grade, vertical curvature and sight distance.

Table 1.2: *Road* Design Criteria

Facility Classification	Design Speed (km/h)
Concrete Walkway	N/A
Multi-Use Pathway	30
Lane	30
Local Roadway	30
Collector Roadway	50
Arterial Roadway(1)	60

(1) Beach Avenue design speed is 30-50 km/h

1.5 Vertical Alignment

The following shall be considered when establishing the vertical alignment of a roadway:

- The vertical alignment of *Roads* shall be set so the grades of the driveway to adjacent properties will conform to the Standard Drawings. Where it is impractical to meet these criteria, the *Approving Officer* may approve the use of private access *Lanes*.
- The draining grade around the outside curb of a *Cul-de-sac* shall be not less than 0.5% and not greater than 5.0%. Longitudinal gradients of *Cul-de-sac* bulbs shall not exceed 10.0%.
- When a *Cul-de-sac* is at the bottom of a hill, the longitudinal gradient of the first 50m of roadway uphill from the *Cul-de-sac* bulb shall not exceed 5.0%. The maximum longitudinal gradient for the rest of the hill shall not exceed 8.0%.
- When a *Cul-de-sac* is at the top of a hill, the longitudinal gradient for the roadway downhill from the *Cul-de-sac* shall not exceed 12.0%.
- All changes in gradient over 1.0% on arterial and collector *Roads* and over 2.0% on all other *Road* classifications shall be connected by vertical curves.
- Standard cross slopes (normal crown) shall be 2.0% on all *Road* classifications unless specified otherwise by the *Approving Officer*. Design *Road* elevations shall give due consideration to floodproofing requirements of adjacent properties. Full *Road*

crossfall (reverse crown) may be considered in special circumstances, as a means of more closely matching *Lot* grade adversity on either side of the roadway.

- The length of a transition from a normal cross-sectioned *Road* to a section of *Road* where there is super-elevation or crossfall shall, in no case, be less than 70 m for a 50 km/h designed *Road*. In selecting the length of the transition, care and consideration shall be given to draining the entire pavement. Typically, if no horizontal spiral curve is used, 60% of the super-elevation is introduced prior to the beginning of the curve, and the balance is developed in the curve.
- Gutter elevations on curb returns and *Cul-de-sacs* shall be shown on the drawings at the beginning, one-quarter points and end of curb returns and at 7.50 m intervals around *Cul-de-sacs*.

1.6 Horizontal Alignment

The following shall be considered when establishing the horizontal alignment of a roadway:

- The horizontal centreline alignment of the *Road* shall be located on the centreline of the right-of-way, unless permitted otherwise by the *Approving Officer*.
- Typical locations of works and utilities in *Roads* are shown on the Standard Drawings.
- Centreline chainage stations shall be fully referenced and dimensioned from *Lot* lines.
- A horizontal curve shall be fully described showing internal angle, radius, tangent length and arc.
- If reversed curves are required in a roadway alignment, the *Approving Officer* may require that they be separated by means of tangents of sufficient length.
- Where angular deflections occur in a roadway alignment, the *Approving Officer* may require that the angle be replaced by a curve of suitable radius.

1.7 Cul-De-Sacs

Cul-de-sac bulbs shall be used to terminate "no exit" *Roads* as detailed in the Standard Drawings. The following shall apply:

- A maximum *Cul-de-sac* length of 150m is allowed, unless a secondary emergency vehicle access is provided at least halfway to the end of the *Cul-de-sac*, in which case the length specification is not prescribed. The right-of-way provided for a secondary emergency access should be a minimum of 6.0m wide, and the maximum grade of a secondary emergency access should not exceed 15%. A pedestrian walkway may be integrated into the access, and non-emergency vehicle access should be restricted through the use of removable bollards or other devices.

- *Cul-de-sac Roads*, designed to be permanent, shall be provided at the closed end with an area designed to permit safe and adequate space for the turning of motor vehicles. The minimum radius of this "bulb" should be 12.5m to the curb face, requiring a minimum right-of-way of 16m radius. Alternative types of street turnarounds may be considered based on site specific conditions. The preferred end treatment is a *Cul-de-sac* bulb.

1.8 Curb Returns

- The minimum radius of curb return at intersections shall be 9.0m for a local *Road* and 12m for a collector or arterial *Road*. Curb returns located on *Roads* within industrial and commercial areas may require a larger radius to facilitate truck traffic and bus traffic, and will be as specified by the *Approving Officer*. The right-of-way geometry at curb returns shall be adjusted so as to provide a curvature parallel to the curb return or, alternatively, provided with 5.0 m corner cut.
- When a new *Road* with curbs intersects an existing *Road* without curbs, only half the curb returns shall be *constructed* unless the *Road* design for the uncurbed *Road* is available and will allow *Construction* of the full curb returns. Full curb returns shall be *constructed* at the intersection of two curbed *Roads*.

1.9 Intersections

- Intersections are to be designed as close to 90° as possible and in all cases located within a range of angles between 70° and 110°.
- The Maximum spacing between tee intersections is 60m.
- The minimum spacing between four-legged intersections on arterial streets is required to provide a minimum 40m of left turn storage (at both intersections), 35m of transition between storage *Lanes* and an allowance for turning movements.

1.10 Sidewalks, Walkways, Multi-Use Pathways, Bicycle Facilities and Wheelchair Ramps

- Concrete sidewalks shall be provided on *Roads* in or adjacent to *Subdivision*s or *Developments* in accordance with Table 1.1 and the Standard Drawings.
- The maximum grade for sidewalks shall not exceed the maximum *Road* grades.
- Concrete walkways shall be provided for access through the *Subdivision* to schools, playgrounds, shopping centres, transit, beaches and other community facilities.
- Fencing for walkways located between *Lots* shall be provided.
- The maximum grade for walkways shall not exceed 15%. Where walkways exceed 15%, alternate walk routes shall be considered by the *Approving Officer*. Only where

other acceptable walk routes are not acceptable, will the installation of concrete stairs be considered.

- Concrete walkways shall conform to the Standard Drawings.
- Multi-use pathways shall conform to the Standard Drawings.
- Wheelchair ramps shall be provided at all intersection curb returns as an integral part of the sidewalk or to link walkways, crosswalks and multi-use pathways. Reference Standard Drawings.
- Bicycle facilities shall be designed as specified in Table 1.1 and Table 1.2 and in accordance with the *Transportation Association of Canada Geometric Design Guide*.

1.11 Curb and Gutter

- Curb and gutters shall be provided as specified in Table 1.1 and the Standard Drawings.

1.12 Driveways / Crossings

.1 Number

.1 The number of crossings to a parcel that is used for residential use only, shall be not more than one for each 24m, plus 6m additional driveway width, of the total *highway frontage* of the parcel.

.2 The number of driveways to a non-residential parcel shall be not more than one for each 30m, plus 9m additional driveway width, of the total *highway frontage* of the parcel.

.3 A second driveway is not permitted through a *lot* line that abuts an arterial *road*. Refer to Table 1.4 Appropriate Vehicular Access for the Zone.

.4 The maximum number of driveways permitted is as set out in Table 1.3 Maximum Number of Driveways Permitted.

Table 1.3 Maximum Number of Driveways Permitted

Residential Parcel frontage length	**Non-Residential** Parcel frontage length	Maximum Number of driveways permitted
3m to under 30m	6m to under 39m	1 driveway
30m to under 54m	39m to under 69m	2 driveways
54m to under 78m	69m to under 99m	3 driveways
Greater than 78m	Greater than 99m	4 driveways

.2 Location

.1 Driveways must be entirely located in front of the subject *lot* frontage.

.2 No two driveways to one parcel shall be closer to each other than 9m at any point.

.3 Where a non-residential parcel adjoins another parcel, no crossing to the non-residential parcel shall be less than 1.5m from the adjoining parcel boundary.

.4 Crossings shall be located no closer than 7.5m at any point to the point of intersection of two *highway* right-of-way boundaries, or if one or more of the *highways* is a *lane*, no closer than within 4.5m of the intersection.

.5 Driveways shall be located a minimum of 1m (horizontal distance) from electrical services, transformer pads, junction boxes, kiosks, utility poles, service manholes or street signs.

.3 Grades

.1 Maximum driveway grades shall be as indicated in Table 1.4 Appropriate Vehicular Access for the *Zone*.

.2 At the discretion of the *Approving Officer*, a Driveway Access Permit may be issued where the proposed driveway access cannot meet the maximum grade requirements. Registration of a Restrictive Covenant in the Land Title Office indemnifying the *District* against any claims that may be brought against the municipality as a result of the steep grade, including the inability of emergency services to access the *Lot* shall be required.

.4 *Construction*

.1 No residential crossing shall be *constructed* narrower than 3m or wider than 6m at any point on public property, except when providing reciprocal access to another property in which case the minimum width shall be 6m.

.2 No commercial crossing shall be *constructed* narrower than 6m or wider than 9m at any point on public property.

.3 Angled crossings to parcels are permitted, provided that the included angle between the crossing and the edge of pavement on the *road* right-of-way is no less than 45°

.4 Loop crossings are permitted, provided that the crossings at each end of the loop meet the requirements in this section 1.12 and that no part of the connecting loop is on public property.

.5 Minimum driveway length on the *Lot*(s) shall be 6m.

.6 Turn around facilities are to be provided for any dead-end access driveways greater than 45m in length.

.7 Except in areas where curbs have been installed, no concrete driveways are permitted on the public property portion of the driveway.

.8 No person shall *construct* a driveway in such a manner that it will reduce the clearance from the finished *road* surface to the underground or overhead utility services. The following vertical clearances must be maintained:

Overhead Utility Service	Clearance
Electrical Cables	4.5m
Communication Cables	4.3m
Underground Utility Service	Clearance
Electrical Cables (Ducts)	.9m
Telephone Cables (Ducts)	.6m
Gas Lines	.9m

.9 All vegetation including trees, shrubs, etc. shall be cleared from the edge of the access for a minimum horizontal distance of 1.5m. Any costs incurred to maintain minimum clearances will be the responsibility of the *Lot* owner.

.5 Culverts

.1 Culverts shall be installed where required by the *District*;

.2 Culverts are to be sized to convey the anticipated 1:10 year storm events, but in no case shall the culvert size be less than 400mm diameter;

.3 Culvert design and condition shall be adequate to provide the load-bearing capacity required for its intended use;

.4 At a minimum, inlets and outlets of culverts shall be protected with sand/cement bags as detailed in Schedule 10 – Standard Drawings – Residential Driveway Access Culvert Inlet and Outlet Construction Detail (SD-HS2).

.6 Drainage

.1 Driveways shall be *constructed* to ensure that no surface water, mud or debris runs off private land onto a public *road* during rainfall events.

.2 Driveways shall be *constructed* to ensure that drainage from the *road* will not enter a private *Lot* via the driveway access.

.3 At the discretion of the *Approving Officer*, access driveway drainage ditches may convey drainage to the municipal *road* ditch.

.7 Gates

.1 Where access to a *lot* is controlled by the use of a gate(s) such gates shall open inwards to satisfy FireSmart guidelines;

.2 All structures associated with gate *construction* shall be subject to subject to Zoning and *Building Bylaw* requirements.

.8 Unique Configurations

Despite the regulations in this section 1.12, unique driveway configurations can be considered and approved at the discretion of the *Approving Officer* or *Building Inspector* in accordance with good engineering practice.

Table 1.4: Appropriate Vehicular Access for the Zone

Zone	Max. Grade First 6m (6)	Max. Grade Next 4m	Max. Grade Driveway – **Local or Collector** *Road* (9)	Max. Grade Driveway – **Arterial** *Road* (7)	Surface (3)	Letdown or Curb Return (4)
Driveway Access < 45m in Length where Urban *Road* Cross-Section Exists (SD-R1, SD-R2, SD-R4 & SD-R6)						
R-1, RC-1, R-2	5%	10%	15%	10%	Hard	Local = Standard Letdown; Collector or Arterial = Curb Return (5)
Driveway Access < 45m in Length where Rural *Road* Cross-Section Exists (SD-R5 & SD-R7 where culvert required)						
R-1, RC-1, R-2	5%	10%	15%	10%	Hard	Local = Standard Letdown; Collector or Arterial = Curb Return (5)
RR-1, RR-2, A-1, A-2	5%	10%	15%	10%	Hard	As above
Driveway Access > 45m in Length						
R-1, RC-1, R-2, RR-1, RR-2, A-1, A-2	5%	10%	15%	10%	Hard	Local = Standard Letdown; Collector or Arterial = Curb Return (5)
Reciprocal Access(1)						
RM-1, RM-2, RM-3, RM-4	5%	10%	N/A	N/A	SD-R8	Curb Returns
C-2, C-3, C-4, C-5, C-9, I-1, P-1, P-2	5%	10%	N/A	N/A	SD-R8	Curb Returns

Notes:

(1) Reciprocal Access Driveways shall service a maximum of three (3) single detached dwellings.
(2) Level of sidewalk service requirements may be reduced by the *Approving Officer* (e.g. from 1 to 0) within a rural *road* cross-section.
(3) Hard = *Hard surfacing*, except in locations where driveway meets unpaved *road*
(4) At the discretion of the *Approving Officer*, access to large parking areas shall be by curb returns rather than by a driveway letdown.
(5) The *Approving Officer* may require deceleration and acceleration *Lanes* for access off major Roads for safety reasons and to minimize disruption to traffic flows.
(6) Measured from edge of pavement or back of curb to *lot* line.
(7) Residential driveway access onto an arterial *road* or collector *road* is not permitted unless alternate access is impractical. Wherever physically possible, alternate local *Road* or *Lane* access shall be dedicated to preclude residential driveways accessing directly onto arterial or collector *road*.
(8) Minimum width of driveways shall be measured at the property line and at the edge of the *road* fronting the *Lot*.
(9) Hillside lot (as defined by Schedule D) driveways still require the registration of a Restrictive Covenant if maximum slopes specified in Table 1.4 cannot be met.

1.13 Transit Facilities

- The requirement for transit facilities shall be established by the *Approving Officer*.
- Transit bays shall be provided where required by the *Approving Officer*, and shall be in accordance with the "Pullouts" section of the *Transportation Association of Canada Geometric Design Guide.*
- Transit signs shall be in accordance with the Manual of Uniform Traffic Control Devices for Canada, Sixth Edition, 2021.

1.14 Regulatory and Information Signs

Road name signs and traffic signs for new or improved *Roads* shall be provided by the *District* of Peachland at the expense of the *Owner*.

1.15 Appurtenances

- All proposed traffic islands, retaining walls, guard-rails, and permanent barricades shall be designed in accordance with good engineering practices.
- For all utility poles and tie-downs which require relocation prior to *Road Construction*, the utility shall confirm the feasibility of their re-location prior to completion of the engineering drawings.
- The top of escarpments, rock cuts and retaining walls *constructed* on or adjacent to proposed roadways shall be equipped with railings or handrails.

1.16 Pavement Structure

a) General Requirements

Pavement structures shall be designed by a qualified *Consulting Engineer* in accordance with a commonly accepted design method (AASHTO, Asphalt Institute, etc.). The pavement shall be designed to provide a 20 year design life.

The parameters used for design shall be based on site specific information which shall include, but is not limited to the following:

1) Existing pavement surface conditions
2) Subsoil conditions
3) Groundwater & drainage conditions
4) Climate
5) Traffic Volumes

b) Field and Laboratory Investigations

A subsurface exploration program shall be completed to a depth of at least 1.2 m below existing and proposed finished roadway surface grades. At least one exploratory borehole and/or test pit shall be made at intervals of no more than 150 m along the proposed horizontal alignment. In-situ testing shall be completed, representative soil samples collected, and laboratory testing carried out as necessary to determine the engineering properties and characteristics of the subgrade materials. The minimum laboratory testing requirements include natural moisture content determinations and grain-size analyses and/or Atterberg limit determinations as appropriate to characterize the site subsoils for design purposes.

Groundwater levels that may influence the roadway performance shall be determined at the time of the investigation and seasonal fluctuations should be estimated.

c) Design Parameters

On the basis of the field and laboratory investigations, a soaked California Bearing Ratio (CBR) value shall be determined or estimated for use in design of the pavement structure. A Resilient Modulus may be approximated from the CBR value using the relationship:

MR (Mpa) = 10.3*CBR

The plasticity of the subgrade soils determined in the laboratory shall be reported (swelling/shrinking potential).

The frost susceptibility of the soils within 850 mm of the finished paved surface shall be considered in the design.

d) Minimum Pavement Design

In the absence of traffic volume data, the *Roads* shall be classified as follows with the associated Equivalent Single Axle Loads (ESAL) for the purposes of pavement structure design:

Table 1.5

Road Classification	Design Traffic (ESAL)
Arterial	$> 2.8 \times 10^5$
Collector	2.8×10^5
Local	2.8×10^4

In the event that the CBR value soaked CBR value is less than 3, the subgrade shall be enhanced to provide a CBR value of 3 to be used for the pavement structure design calculations.

Irrespective of calculated requirements, the following values for pavement structure component thicknesses are considered to be minimum requirements for all roadways where:

1) the subgrade CBR value is greater than or equal to 6 and,
2) the subgrade soils are not frost susceptible within 850 mm of the finished paved surface or groundwater is at least 1.5 m below the proposed subgrade surface:

Table 1.6

Road Classification	Subbase [1] 75 mm (minus) (mm)	Base [2] 19 mm (minus) (mm)	Hot Mix Asphalt Surface Course [3] (mm)
Arterial	400	100	100 (2 lifts)
Collector	400	100	75 (2 lifts)
Local	300	100	50
Lanes	200	100	50
Multi-Use Pathways	150	75	50

[1] *MMCD* Crushed Granular Sub-base
[2] *MMCD* Granular Base
[3] *MMCD* Upper Course #1

Pavement structure designs shall be submitted to the *Approving Officer* in an acceptable report format.

e) *Construction* Recommendations

Recommendations related to roadway *Construction* shall be provided by the *Consulting Engineer*. The recommendations shall address:

1) Subgrade preparation and enhancement
2) Long term drainage
3) *Road* structure materials requirements
4) *Construction* methods and procedures

f) Permit

Where *Works and Services* are required on existing roadways, a *Road Usage Permit* shall be obtained by the *Consulting Engineer* setting out the general conditions for *Construction.*

1.17 Emergency Access Routes

a) Alternate access routes are required where the primary access *Road* to the *Subdivision* or *Development* exceeds 10% and there is no existing alternate access route.

b) Maximum grade is 15%.

c) Right-of-way width to be 6.0m.

d) *Road* paved width to be 6.0m.

e) Restrict non-emergency vehicles access through the use of removable restriction posts.

f) Shared use with pedestrian trails is permitted.

g) Approach angles to emergency access route should be examined to ensure they are compatible with *District* equipment.

1.18 Community Mailboxes

a) The *Developer* shall supply, install and locate the mail delivery equipment to Canada Post specifications and to the satisfaction of the *Approving Officer*. All mail delivery equipment is to be accessible by persons with physical disabilities.

SCHEDULE 2
STORM DRAINAGE

DESIGN STANDARDS

Schedule 2. STORM DRAINAGE

2. STORM DRAINAGE

2.1 General

Drainage systems shall be designed in accordance with the standards and specifications set out in this Schedule, and the provisions of this Bylaw. These standards are not intended to be a substitute for sound engineering knowledge and experience. Drainage designs shall be prepared under the direction of a *Consulting Engineer* with the appropriate experience and knowledge.

These standards are intended to cover only minimum requirements. Drainage designs shall conform to all pertinent *District* Bylaws, regulations, guidelines and policies as well as federal and provincial statutes and guidelines. These include but are not limited to the following:

- Local Government Act
- Fisheries Act
- Water Act
- Navigable Waters Protection Act
- Wildlife Act
- Heritage Act
- Riparian Areas Regulation
- Migratory Birds Convention Act
- Dyking Act
- Species At Risk Act
- Waste Management Act
- Land *Development* Guidelines for the Protection of Aquatic Habitat (Canada/BC)
- Stormwater Planning – A Guidebook for British Columbia (BC/Canada)
- British Columbia Approved Water Quality Guidelines 2006 (BC)*Develop* With Care: Environmental Guidelines for Urban and Rural Land *Development* in BC 2006 (BC) National Guide to Sustainable Municipal Infrastructure (Canada)

2.2 Storm Water Management

Stormwater management involves the planning and design necessary to mitigate the hydrological impacts of land *Development* or land use changes. Adverse hydrological impacts include such things as increased peak stormwater flows, erosion, sedimentation, flooding, reduced surface infiltration, reduced minimum groundwater levels and stream flows, water quality deterioration, and degradation of aquatic and wildlife habitats. Mitigation measures include but are not limited to the following:

- Appropriate sizing and routing of pipes and channels
- Major flow path routing and protection
- Detention storage
- Sediment removal
- Biofiltration
- Landscaping
- Source control
- Erosion protection
- Groundwater infiltration
- Subsurface disposal
- *Lot* grading

2.3 Stormwater Management Plan

A Stormwater Management Plan is required for any *Development* larger than 0.4 ha. The stormwater management plan shall include the following:

- Catchment plan for the subject Site which includes all upstream lands that drain into or through the Site.
- Location, extent, and description of the existing and proposed land uses.
- Details indicating how the Stormwater Management Plan integrates with the *District*'s Stormwater Master Plan.
- Contours at 1.0m elevation intervals (existing and proposed).
- Alignment and limits of existing and proposed *Watercourse*s and wetlands located in, or within 30 meters of, the subject Site, complete with environmental classifications and/or fish presence information, if available.
- Layout of existing and proposed drainage systems.
- Proposed point of stormwater discharge, and method of stormwater discharge, from the Site (e.g. Pipe connection to *District* main(s), open discharge to ditch or natural *Watercourse*).
- Existing and proposed major surface flow paths, including the location of low points on all *Road*s, *Lanes*, or walkways
- Proposed *Lot* grading plan.
- Proposed source control and/or quality treatment facilities, including target level of treatment, if appropriate.
- Locations, sizes and hydraulic grade line (HGL) elevations of proposed conveyance and other management facilities for both minor and major systems.

- Indicate Maximum ponding depths for low points on *Road*s, *lanes* or walkways
- Proposed minimum building elevations (MBE) and its relationship to the major flow path HGL.
- *Construction* erosion and sediment control plan.
- Pre- and post-*Development* peak flow rates for both the minor and major systems
    - Velocities under design peak flow rate conditions for all open channels (ditches, swales, ravines, streams, etc…) both on and off site.
    - Downstream capacity for the system which the subject Site is proposed to discharge to.
- Pre-*Development* flows for all areas draining to and through the subject site.

2.4 Minor and Major Systems

Each drainage system usually consists of the following components:

a) The Minor System

Pipes, gutters, catchbasins, driveway culverts, open channels, *Watercourse*s, and stormwater management facilities designed to carry flows with the specified return frequency.

b) The Major System

Surface flood paths, *Road*ways, *Road*way culverts, swales, *Watercourse*s, and stormwater management facilities designed to carry flows with the specified return frequency.

2.5 Runoff Analysis

Storm drainage systems shall be designed to accommodate the post-*Development* flows using the Rational Method or an approved hydrologic/hydraulic computer model. All calculations pertinent to the design of the drainage system shall 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 may be used to compute the peak runoffs. An approved hydrologic/hydraulic computer model shall be used for analyzing larger catchments and for the design of all storage facilities.

The extent of the tributary drainage areas of the storm drainage system under design shall be based on the natural contours of the land and be subject to the overall drainage plan established by the *District* through any Master Drainage Plan (MDP), Neighbourhood Concept Plan (NCP), or other area servicing plans established for the catchment in which the subject *Lot* is located.

It is the *Consulting Engineer*'s responsibility to confirm the extent of the drainage area with the *Approving Officer* prior to final design.

2.6 Design Frequencies

In general, the design of stormwater management system components is required to accommodate a number of variable storm runoff rates and volumes generated by storms of certain recurrence intervals. The following storm return frequencies shall be used for the design of the drainage and stormwater management system components:

Table 2.1

Drainage System Component	Hydraulic Variables	Hydrologic Design Basis
On-site Minor Disposal System (where proven to be appropriate).	Mean Annual Rainfall (MAR) volume, infiltration rates of native soils, groundwater levels.	On-site disposal features to retain 50% of the Mean Annual Rainfall (MAR)[1] volume.
Minor conveyance system as defined in Section 2.4(a)	Base and peak flow rates, flow depths, flow velocities, and durations.	1:10 year design storm
Storage facility.	Runoff volume, depth, freeboard, peak inflow rate, control discharge rate, time to empty, base flow rates.	Storage capacity to reduce the post-*Development* flow rates with return periods of up to 10 years. Attenuation of Post Development runoff with return periods up to 100 years may be required if inadequate downstream major flow paths exist. Runoff from commercial sites must be attenuated for all events with return periods of up to 100 years.
Major system as defined in Section 2.4(b).	Base and peak flow rates, depths, velocities, and durations.	1:100 year design storm with winter condition antecedent moisture condition. Sufficient freeboard above the maximum hydraulic grade line must be provided to protect buildings. Ponds to have an overflow point at a minimum 0.6m below the closest opening (i.e.

Table 2.1		
Drainage System Component	Hydraulic Variables	Hydrologic Design Basis
		adjacent doors, windows, etc).
Culverts, bridges, and other crossing structures.	Peak flow rates, depth and freeboard, backwater effect, fish passage.	1:100 year design storm and/or with safe overflow to protect *District* infrastructure and private. 1:200 year for natural streams with catchments exceeding 10 sq. km or for structures crossing arterial or collector *Road*s.
Water Quality Treatment Systems	Peak flow, base flow, pollutant load and type	Treatment of flows equivalent to 50% of the Mean Annual Rainfall (MAR) volume.

[1] The Mean Annual Rainfall is defined as the 2 year 24 hr rainfall volume, see section 2.10.4.

2.7 Site and Lot Grading

Developments shall incorporate site and *Lot* grading techniques in accordance with the following criteria:

a) Each *Lot* shall be graded to drain to a *District* drainage system or to a natural drainage path independent of adjacent *Lot*s. Minimum *Lot* grades to be 2%. *Lot* grading is to be uniform and consistent.

b) Areas around buildings (or proposed building sites) shall be graded away from the (proposed) foundations to prevent flooding. Grading within 2m of the structure should have 10% slope or minimum 0.15m drop.

c) *Lot*s lower than adjacent *Road*ways shall be avoided where possible, otherwise an approved stormwater management technique shall be incorporated to direct the runoff to an existing or proposed drainage system. Proper flood proofing is required at the low points of *Road*ways.

d) Existing or proposed buildings shall be sited above the hydraulic grade line of the Major System. The Minimum Building Elevations (MBE) shall be noted on the drawings.

e) *Lot* grading shall not channelize flow for discharge into natural *Watercourse*s. Where *Lot* grading directs runoff to natural drainage courses, measures shall be implemented to distribute rather than concentrate flows.

f) Avoid drainage across adjacent *Lot*s where practical. Side and rear yard swales shall be employed as necessary.

2.8 Minimum Building Elevations (MBE)

The MBE is defined as 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 crawlspace. Crawlspace is defined as the space between a floor and the underlying ground having a maximum height of 1.2m to the underside of the joists and not used for the storage of goods or equipment damageable by floodwater.

The MBE shall be established at least 0.6m above the service connection invert and 0.3m above the 100-year hydraulic grade line elevation. Accepted MBE's may not be revised without the permission of the *Approving Officer*.

For sites near a *Watercourse* for which a floodplain elevation has been established, the MBE is 0.3m above the 200-year return period instantaneous flood elevation.

2.9 Roof Drainage and Building Perimeter Foundation Drainage

Roof drainage shall be:

a) discharged to the ground and dispersed via splash pads at the downspouts, provided that the site is graded away from the building and **not in steep slope areas**, or

b) to an approved sub-surface soak-away system, or

c) To an approved rain storage tank for on-site reuse

If site grading in accordance with Clause 2.7 is not possible, roof drainage may be discharged into the municipal drainage system, at the discretion of the *Approving Officer*, where the size of the proposed or existing drainage has been designed for, or can be shown to accommodate the anticipated flows.

Roof leaders and foundations drains shall not discharge at the top of bank of a natural *Watercourse* or other open channel.

Building perimeter foundation drains shall be discharged into the municipal drainage system where the size of the proposed and existing downstream storm sewer has been designed for, or can be shown to accommodate the anticipated flows.

Under no circumstances shall a building perimeter foundation drain be connected to a sanitary sewer.

2.10 Rational Method

The Rational Method calculates the peak flow using the formula:

Q = RAIN

Where: R = Runoff Coefficient

A = Drainage area in ha.

I = Rainfall intensity in mm/hr.

N = 0.00278

Q = Flow in m^3/s

2.10.1 Runoff Coefficients

Zone designations selected for design purposes shall be based on the highest and best use of the properties in the design catchment area based on the most current version of *District*'s *Zoning Bylaw* and *OCP*. Future land designations, as defined in the *OCP* shall be used if such land use designations will result in a higher runoff coefficient.

The requirements for Single Family shall include *Single Detached Dwellings* with *Secondary Suites* and *Single Detached Dwellings* with *Garden Suites*.

Table 2.2 Runoff Coefficient Table

Land Use or Surface Characteristic	Coefficient	
	1:10 year	1:100 year
Business:		
Commercial	.85	.95
Neighborhood Area	.60	.70
Residential:		
Single Family	.35	.40
Multi-Unit (Detached)	.45	.50
Multi-Unit (Attached)	.55	.65
½ *Lot* or Larger	.25	.30
Apartments	.60	.70
Industrial:		
Light Areas	.65	.75
Heavy Areas	.85	.95
Parks, Cemeteries, and Playgrounds	.20	.25
Schools	.45	.50
Railroad yard Areas	.35	.40
Streets:		
Paved	.90	.95
Gravel	.40	.45
Drives, Walks, & Roofs	.90	.95
Lawns		
50%-75% Grass (Fair Condition)	.20	.25

Table 2.2 Runoff Coefficient Table		
Land Use or Surface Characteristic	Coefficient	
	1:10 year	1:100 year
75% or more Grass (Good Condition)	.15	.20
Undeveloped Surface(1)		
Flat (0-1%)	0.04	0.09
Average (2-6%)	0.09	0.14
Steep (>6%)	0.13	0.18

(1) Undeveloped Surface Definition: Forest and agricultural land, open space

2.10.2 Time of Concentration

The time of concentration is the time required for runoff to flow from the most remote part of the catchment under consideration to the design location (inlet, pipe, channel, outfall, etc…). For both urban and rural areas, the time of concentration consists of the following formula:

$$Tc = Ti + Tt$$

Where: Tc = time of concentration (minutes)
Ti = inlet or overland flow time (minutes)
Tt = travel time in sewers, ditches, channels or *Watercourse*s (minutes)

Inlet or Overland Flow Time (Ti)

i) Minimum inlet times for various *Development* conditions are given to ensure uniformity in runoff computations.

Table 2.3[1]		
Lot Type	Minimum Inlet time (minutes)	
	10 year	100 year
Single Family	15	10
Multi Family	10	5
Commercial/Industrial/Institutional	10	5

[1] The requirements for Single Family shall include *Single Detached Dwellings* with *Secondary Suites* and *Single Detached Dwellings* with *Garden Suites*.

ii) The inlet time in rural areas shall be calculated using the Airport Method:

$$Ti = \frac{3.26(1.1 - C)\, L^{0.5}}{S^{0.33}}$$

Where: Ti = inlet (minutes), minimum time = 15 minutes
C = runoff coefficient
L = travel distance (m), maximum length = 300m
S = slope of travel path (%)

Travel Time (Tt)

The travel time in sewers, ditches, channels or *Watercourse*s shall be estimated using the following formula:

$$Tt = \frac{C_t \, Ln}{12 \, s^{0.5}}$$

C_t	=	Concentration coefficient depending on the type of flow
	=	0.5 for natural *Watercourse*s or ditches
	=	1.4 for overland flow
	=	0.5 for storm sewer flow
L	=	Length of *Watercourse*, conduit or overland flow in meters, along the drainage path from the furthest point in the basin to the outlet.
n	=	Channel friction factor
	=	0.050 Natural channels
	=	0.030 Excavated ditches
	=	0.016 Overland flow on smooth paving
	=	0.400 Overland flow on natural areas
	=	0.013 Concrete pipe
	=	0.011 PVC pipe
s	=	Basin slope in meter/meter

The above equation provides an approximate travel time which shall be corrected with the actual time of flow calculated from the hydraulic properties of the selected pipe/channel. A composite value for Tt shall be calculated in cases where the type of flow along the longest path varies or the slope changes.

2.10.3 Rainfall Intensity

The rainfall intensity for the Rational Method formula shall be determined from the following rainfall Intensity-Duration-Frequency (IDF) equation.

$$I = a \times (T)^b$$

Where: I = rainfall rate in mm/hour
T = time in hours
a, b = constants as specified in Table 2.4

Table 2.4						
	Return Period (Yrs)					
	2	**5**	**10**	**25**	**50**	**100**
Coefficient a	8.9	12.9	15.5	18.9	21.3	23.7
Coefficient b	-0.666	-0.716	-0.735	-0.752	-0.762	-0.769

2.10.4 Mean Annual Rainfall (MAR)

Statistically, the Mean Annual Rainfall (MAR) is defined to be the 24 hour rainfall volume with a return period of 2.33 years. For practical purposes, the 2 year 24 hour rainfall volume is used, and is calculated to be 25.7 mm.

2.10.5 Presentation of Rational Calculations

The *Consulting Engineer* shall be required to tabulate the Rational Method calculations in accordance with Table 2.5 for submission along with the appropriate plans and other relevant information.

2.11 Computer Modeling Method

2.11.1 Selection of Modeling Software

For basins larger than 10 hectares, hydrologic modeling software shall be used for runoff analyses. Hydrologic/Hydraulic software shall also be used for the design of all stormwater detention facilities. The *Approving Officer* shall maintain a list of currently approved software programs, and only these shall be used for design purposes.

2.11.2 Design Storms

Rainfall hyetographs for single-event design storms with durations 15 minutes to 24 hours and various return frequencies are listed in Table 2.6. These hyetographs were developed using Atmospheric Environmental Services (AES) rainfall data and rainfall distribution curves from Penticton (2002). The total rainfall depth for each storm is also listed in Table 2.6.

Drainage and stormwater management facility sizing is sensitive to the duration of the design storm. Shorter duration storms tend to generate low volume, high peak flow runoff, especially from smaller catchments. Longer duration storms tend to generate high volume, low peak flow runoff, especially from larger catchments. The critical design storm for components of a stormwater management system may differ for each primary component in terms of duration, even though the return period is identical. Therefore, the Design must identify the critical storm used to size each primary drainage and stormwater management component, the critical storm being the storm with the duration

which requires the largest component size necessary to meet the design objectives and servicing standards specified in this document.

The total rainfall depth for each storm is also listed in Table 2.6.

Table 2.5 Storm Sewer Design – Rational Method																	
Project Location:													**Date:**				
Reference No.:													**Calculated By:**				
Storm Return Period:													**Sheet:** _____ of ____				
			Tributary Area				**Rainfall Intensity (mm/hr)**	**Storm Q (m^3/s)**	**Storm Sewer Design**								
Location	**From MH**	**To MH**	**R**	**A**	**Sum A**	**Sum RA**			**L**	**S**	**Diam.**	**n**	**Velocity**	**Q cap**	**Tc**	**HGL**
				(ha.)	**(ha.)**				**(m)**	**(%)**	**(mm)**		**(m/s)**	**(m^3/s)**	**(min)**	**(m)**

Table 2.6 – 1:2 Year Rainfall

15 Minute Storm

Return Period	Rainfall (mm) for Indicated Time Period (min)												
	Total	5	10	15	20	25	30	35	40	45	50	55	60
2	5.6	4.0	1.3	0.3									
10	10.7	7.7	2.5	0.5									
100	17.2	12.4	4.0	0.8									

30 Minute Storm

Return Period	Rainfall (mm) for Indicated Time Period (min)												
	Total	5	10	15	20	25	30	35	40	45	50	55	60
2	7.1	1.4	3.8	1.3	0.4	0.2	0.1						
10	12.9	2.5	6.9	2.3	0.7	0.4	0.2						
100	20.2	3.9	10.7	3.6	1.1	0.6	0.3						

1 Hour Storm

Return Period	Rainfall (mm) for Indicated Time Period (min)												
	Total	5	10	15	20	25	30	35	40	45	50	55	60
2	8.9	0.4	0.4	0.8	1.3	2.7	0.5	0.2	0.5	1.0	0.6	0.4	0.2
10	15.5	0.7	0.7	1.3	2.2	4.7	0.9	0.4	0.8	1.8	1.0	0.7	0.4
100	23.7	1.0	1.0	2.0	3.3	7.3	1.4	0.6	1.2	2.7	1.5	1.1	0.6

2 Hour Storm

Return Period	Rainfall (mm) for Indicated Time Period (min)												
	Total	10	20	30	40	50	60	70	80	90	100	110	120
2	11.2	0.5	0.5	1.0	1.6	3.4	0.6	0.3	0.6	1.3	0.7	0.5	0.3
10	18.6	0.8	0.8	1.6	2.6	5.7	1.1	0.5	1.0	2.1	1.2	0.8	0.5
100	27.8	1.2	1.2	2.4	3.9	8.5	1.6	0.7	1.4	3.2	1.7	1.3	0.7

3 Hour Storm

Return Period	Rainfall (mm) for Indicated Time Period (min)												
	Total	15	30	45	60	75	90	105	120	135	150	165	180
2	12.8	0.5	0.5	1.1	1.8	3.9	0.7	0.3	0.7	1.5	0.8	0.6	0.3
10	20.7	0.9	0.9	1.8	2.9	6.3	1.2	0.5	1.1	2.4	1.3	0.9	0.5
100	30.5	1.3	1.3	2.6	4.3	9.3	1.7	0.8	1.6	3.5	1.9	1.4	0.8

6 Hour Storm

Return Period	Rainfall (mm) for Indicated Time Period (hrs)												
	Total	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
2	16.2	0.7	0.7	1.4	2.3	5.0	0.9	0.4	0.8	1.9	1.0	0.7	0.4
10	24.9	1.0	1.0	2.1	3.5	7.6	1.4	0.6	1.3	2.9	1.5	1.1	0.6
100	35.9	1.5	1.5	3.1	5.1	11.0	2.0	0.9	1.9	4.1	2.2	1.6	0.9

Table 2.6 – 1:2 Year Rainfall Hyetographs – Continued*

12 Hour Storm

Return Period	Rainfall (mm) for Indicated Time Period (hrs)												
	Total	1	2	3	4	5	6	7	8	9	10	11	12
2	**20.4**	1.6	1.8	2.0	2.0	2.0	2.2	2.2	2.2	1.6	1.4	0.6	0.4
10	**29.9**	2.4	2.7	3.0	3.0	3.0	3.3	3.3	3.3	2.4	2.1	0.9	0.6
100	**42.1**	3.4	3.8	4.2	4.2	4.2	4.6	4.6	4.6	3.4	2.9	1.3	0.8

24 Hour Storm

Return Period	Rainfall (mm) for Indicated Time Period (hrs)												
	Total	2	4	6	8	10	12	14	16	18	20	22	24
2	**25.7**	2.1	2.3	2.6	2.6	2.6	2.8	2.8	2.8	2.1	1.8	0.8	0.5
10	**36.0**	2.9	3.2	3.6	3.6	3.6	4.0	4.0	4.0	2.9	2.5	1.1	0.7
100	**49.4**	4.0	4.4	4.9	4.9	4.9	5.4	5.4	5.4	4.0	3.5	1.5	1.0

*These hyetographs were developed using Atmospheric Environmental Services (AES) rainfall data and rainfall distribution curves from Penticton (2002).

The tabulated data are suitable for most hydrological studies. However, the simulation of large watersheds or complex drainage systems may require extended duration storms or continuous rainfall data. It is incumbent on the *Consulting Engineer* to obtain the appropriate rainfall data for the analysis.

2.11.3 Catchment Data

Data preparation for planning areas or proposed *Development* shall be based on the best available information as per the *OCP*, any Neighbourhood Concept Plan (NCP), Master Stormwater Plan, *Subdivision* proposals and other pertinent land use information.

In most cases, the *Consulting Engineer* shall determine both pre-*Development* and post-*Development* flows using the default methods of selected software, except when that is the Soils Conservation Service (SCS) curve number (CN) approach. The SCS CN method shall not be used. If sufficient information is known about the infiltration characteristics of the soils, either the Horton's or Green Ampt methods may be applied. Whichever method is selected, the parameters shall be reflective of the type of soils, ground cover and typical antecedent moisture condition (AMC).

Where information is not specifically available through applicable documents, future impervious fractions for common land uses, as shown in Table 2.7 shall be used for analysis. These are intended as a guide only. In areas of existing *Development* or where more detailed information is available, the *Consulting Engineer* shall verify that the values shown are representative of the true conditions.

Table 2.7 Common Impervious Fractions	
Common Land Use	**Total Impervious Fraction**
Wood *Lot*	0.00
Agricultural	0.10
Sub-Urban Residential	0.35
Single Family Residential (700 m²/*Lot*)	0.45
Low Density Multi-Family Residential	0.65
Apartment	0.75
Commercial	0.90
Industrial	0.90
Institutional	0.80

2.11.4 Storm Events

In order to determine the critical storm event for designing drainage works, analysis shall be conducted using design storms with the appropriate return period and a range of durations, preferably all durations included in Table 2.6. Developing design flows for both existing and proposed *Development* conditions may be required. The following guide shall be used to assess the level of effort. However, the specific requirements shall be confirmed with the *Approving Officer*.

Table 2.8		
Infrastructure Component	**Storm Return Period**	**Storm Duration Range**
Minor conveyance system	1:10 year	0.5 to 24 hours to determine design peak flow rate.
Major conveyance system	1:100 year	0.5 to 24 hours to determine design peak flow rate.
On-site Retention (Infiltration) Systems	1:2 year	24 hours (MAR) to determine on-site retention volume.
Detention Storage Facilities	1:10 year 1:100 year (if necessary)	0.5 to 24 hours to determine maximum storage volume and peak overflow rate.

The storm duration which generates the critical peak runoff rate is not necessarily the event which results in the largest storage volume requirement for

peak flow attenuation. The *Consulting Engineer* is required to review all design storm events and select the critical design values for each component of the drainage system.

2.11.5 Presentation of Modeling Results

To document the design rational used to *Develop* the hydrologic model and to standardize the presentation of model results, the design reports shall include an appropriate section which shall indicate the following:

- Type and version of modeling software used.
- Summary of all parameters and specific simulation assumptions used.
- Design storms used, to be clearly documented (return periods, duration, and depth)
- A summary of peak flows for each system component
- Inflow and outflow hydrographs for storage facilities.
- Predicted hydraulic grade lines throughout the drainage system under conditions governing the design.
- Volumetric runoff coefficient (runoff volume divided by rainfall volume) and unit peak flow (peak flow divided by area) summarized for each catchment.

The report documentation shall include:

- A plan showing sub-catchment areas, watershed boundary (including upstream catchments) and the drainage system.
- A plan identifying the specific land uses modeled for each *Development* condition analyzed.
- For detention ponds, stage-area and storage-discharge curves and the layout (including sizing) of pond control devices.
- The functional layout and sizing of any flow control/diversion structure and the tabular/graphical plots of inflow and outflow hydrographs.
- Tables summarizing the above-described performance related parameters.
- Appropriate identification tables for cross-reference between plans and tables.

2.12 Minor System Design

2.12.1 Level of Service

The minor drainage system consists of pipes and appurtenances sized to convey peak runoff by gravity (non-surcharged) flow conditions for storms having the return period specified in Section 2.6.

2.12.2 Pipe and Channel Capacity

Apply the Manning Formula under free flow (non-surcharged) condition. The Manning formula is:

$$Q = \frac{A\, R^{0.667}\, S^{0.5}}{n}$$

Where: Q = flow capacity (m/s)
A = cross sectional area (m²)
R = hydraulic radius (m)
S = slope of hydraulic grade line (m/m)
n = roughness coefficient
0.011 for PVC pipe
0.013 for concrete pipe
0.024 for corrugated metal pipe (CMP or CSP)

Indicate hydraulic grade line for both the 10-year and 100-year return period on the *Design Drawings*, along with the peak design flow rate and pipe capacity for each reach.

2.12.3 Flow Velocities

Minimum design velocity for pipes flowing full or half full: 0.6 m/s.

Where steep grades result in velocities exceeding 6 m/s, consider measures to prevent pipe erosion and movement.

Provide riprap bank protection and, if necessary, energy dissipation facilities where discharges are approved into a *Watercourse*. Avoid discharge perpendicular to stream flow.

2.12.4 Minimum Grades

Minimum grades of storm mains are required to obtain the minimum velocity of 0.6 m/s except for catchbasin leads and service connections, for which minimum grades are as indicated elsewhere in this schedule.

2.12.5 Minimum Pipe Diameter

- Storm Mains 250mm
- Culverts:
  - Crossing *Roads* 600mm
  - Crossing Driveways 400mm
- Catchbasin Leads 200mm for single catchbasin
  250mm for double catchbasin

- Service Connections:
  - Residential 100mm
  - Commercial/Industrial 150mm

Downstream pipe sizes are not to be reduced unless the proposed downstream pipe is 600mm diameter or larger and increased grade provides adequate capacity. Detailed hydraulic analysis is required. The maximum reduction is two pipe sizes.

2.12.6 Alignment

Except as noted in 2.12.7, horizontal and vertical alignments are to be straight lines between manholes.

2.12.7 Curved Sewers

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

- Minimum radius – 65m.
- 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 at ¼ points and midpoint.
- Constant offset from *Lot* line or *Road* centerline.

Where permitted by the *Approving Officer*, mains larger than 600mm diameter may include deflections formed by mitered bends, with minimum 1.25m straight sections and maximum 45° miters.

2.12.8 Manholes

a) Locations:

Manholes are required at:

- Every change in grade, except as permitted for curved mains.
- Every change in direction, except as permitted for curved mains.
- Every change in pipe size.
- The downstream end of curved mains and mitered bends.
- Every pipe intersection except for 100mm and 150mm service connections and junctions with trunk mains 900mm and larger.

- 150m maximum spacing for mains smaller than 900mmØ.
- 250m spacing for pipes 900mmØ and larger.
- Every future pipe intersection.
- The upstream end of every storm main.

Catchbasins leads shall discharge into a manhole and not directly into the main wherever possible.

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

- Future extension of the main is proposed or anticipated.
- The length of main to the downstream manhole does not exceed 45.0m.
- The depth of the main does not exceed 2.0m at the terminal point.
- Clean-outs are not to be considered a permanent structure.

Manhole rim elevations outside of paved *Road*ways shall be designed to be above the surrounding ground so that infiltration from ponding will not occur.

b) Hydraulic Details:

- Crown elevations of inlet mains shall not be lower than the crown elevation of outlet mains.
- Minimum drop in invert elevations across manholes:
  - Straight run: 5mm drop
  - Deflections up to 45 degrees: 25mm drop
  - Deflections 45 to 90 degrees: 50mm drop
- Drop manhole and ramp structures shall generally be avoided by steepening inlet mains. Where necessary, provide drop structures as follows:

Invert Difference	**Structure**
- Up to 0.45	Inside Ramp
- 0.45 to 0.90m	Outside Ramp
- Greater than 0.90m	Inside Drop*

* Outside drop may be used if specifically permitted by the *Approving Officer*.

- Hydraulic losses shall be calculated for manholes with significant change of grade or alignment. For high velocity flows or large mains (>600mmØ), detailed analysis is required.

For low velocities and smaller mains, use the following formula:

$$H_L = k \frac{V^2}{2g}$$

Where: H_L = head loss (m)
V = outlet flow velocity (m/s)
g = gravitational acceleration (9.81 m/s^2)
k = head loss coefficient (1.0 for channeled 90° bends and tees, to 1.5 without channelized benching)

2.12.9 Depth and Cover

- Depth shall be defined as the distance from the finished ground surface to the top of the main.
- Mains shall be of sufficient depth to:
  - Permit gravity sewer service to the basements of properties adjacent to the *Road*way of sewer right-of-way.
  - Prevent freezing.
  - Meet the minimum depth of cover requirements of 1.5m.
  - Clear other underground utilities.
  - Prevent damage from surface loading.
  - Allow for future extension of the minor system to service upstream tributary lands at ultimate *Development*, as defined by the *Approving Officer*.
- Maximum cover depth: 4.5m, except under special circumstances and with permission of the *Approving Officer*.

2.12.10 Rights-of-Way (R.O.W.)

Right-of-way locations shall be selected to avoid environmentally sensitive areas such as *Watercourse*s, wetlands and wildlife migration corridors and forested areas.

Rear yard mains are discouraged and shall only be permitted with the approval of the *Approving Officer*.

Where location of a municipal utility in a statutory right-of-way is permitted by the *Approving Officer*, 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 main [4.5m minimum width].

- Two Services within the Same Trench:

  R.O.W. width = Twice the depth from surface to the crown of the deeper main [5.5m 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 [6m minimum width].

- Where the service is within a *Road* allowance, and the distance from the *Lot* 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 *Lot*.

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, trunk and interceptor mains should have rights-of-way wide enough for future widening and/or twinning. The width of the right-of-way should be the required separation between pipe centerlines plus 2 times the depth of the crown of the deeper main.

The *Consulting Engineer* 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 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. Maximum allowable grade of the maintenance access is 15%.

2.12.11 Utility Separation

Requirements for separation of storm mains from watermains are as follows, unless otherwise indicated by the local public health authority:

a) Horizontal Separation:

At least 3.0m horizontal separation shall be maintained between a watermain and a storm main.

In special circumstances, specifically in rock or where the soils are determined to be impermeable, lesser separation than 3.0m may be permitted provided that:

- The storm main and water main are installed in separate trenches and the water main invert is at least 0.5m above the crown of the storm main and the joints are wrapped with heat shrink plastic or packed with compound and wrapped with petrolatum tape in accordance with the latest version of AWWA Standards C217, and C214 or C209; or,
- The pipes are installed in the same trench with the water main located at one side on a bench of undisturbed soil at least 0.5m above the crown of the storm main and the joints of the water main are wrapped with heat shrink plastic or packed with compound and wrapped with petrolatum tape in accordance with the latest version of the AWWA Standards C217, and C214 or C209.

b) Vertical Separation

Where a storm main crosses a water main, the main should be below the water main with a minimum clearance of 0.45m and the joints of the water main, over a length extending 3.0m either side of the storm main, are to be wrapped with heat shrink plastic or packed with compound 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 public health considerations, the following details may be used:

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

c) Storm mains in Common Trench

Sanitary and storm 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 mains shall be no less than 1.0m and the horizontal clearance between manholes should be no less than 0.3m.

2.12.12 Service Connections

Every *Lot* shall be provided with a separate service connection; except that a strata plan with more than three *Lots* shall be provided with a single connection.

Unless otherwise permitted by the *Approving Officer*, connections are to serve the perimeter (foundation) drains of all buildings by gravity. The Minimum Building Elevation (MBE) shall be a minimum 0.6m above the 100 year hydraulic grade line by gravity. Building elevations should be established accordingly. At the discretion of the *Approving Officer*, a private pump and backflow prevention device may be requested by the *Lot Owner*, or required by *District* of Peachland, where the predicted major flow hydraulic grade line in the municipal system is higher than the foundation level. All pumping and backflow prevention devices shall be located on private *Lot* and remain solely the responsibility of the *Lot Owner*. A covenant shall be registered on the *Lot* for such pumped systems.

Every *Lot* shall be provided with a separate service connection; except that a strata plan with more than three *Lots* shall be provided with a single connection. Service connections shall not be extended at an angle that exceeds 45° from perpendicular to the main, and in no case shall a service connection be placed so that it extends in front of any *Lot* other than the one being serviced.

Each *Lot* is permitted only one service connection. In special circumstances, where servicing of all buildings on existing Industrial or Commercial properties is not feasible, two services may be allowed if permitted by the *Approving Officer*.

Connections to new mains shall be made using standard wye fittings. Connections to existing mains shall use wye saddles or, where permitted by the *Approving Officer*, inserta-tees may be used. All services shall enter the main at a point just below the springline.

The standard size for single family residential service connections shall be 100mm, for which the minimum grade from the main to the *Lot* line shall be 2.0%.

The minimum depth of a service at the *Lot* line shall be 1.5m provided that gravity service to the Minimum Building Elevation is available.

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

A *Secondary Suite* and a *Garden Suite* shall be connected to the same Storm Drainage service connection that services the principal *Single Detached Dwelling*.

2.12.13 Catchbasin Spacing

Catchbasins are required at regular intervals along *Road*ways, at intersections and at low points.

Catchbasin spacing is to provide sufficient inlet capacity to collect the entire minor flow or major flow, if required, into the piped system.

The capacity of a single catchbasin (in sump conditions) can be calculated using the orifice formula:

$$Q = kCA\sqrt{2gh}$$

Where: Q = inlet capacity (m^3/s)

k = clogging factor (0.6)
C = orifice coefficient (0.8)
A = open area (0.68m² for Dobney B-23 grate)
g = gravitational acceleration ($9.81 m/s^2$)
h = depth of ponding (m)

Space catchbasins to drain maximum paved areas of:

- 500m² on *Road*s with grades up to 4%.
- 400m² on *Road*s with grades greater than 4%.

Other spacing requirements and considerations:

- Prevent overflows to driveways, boulevards, sidewalks and private *Lot*.
- Avoid interference with crosswalks.
- Avoid low points in curb returns at intersections.
- Catchbasin leads to discharge into manholes.

Minimum grade of catchbasin leads: 2.0%.

Lawn basins are required on boulevards and private properties where necessary to prevent ponding or flooding of sidewalks, boulevards, driveways, buildings, and yards.

Double catchbasins shall be connected directly together with a minimum 250mm PVC lead with one lead extending to the manhole. Maximum lead length shall be 30m.

Double catchbasins shall be provided at all low points.

2.12.14 Pipe Joints

Use watertight joints except where storm mains are part of a subsurface disposal system.

2.12.15 Groundwater Infiltration

In low areas where groundwater concentration may cause surface ponding, reduced soil stability, or submergence of other utilities, provide screened and filtered manhole inlets or perforated sections of storm main.

2.12.16 Ditch Inlets

Ditch inlets to storm main shall include safety grillage for large pipes (>400mm), debris screens and sedimentation basins.

2.13 Major System Design

2.13.1 Surface Flow Routing

All surface flows shall have specially designed routes that are preserved and protected by right-of-ways and are accessible for maintenance. Design criteria include:

- HGL is to be at least 600mm below the MBE of adjacent buildings.
- Maximum flow depth on *Road*ways: 150mm.
- One *lane*, or a 3.5m width at the crown of each *Road*, is to be free from flooding.
- Where a *Road* is used as a major flow path, the *Road* grades are to be designed to accommodate the flow at intersections and driveways.
- Flooding is not permitted on private *Lot* except in flow channels in municipal rights-of-way.
- Overflow routes are required at all sags and low points in *Road*s and other surface flow routes.
- Major flood routes are required at down-slope *Cul-de-sac*s.

2.13.2 Surface Flow Capacity

Flow capacity of *Road* surfaces and swales shall be calculated using the Manning formula, which is presented in Section 2.12.2. Typical values of the Manning Roughness Coefficient "n" are:

- 0.018 for paved *Road*way.
- 0.030 for grassed boulevards and swales.

- 0.040 to 0.10 for irregular or treed channels.

Design detail is to include consideration of flow velocities and the potential requirement for erosion control measures. Maximum allowable velocities for various soil types are listed in Table 2.9

Table 2.9
Maximum Recommended Velocities In Earth And Grass Lined Channels

Earth – Soil Type	**Permissible Velocities M/Sec**		
Fine Sand (noncolloidal)	0.5		
Sandy Loam (noncolloidal)	0.5		
Silt Loam (noncolloidal)	0.6		
Ordinary Firm Loam	0.9		
Fine Gravel	1.2		
Stiff Clay (very Colloidal)	1.4		
Graded Loam to Cobbles (noncolloidal)	1.4		
Graded, Silt to Cobbles (colloidal)	1.7		
Alluvial Silts (noncolloidal)	0.9		
Alluvial Sites (colloidal)	1.4		
Coarse Gravel (noncolloidal)	1.8		
Cobbles and Shingles	1.7		
Shales and Hard Pans	1.8		
Grass Lined	**<0.5%**	**5 – 10%**	**>10%**
Erosion Resident Soils	1.2	0.9	0.7
Highly Erodible Soils	0.9	0.7	0.5

2.13.3 Piped System

Where permitted by the *Approving Officer*, the minor drainage system may be enlarged or supplemented to accommodate major flows. System details shall be indicated in the Storm Water Management Plan. Design considerations include:

- Provision of adequate inlets to accommodate major flows, especially for debris-laden water.
- The requirement for surface overflow routes at potential surface ponding locations.
- Design in accordance with minor drainage system guidelines.
- Adequate capacity of the existing downstream storm main.

2.13.4 Culverts

Culverts located in *Watercourse*s or culverts crossing *Road*s shall be designed for the 1:100-year event (see Table 2.1 for conditions which require a 200-year design flow). Driveway culverts that form part of the minor system shall have capacity for the runoff from the 1:10 year storm. All culverts shall be sized with the design headwater not to exceed the top of the culvert. The *Consulting Engineer* shall determine whether the culvert will operate under the inlet or outlet control at design conditions.

The minimum depth of cover for culvert shall be 0.3m, subject to the correct pipe loading criteria.

The maximum length of a driveway culvert is 6.0m, unless otherwise permitted by the *Approving Officer*.

Inlet and outlet structures are required for all culverts, in accordance with Section 2.13.5) – Inlet and Outlet Structures.

2.13.5 Inlet and Outlet Structures

Provide inlet and outlet structures for all culverts larger than 400mm. Pipes larger than 1,200mm diameter and non-circular culverts require specially designed inlet and outlet structures.

Outlets having discharge velocities in *Excess* of 1m/s require rip rap protection and/or energy dissipating structures for erosion control.

Hinged trash racks shall be required at the inlets of all pipes that are 450mm and larger. Grills may also be required at the inlets on smaller diameter storm sewers, at the discretion of the *Approving Officer*.

2.13.6 Ditches

Ditches shall only be provided if in accordance with the applicable *Road* classification and design standards. They may also be considered by the *Approving Officer* for special interim uses.

Ditches adjacent to *Road*s shall conform to the following criteria:

- Maximum depth 1.0m
- Minimum bottom width 0.5m
- Maximum side slope 1.5(H):1(V)
- Minimum grade 0.5%
- Minimum freeboard 0.3m
- Maximum velocity (Unlined ditch) See Table 2.9

Where soil conditions are suitable or where erosion protection is provided, higher velocities may be permitted. If grades are excessive, erosion control structures or ditch enclosures may be required.

The minimum right-of-way width for a ditch through private *Lot* shall be 5m or the width of the ditch plus 3m, whichever is greater. The ditch shall be offset in the right-of-way to permit a 3m wide access for maintenance vehicles. Additional right-of-way may be required to facilitate the ditch *Construction* and access. The top of the ditch shall be a minimum 0.5m away from any *Lot* line.

2.14 Runoff Controls

2.14.1 Stormwater Storage Facilities

The application of infiltration features to retain frequent rainfall volumes on-site is encouraged. The application of such features shall be supported by a geotechnical evaluation which supports the long-term viability of stormwater disposal on-site (See Section 2.14.8 – Groundwater Recharge). Target design parameters are listed in Section 2.6 – Design Frequencies.

Peak flow attenuation shall be provided where post-*Development* stormwater runoff rates exceed the existing or pre-*Development* runoff rates, and the following conditions exist:

- The proposed *Development* site contributes directly or indirectly to a natural *Watercourse* or open channel that has a risk of increased erosion.
- The need for a storage facility has been identified in historical documents governing drainage for that catchment.
- The existing stormwater infrastructure downstream of the site does not have adequate capacity to accept additional flow and still meets the criteria herein. In this case, the *Approving Officer* will consider upgrading of the downstream deficiencies, at the *Owner*'s cost, as an alternative to storage.

Stormwater detention shall be provided in accordance with the criteria herein:

a) Capacity Requirements

The storage capacity requirement is determined by evaluating the performance under a number of storm events as listed in Table 2.10. Sufficient live storage capacity shall be provided as follows:

- For the purpose of minor system performance and flood control, the storage facility shall be sized to limit the 1:10 year post *Development*

flow to the 1:10 year pre-*Development* level with the outlet to have a graduated control structure based on a range of pre-*Development* flow rates (1, 2, 5, and 10 years).

- Storm events exceeding the 1:10 year level are generally considered an overflow condition and part of the major system. The facility shall be designed to permit the controlled overflow release of flows up to the peak 1:100 year level to an approved major flow path. If a sufficient major flow path does not exist, or if the proposed release rate will increase the risk of downstream impacts, then storage will be required to ensure that the post-*Development* 1:100 year flows do not exceed the 1:100 year pre-*Development* levels.
- In commercial areas, storage will be required to ensure that the post-*Development* 1:100 year flows do not exceed the 1:10 year pre-*Development* levels.

The performance of the storage facility shall be evaluated under the selection of storm events listed in Table 2.10. The facility shall be sized and designed for the criteria which result in the largest storage volume required. Storage facilities shall be designed and evaluated using approved modelling software as discussed in Section 2.11. This criteria is applicable to all service areas 0.4 hectares or greater.

b) Small *Lot* Criteria

For service areas smaller than 0.4 hectares, the *Approving Officer* may waive the requirement for a detailed analysis of the storage facility, provided that on-site storage is provided in accordance with the criteria listed in Table 2.10.

Table 2.10[2]
Small *Lot* Stormwater Detention Requirements

Land Use	Storage Rate	Maximum Allowable Release Rate (1:10 year)
Single Family Residential	200 m³/ha.	0.005 m³/s/ha.
Townhouse/Apartment	250 m³/ha.	0.005 m³/s/ha.
Commercial/Industrial	300 m³/ha.	0.005 m³/s/ha.

[2] The requirements for Single Family Residential shall include *Single Detached Dwellings* with *Secondary Suites* and *Single Detached Dwellings* with *Garden Suites*.

1:100 year flows and volumes are to be determined by the *Consulting Engineer* as required to suit downstream constraints.

c) Storage Alternatives

Further to 2.14.1, storage facilities shall be considered private systems and are to be located on private *Lot* with a registered protective covenant. Costs and long-term operation and maintenance are the responsibility of the *Lot Owner*. These private systems shall not service more than a single *Lot*.

At the discretion of the *Approving Officer*, the *District* may agree to assume responsibility for the long-term operation and maintenance of facilities that service multiple properties. In that case, the proposed facility and all connecting services shall be contained within a municipal right-of-way and must be accessible by vehicle from a *Road* right-of-way.

The proposed stormwater detention alternatives shall be reviewed on a site-specific basis. The *Consulting Engineer* shall consider storage methods listed in this section, and other methods of merit which the *Consulting Engineer* may determine appropriate. The number and location of the facilities shall consider the ultimate land use and servicing plan for the watershed. The proposed concept for all storage facilities shall be approved by the *Approving Officer* prior to detailed design. Typical control facilities include:

- Dry detention ponds, rain gardens, and swales
- Underground storage vessels
- Parking *Lot* surface detention

The *Consulting Engineer* shall consider the site and downstream conditions to determine the most suitable type of storage facility. All proposals shall address safety, long-term performance and maintenance issues.

d) Geotechnical Considerations

On steep slopes, where stormwater detention or recharge is proposed, where discharge to a natural *Watercourse* or open channel is proposed, or as required by the *Approving Officer*, a geotechnical investigation shall be completed in order to address issues such as groundwater table, soil permeability, composition and stability. Such investigations shall be undertaken prior to the preparation of the final design of the facilities.

e) Control Structures

A graduated spectrum of release rates from detention facilities shall be required using a control structure. Control structure design shall be subject to approval by the *Approving Officer*.

The outlet control for storage facilities shall be designed using standard orifice or weir equations:

Orifice Equation: $Q = C\ A\ (2\ g\ h)^{0.5}$

Where Q = release rate (m^2/s)
C = coefficient (0.62 for sharp or square edge)
A = area of orifice (m^2)
g = gravitational acceleration (9.81 m/s^2)
h = net head on orifice (m)

Weir Equation: $Q = C\ L\ H^{1.5}$

Where Q = release rate (m^3/s)
C = weir coefficient (from published references)
L = effective length of weir crest (m)
H = net head on weir crest (m)

Storage facility shall include provisions for discharge rates greater than the design release rate. Rapid draw down of the facility may be necessary for emergency purposes or to restore the available storage to accommodate subsequent storm events.

Provisions to accommodate higher discharges shall involve over-sizing the fixed openings and sewers connected to control structure. Adjustable mechanism such as slide gates or removable orifice plates can be used to regulate the design release rates. The extent of the over-sizing will depend on the capacity of the downstream drainage system.

Design of inlet/outlet structures shall consider flow energy dissipation and erosion control. Safety gates are required over all inlet/outlet openings larger than 450mm in diameter. Locks for access hatches are required to prevent unauthorized entrance to the structure.

f) Provision for Water Level Measurement

A manhole accessible by maintenance vehicles shall be provided and shall be hydraulically linked to the storage facility. The invert of the manhole shall be set equivalent to the invert of the facility to allow quick and accurate measurement of the storage depth at any given time. The access for measuring depth may nor may not be the same facility as the control structure.

g) Emergency Overflow

Whether the facility is sized to control the 1:100 year event or not, an emergency overflow spillway with the capacity for the peak 1:100 year flow rate

shall be provided for all storage facilities. The spillway surface shall be finished with erosion resistant material such as concrete, asphalt, paving stone, or an approved equivalent. The design of the spillway and/or overflow shall consider the possibility of blockages in the outlet structure. The overflow shall provide safe discharge to an accepted major flow path.

h) Operation and Maintenance Requirements

A minimum 4 meter-wide all-weather vehicle access shall be *Constructed* from a public *Road* right-of-way to the control structure and other works requiring maintenance. The maximum grade on the access shall be 15%. The surface shall be finished with an erosion resistance material such as concrete, asphalt, paving stone, or approved equivalent. A maintenance access of the same type shall also be provided to a sediment sump or forebay at the inlet end of an open pond.

For facilities servicing multiple *Lot*s, and where the *District* agrees to assume responsibility for operation and maintenance of the facility, six copies of the operation and maintenance manual shall be provided when the facility is completed and prior to ownership to the *District*. The manual shall include:

- *Record Drawings* of the *Constructed* facility.
- Brief description of the facility operation including design flows, design depths, and schematic diagrams of the inlet and outlet structures, connections, controls, valves, bypasses, overflows, etc.
- List of manufacturer's operation, service and repair instructions and parts lists (where applicable).
- Stage-storage-discharge relationship of all controls.
- General maintenance requirements and emergency procedures.

i) Public Safety and Signage

All above ground storage facilities shall be designed to maximize public safety. Interior side slopes shall be 5:1 within the limits of the live storage volume. Side slopes above the live storage *Zone* may be a maximum of 3:1. The design of storage facilities shall include adequate provisions for installation of standard signage to warn of anticipated water level fluctuations, with demarcation of the expected maximum water levels for design conditions. If the permanent storage depth in a wet detention pond exceeds 1.0 meters, a safety barrier shall be provided in addition to signage. This barrier should be aesthetically pleasing and may be in the form of a chain and post fence, continuous planting of dense shrubs, etc.

j) Performance Monitoring

Prior to final approval of all stormwater detention facilities, the *Owner* shall prepare and submit to the *Owner* a written monitoring program to be conducted by the *Owner* for a period of 12 months following *Construction*. Monitoring results are to be submitted to the *District* on a monthly basis for review. Adjustments to the control device shall be required as necessary prior to the expiry of the 1 year *Maintenance Period*.

2.14.2 Swales and Biofiltration Swales

The term biofiltration refers to a depressed flow conveyance / detention area that is surfaced with a relatively deep layer of highly permeable topsoil and vegetation (turf or ornamental landscaping) that absorbs and filters stormwater prior to discharge off-site.

Minimum depth of biofiltration swales shall be 150 mm. Maximum depths shall be 300mm. Deeper swales may be considered provided side slopes do not exceed 3:1. Turf lined swales shall be lined with a minimum 200mm of top soil beneath the turf. Ornamentally landscaped swales to be lined with a minimum of 450mm of top soil, with consideration for ornamental rock placed in the invert to resist soil erosion.

Perforated underdrains may be added for enhanced groundwater recharge in areas where underlying native soils provide reasonable infiltration capacity. See Section 2.15.2 (Water Quality Protection) and Section 2.15.5 (Groundwater Recharge).

2.14.3 Erosion and Sediment Control

An erosion and sediment control plan shall be provided. The purpose of this plan is to prevent the release of silt, raw concrete, concrete leachate and other deleterious substances into any ditch, storm main, *Watercourse* or ravine. *Construction* materials, excavation wastes, overburden soils, or other deleterious substances shall be disposed of or placed in such a manner as to prevent their entry into any *Watercourse*, ravine, storm sewer system, or restrictive covenant area.

All siltation control devices shall be situated to allow for ready access for cleaning and maintenance. Siltation control structures shall be maintained throughout the course of *Construction* and to the end of the *Maintenance Period* (final acceptance). Changes in the design of the structure shall be required if the proposed structure is found to perform inadequately.

At minimum, the control plan shall provide the following:

a) Section I: Narrative

- Project description: A brief description of the nature and purpose of the land- disturbing activity and the amount of grading involved.
- Existing site conditions: A description of the existing topography, vegetation, and drainage.
- Adjacent areas: A description of neighbouring areas, such as streams, lakes, residential areas, and *Road*s that might be affected by the land disturbance.
- Soils: A brief description of the soils on the site including erodibility and particle size distribution (texture).
- Critical areas: A description of areas within the Developed site that have potential for serious erosion or sediment problems.
- Erosion and sediment control measures: A description of the methods that will be used to control erosion and sediment on the site including, temporary erosion control, temporary sediment control measures, and whom will be responsible for implementation. Financial guarantees may be required to assure proper implementation.
- Permanent stabilization: A brief description of how the site will be stabilized after *Construction* is completed.
- Maintenance: A schedule of regular inspections and repairs of erosion and sediment control structure, and the person responsible for maintenance.

b) Section II: Details

- Detailed drawings: Enlarged dimensioned drawings of such key facilities as sediment basin risers, energy dissipaters, waterway cross-sections, and sediment barriers.
- Seeding and mulching specifications: Seeding dates, seeding, fertilizing, and mulching rates in kilograms per hectare, and application procedures.
- Maintenance program: Inspection schedules, spare materials needed, stockpile locations, and instructions for sediment removal and disposal and for repair of damaged structures.

c) Section III: Calculations

- Calculations and assumptions: Data for design storm used to size pipes and channels and sediment basins and traps (e.g., 10-year, 6-hour storm = 3.1 inch; i peak = 2.6 inch/hr), design particle size for sediment trap efficiencies, basin discharge rates, size and strength characteristics for filter fabric, wire mesh, fence posts, etc. and other calculations necessary to support drainage, erosion, and sediment control systems.
- Attachments: The erosion control plan shall be accompanied by a grading plan.

2.15 Environmental Protection

2.15.1 Creek Setback Protection

An environmental assessment pursuant to applicable provincial and federal legislation shall be completed where the top of bank of an existing *Watercourse* is located within 30m of the *Lot* line of a proposed *Development*.

No new stormwater outfall is permitted into a natural *Watercourse* without approval from applicable provincial and federal authorities.

2.15.2 Water Quality Protection

Specific practices for the quality treatment of stormwater runoff shall be applied to the paved surfaces of all multi-family residential, industrial, commercial, public and institutional uses, or other areas that provide communal vehicle parking, or where there is a specific risk from other point source pollution.

Best Management Practices (BMP's) shall be implemented to protect water quality where indicated above, or where required by the *Approving Officer*. Also, runoff temperature shall be no greater than 15 deg C.

Table 2.11 summarizes potential BMP's and appropriate application. These shall be considered and implemented where practical. This list is not exhaustive and there may be alternatives which the *Consulting Engineer* may wish to propose for review by the *Approving Officer*.

Table 2.11	
Best Management Practice	**Typical Applications**
Coalescing plate Oil/Water separator or equivalent (mandatory for noted applications)	Gas stations, automotive service facilities, auto recycling facility.
Engineered Treatment Unit	Parking *Lot*s, light industrial and commercial sites. **Required** within 30m of the high water mark for Okanagan Lake (343.05m), and within 30m of any Riparian Areas.
Biofiltration swales and rain gardens	All uses
Sump manholes and catchbasins with trash hoods	All uses
Covered containment area	All commercial, industrial or agricultural chemical handling and storage areas.
Infiltration and groundwater recharge systems	All uses
Constructed wetland / stormwater detention	All uses

The noted Best Management Practices are intended for water quality control and do not necessarily perform a function of runoff control. Treatment BMP's should be located upstream of any detention storage facilities. The target levels of treatment and the proposed type of treatment unit shall be provided by the *Consulting Engineer* to the *District* for approval. *The Approving Officer* may require different levels of treatment depending on specific site constraints.

2.15.3 Slope Stabilization

The implementation of stormwater management measures, combined with controls on *Development* adjacent to *Watercourse*s, is intended to minimize the impact on the receiving *Watercourse*s.

a) Setbacks

Disturbance too close to a slope bank can destabilize the bank material and contribute to bank failures. In addition to the environmental restrictions to working within the streamside protection area of a natural *Watercourse*, no disruption to the native ground is permitted within a setback *Zone* established by a 4:1 slope measured from the bottom of the slope. Detailed site investigations by a qualified Geotechnical *Consulting Engineer* is required prior to the approval of any *Development* of disturbance within this setback *Zone*.

b) Retention of Bank Vegetation

Existing vegetation along stream channel banks and within the established riparian setback shall be retained, and the disposal of debris within this setback is prohibited. The design shall consider the erection of temporary fencing and

flagging during *Construction* which clearly identifies the working limits for the protection of the riparian setback.

c) Storm Outfalls

The number of storm outfalls into natural *Watercourse*s shall be minimized. All storm drains from private properties must connect to a municipal system. Individual drains to natural *Watercourse*s are not permitted unless specific approval has been granted by provincial and federal agencies as well as the *Approving Officer*.

2.15.4 Channel Erosion Protection

Where required and permitted by the approving authorities, bank protection shall be considered along existing and new open *Watercourse*s to provide adequate erosion protection in the form of bank armoring, soil stabilization, flow deflection and other methods applicable for the specific site conditions. Some of the optional methods are summarized below. However, it is the *Consulting Engineer*'s responsibility to assess the requirements for and suitable method of bank protection.

- Grass lined and natural channels: Most suitable for longitudinal gradients of 2% or less.
- Rip-Rap protection: The selection of rip-rap protection shall consider the flow velocities and scour of the underlying materials. The use of granular material or geotextiles shall provide a suitable barrier to prevent the migration of finer materials caused by either the flow in the main channel or by flows from the channel banks due to seepage.
- Bio-Engineering: Bio-engineering methods of bank protection shall be promoted wherever possible for the protection and stabilization of *Watercourse*s. Bio-engineering solutions involve the use of live plants and vegetation to provide bank lining and cohesion of bank materials to resist scour. The plant materials used will require anchoring to ensure long-term stability. Bio-engineering solutions shall be compiled by the *Consulting Engineer* with demonstrated expertise in this area.

It is noted that any proposed works within the streamside protection area of an existing *Watercourse* falls under the jurisdiction of the Provincial or Federal governments, and as such, shall be subject to their approval.

2.15.5 Groundwater Recharge

The drainage characteristics of the surface soils in the *District* are variable from one location to another. These conditions may provide the opportunity to

implement infiltration measures to reduce stormwater runoff. All *Development* proposals are encouraged to implement on-site mitigative measures for the purposes of groundwater recharge. For all commercial, institutional, multi-family residential and industrial *Developments*, the *Consulting Engineer* shall submit a report, prepared by a qualified hydrogeologist, which clearly identifies the specific opportunities and constraints for implementing shallow groundwater recharge systems on-site. At a minimum, this report shall present the following items:

- Description of site condition, size and location.
- Description of proposed *Development* and resulting design flows.
- Description of native soils and water table conditions on-site to a depth of 5m.
- Estimated infiltration rates for each strata of material within the 5m depth (complete with a description of seasonal variability.
- Recommendations for recharge methods suitable for the proposed *Development*.

Based on the opportunities identified in the above noted investigation, groundwater recharge systems may be approved, at the discretion of the *Approving Officer*, either in lieu of stormwater detention facilities, or to reduce stormwater detention requirements.

Requirements to incorporate recharge systems in the design shall be reviewed by the *Approving Officer* on a site-specific basis. However, the *Consulting Engineer* is required to demonstrate that infiltration potentials are being maximized, within reasons:

a) Pre-Treatment

Particularly in multi-family, commercial, institutional and industrial *Developments*, all groundwater recharge systems shall include pre-treatment measures to remove sediments, suspended solids and greases prior to entering the infiltration *Zone*. Biofiltration is the preferred approach.

b) Overflow System

Recharge systems shall be designed with sufficient volume to maximize the opportunity for infiltration. However, systems contained within a municipal right-of-way, or where the infiltration rate of the native sub-soils are questionable, an overflow connected to the municipal drainage system which is sufficiently sized for the 1:10 year peak discharge from the site.

c) Recharge Systems

Methods of groundwater recharge (infiltration) systems are discouraged, and will only be approved by the *Approving Officer* on a site specific basis. The proposed system shall satisfy long-term performance and maintenance issues in order to be approved. Typical systems supported by the *District* include the following:

- Drywells
- Rock pits
- Perforated drains
- Premanufactured modular infiltrator chambers (design as per manufacturers recommendations)

SCHEDULE 3
WATER DISTRIBUTION

DESIGN STANDARDS

Schedule 3. WATER DISTRIBUTION

3.0 WATER DISTRIBUTION

3.1 Water Distribution

Water distribution systems shall be designed in accordance with the standards and specifications set out in this Schedule, and the provisions of this bylaw.

3.2 Per Capita Demand

For residential areas, use the following per capita demands:

- Average annual daily demand (A): 900 liters per capita per *Day* (L/c/d)
- Maximum *Day* demand (D): 2,400 liters per capita per *Day* (L/c/d) for Single-Family Residential and 1,600 liters per capita per Day (L/c/d) for Multi-Family Residential
- Peak hour demand (H): 4,000 liters per capita per *Day* (L/c/d)

For other than residential areas, the demand criteria must be selected to suit the particular circumstances as approved by the *District.*

3.3 Fire Flows

a) Fire flows should be determined in accordance with the requirements of the current edition of "Water Supply for Public Fire Protection – A Guide to Recommended Practice", published by Fire Underwriters Survey.

b) Fire flows are also subject to the following minimum requirements:

Table 3.1

***Developments* (without sprinklers)**	**Minimum Fire Flow**
Single Family Residential	60 L/s
Apartments, Townhouses	90 L/s
Commercial	150 L/s
Institutional	150 L/s
Industrial	225 L/s

c) The requirements for Single Family Residential shall include *Single Detached Dwellings* with *Secondary Suites* and *Single Detached Dwellings* with *Garden Suites*.

3.4 Design Flows

a) System design flows should be based on the ultimate population and fully Developed non-residential land as anticipated in the *Official Community Plan* (*OCP*).

b) Equivalent populations for non-residential flows can be estimated using the established non-residential demands and the Maximum *Day* per capita demand.

c) Total design flows (Q_{design}) are to be greater of the following:

Q_{design} = D+F	Maximum *Day* Demand for the population or equivalent population ***plus*** the Fire Flow, or
Q_{design} = H	Peak Hour Demand for the population or equivalent population

3.5 Water Pressure

Table 3.2	
Static Conditions - Maximum	860 kPa* (125psi)
Static Conditions – Minimum	380 kPa (55psi)
Peak Hour Conditions	310 kPa (45 psi)
Minimum Hydrant Residual (MDD + Fire Flow)	140 kPa (20psi)

*Where permitted by the *Approving Officer*, the maximum allowable pressure may be increased to 1,035 kPa for systems with multiple pressure *Zones.*

Where the maximum pressure exceeds 515 kPa, service connections must be individually protected by pressure reducing valves located in the buildings being served.

Determination of maximum and minimum pressures shall include consideration of final *Lot* grades relative to *Road* and street elevations.

3.6 Hydraulic Design

a) Use a proven network analysis computer model based on the Hazen-Williams formula:

$$Q = \frac{CD^{2.63}S^{0.54}}{278780}$$

Where: Q = Rate of flow in L/s
D = Internal pipe diameter in mm
S = Slope of hydraulic grade line in m/m
C = Roughness coefficient
= 120 for all pipes

b) the maximum allowable design velocity under fire flow conditions should be 4.0m/s, and

c) 2.0m/s under Peak Hour demand conditions.

3.7 Minimum Pipe Diameter

Table 3.3	
Distribution mains:	200mm
Fire hydrant connections:	150mm
Service connections:	25mm
With fire sprinklers:	50mm

Where permitted by the *Approving Officer*, distribution main minimum diameter may be reduced to 150mm provided that the main terminates in a short residential *Cul-de-sac*, has a length less than 80m and serves no fire hydrants. The *District* may require water mains larger than 200mm diameter for main feeder lines.

3.8 Dead Ends

Watermains shall be looped wherever possible. Where dead ends are unavoidable, and where permitted by the *Approving Officer*, blow-offs or blow-downs shall be provided. Blow-off and blow-down sizes are:

- 50mm diameter for 150mm diameter watermains.
- 100mm diameter for 200mm diameter and larger watermains.

Where practical, a hydrant may serve a secondary role as a blow-off.

3.9 Minimum Depth of Cover

Depth of cover shall be determined on the distance from finished ground surface to top of pipe. Watermains and services must be of sufficient depth to:

- Prevent freezing. Minimum 1.5m cover.
- Provide mechanical protection from external loads.
- Clear other underground utilities.

Provide special consideration for frost and mechanical protection in cases where minimum depths cannot be attained, e.g., at bridge crossings and in chambers.

3.10 Grade

Grades shall be straight lines between defined deflection points.

Where possible, the minimum grade of watermains shall be 0.1%. Grading shall be designed to minimize the number of high points.

When the grade of the main equals or exceeds 20%, provide anchorage, joint restraints, trench dams and trench drainage. Provide geotechnical engineering report where appropriate.

3.11 Corrosion Protection

Where there is a potential for encountering corrosive soils, a geotechnical corrosion analysis along the alignment of any proposed metallic watermain shall be conducted to determine the corrosiveness of the native soils. If the soils are determined to be

corrosive, measures such as cathodic protection shall be included to prevent corrosion of the watermain and appurtenances.

3.12 Valves

In general, valves should be located as follows:

- In intersections either in a cluster at the pipe intersection or at projected *Lot* lines to avoid conflicts with curbs and sidewalks:
  - 4 valves at "X" intersection
  - 3 valves at "T" intersection
- Not more than 250m apart
- Not more than 2 hydrants isolated
- Not more than 50 service connections isolated.

Gate valves are required on all mains. Gate valves 400mm and larger to include a bypass.

3.13 Hydrants

Fire hydrants shall be located, in general, at street intersections and as follows:

- Not more than 150m apart nor more than 90m from a building.
- In accordance with "Water Supply for Public Fire Protection – A Guide to Recommended Practice" published by Fire Underwriters Survey.
- 2.0m back from curb or 0.5m back of sidewalk.
- Minimum 3.0m clear of any other utility structure.
- At *Lot* lines in mid-block locations.

Private Fire hydrants must be metered and meet both domestic and on-site fire flows as per the specifications required by the District.

3.14 Air Valves

Combination air valves shall be installed at the summits of all mains of 200mm diameter and larger, except as follows:

- Where the difference in elevation between the summit and valley is less than 600mm.
- Where it can be shown that air pockets will be carried by typical flows.
- Where active service connections are suitably located to dissipate entrapped air.

Typical air valve sizes, subject to design analysis, are as follows:

Table 3.4	
Watermain Size	**Valve Size**
200mm to 300mm	25mm
350mm to 600mm	50mm
Larger than 600mm	Special design

Air valves shall be vented to an appropriate above-grade location to eliminate any potential for cross connection in a flooded or contaminated chamber.

3.15 Thrust Restraint

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

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

3.16 Chambers

Chambers or manholes containing valves, blow-offs, meters, or other appurtenances shall allow adequate room for maintenance, including headroom and side room. Access openings shall be suitable for removing valves and equipment. The chamber shall be provided with a drain to storm main or to a ditch, complete with backflow prevention, to prevent flooding of the chamber. Rock pits may be considered, subject to suitable soil and groundwater conditions. A pumping system may be required for drainage.

Adequate venting shall be provided. The *Approving Officer* may require provision of forced ventilation, lighting, heating, and dehumidification. Access and ventilation details shall comply with WorkSafe BC regulations.

Insulation to prevent freezing shall be provided where necessary.

3.17 Service Connections

Service connections size shall be calculated on the basis of the designated land use including sprinkler systems and/or on-site hydrants, where applicable. The minimum connection size shall be 25mm.

Each service shall have a shut-off located within 300mm of the *Lot* line on the public side. Each connection of 100mm diameter or larger requires a check valve at the *Lot* side of the shut-off.

All service connections shall have provisions for metering, as set out in Schedule 3, section 3.24.

3.18 Alignment

Except as noted in 3.21, watermains shall have straight alignments, with uniform offsets between intersections.

There must be a minimum lineal horizontal separation of 1.0 m between the municipal water and sewer line and other proposed underground services on the *Lot*.

Mains shall be located such that each *Lot* served has at least one side facing the watermain.

3.19 Rights-Of-Way (R.O.W)

Right-of-way locations should be selected to avoid environmentally sensitive areas such as *Watercourse*s, wetlands and wildlife migration corridors and forested areas.

Where location of a municipal utility in a statutory right-of-way is permitted by the *Approving Officer*, 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 [4.5m minimum width]
• Two services within the same trench	R.O.W. width =	twice the depth from surface to the crown of the deeper pipe [5.5m 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 [6m minimum width]

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

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, water mains should have rights-of-way wide enough for future widening and/or twinning. The width of the right-of-way should be the required separation between pipe centerlines plus 2 times the depth to the crown of the deeper pipe.

The *Consulting Engineer* 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. Maximum allowable grade of the maintenance access is 15%.

3.20 Curved Watermains

Where permitted by the *Approving Officer*, horizontal curves may be formed by arcing the pipe barrel as follows:

- Radius and curvature not less than 60m.
- No deflection at pipe joints.
- Constant radius throughout curve.
- Curvature limited to half of maximum curvature specified by pipe manufacturer.
- Curve locations to be recorded at ¼ points and mid-point.
- Constant offset from *Lot* line or *Road* centerline.

3.21 Reservoirs

a) Preliminary Design Requirement

Reservoir design shall include a preliminary design report which is to be accepted by the *Approving Officer* before detailed design begins. Preliminary design shall cover the following issues:

- Selection of materials (concrete or steel)
- Operational Schematic
- Design standards
- Volume
- Shape
- Number of cells
- Geotechnical report on foundation conditions
- Aesthetics
- Water Quality and reservoir mixing

b) Capacity

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

Total Storage Volume = A + B + C

Where: A = Fire Storage (from Fire Underwriters Survey guide)
B = Equalization Storage (25% of Maximum *Day* Demand)
C = Emergency Storage (25% of A + B)

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

- Dependability of water source
- Reliability of supply system
- Presence of more than one supply source
- Whether the reservoir is part of a large system
- Presence of other reservoir(s) in system
- Availability of standby power

c) Structural Design Codes

Design in accordance with the latest edition of the BC Building Code and, as applicable, 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 350/350R: Seismic Design of Liquid Containing Concrete Structures, and Commentary
- American Waterworks Association (AWWA) D110: AWWA Standard for Wire and Standard-Wound Circular Prestressed-Concrete Water Tanks
- AWWA D115: AWWA Standard for Circular Prestressed Concrete Water Tanks with Circumferential Tendons
- AWWA D100: AWWA Standard for Welded Steel Tanks for Water Storage
- AWWA D103: AWWA Standard for Factory-Coated Bolted Steel Tanks for Water Storage

d) Design Features

- Seismic Loading: Design for the following:
  - Watertight structure and fully operational mechanical equipment, following a 475-year return period earthquake.
  - Repairable damage and no uncontrolled release of water following a 2500-year return period earthquake.
- Two cells, each containing one-half of total required volume and capable of being drained and filled independently. A single cell reservoir may be considered under the following circumstances:
  - Total volume less than 4500m³.
  - Alternative storage available (another reservoir in system).
  - Alternative supply source available.
  - Alternative storage or supply source scheduled to be available within five years.
- Independent drain outlet at bottom, with consideration given to discharge route, capacity and any environmental concerns.
- Overflow drain sized to handle the maximum design inflow.
- Separate inlet and outlet pipes, located and oriented to provide circulation within the reservoir.
- Roof access hatch sized and located for safe and convenient access for personnel, parts, temporary ventilation facilities and cleaning equipment into each cell.
- Hatches: watertight aluminum, complete with hinges and related hardware, drains, locks and intrusion alarms.
- Ventilation pipes or openings sized to handle appropriate intake and exhaust air volumes for filling and draining the reservoir. Include security considerations.
- 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 minimum 1,000mm x 1,000mm x 400mm; invert of drain pipe to be flush with sump floor; grating to be installed over sump.
- *Zone*d sub-drains under floor to collect, drain and allow monitoring of any leakage.
- Stairways or stainless steel or aluminum interior wall ladder from roof access to floor. All ladders and stairs to meet WorkSafe BC regulations, including attachment points for fall arrest equipment.

- Fall prevention railings.
- All pipework within the reservoir to be 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 for each cell.
- Sample lines for at least one sample per 1,000 m^3 volume within each cell.
- Washdown connection in each cell, complete with backflow preventer and 65mm diameter pipe.
- Convenient vehicular maintenance access conforming to Section 1 - *Roads*.
- Fencing, lighting, locks, ladder guards, alarms and other security facilities to minimize vandalism and prevent water contamination.
- Site finishing to suit location and surrounding land uses.

e) Valve Chamber

Reservoir piping is to incorporate a valve chamber with the following design features:

- Chamber to include all valves associated with the reservoir operation
- Design in accordance with seismic codes noted above
- Entrance at grade large enough to permit safe removal of largest equipment
- Lifting beams and hoists where necessary to enable removal of equipment
- Space for safe and convenient operating and maintenance access to all valves, piping, equipment and instruction
- Interior and exterior of all steel piping to be coated to AWWA standards, or, alternatively, use stainless steel. Steel pipe in contact with potable water to use products that are NSF 61 certified.
- Floor drains and drainage system
- Located above 200-year flood level or 1.0m above highest recorded flood elevation

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

- Sampling ports for inlet, outlet and reservoir water
- Flow measurement and recording
- Heat, light and ventilation WCB standards
- PLC-controlled inlet valve and level monitoring and control system

- Connection to SCADA system
- Uninterruptible power supply (UPS) for control system
- Chlorine residual analyzer for reservoir inlet and outlet
- Provision for re-chlorination facilities
- Four (4) copies of a comprehensive Operations and Maintenance Manual. Manual shall be hardbacked bound documents with the name of the facility embossed on the cover. Manuals shall contain a table of contents with each section identified by a plasticized, labeled divider.

3.22 Pump Stations

a) Preliminary Design

Pump station design shall include a preliminary design report which is to be accepted by the *Approving Officer* before detailed design proceeds. The preliminary design shall follow a 'systems based' approach which addresses the performance of the pump station and the supply and distribution network together. Preliminary designs shall include the following issues:

- Location
- Capacity
- Hydraulics (Pressure, NPSH, pump RPM, efficiencies)
- Water hammer analysis and mitigative measures.
- Number and type of pumps
- Preliminary piping layout
- Type and appearance of structure
- Foundation conditions
- Maintenance requirements and access
- Energy requirements (sustainability, energy efficiency)
- Standby power
- HVAC
- Aesthetics
- Noise
- Controls and monitoring, including process and instrumentation drawing and control narrative
- Life cycle costs
- Operations

b) Capacity

Pumping capacity shall be designed to suit the particular circumstances. In general, capacity should 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 should meet peak hour demand with the largest pump out of service. Stand-by power should be provided to allow the greater of maximum *Day* demand plus fire flow or peak hour demand (D+F or H) during a power outage.

c) Design Features

- Structure, piping and mechanical systems designed in accordance with seismic codes for post-disaster structures.
- Located above 200-year flood level or 1.0m above highest recorded flood elevation.
- Reinforced concrete, blockwork or brick *Construction* designed to incorporate aesthetic considerations.
- Lockable access doorways sized for safe and convenient removal and replacement of the largest piece of equipment. Lifting hooks or rails with hoisting equipment 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 volt, 3-phase, premium efficiency, with thermal protection. Lower voltage (208V, 3-phase), single phase may be considered, depending upon service voltage available from the power company.
- Electrical motors to be suitable for use with a Variable Frequency Drive (VFD).
- 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.
- Totalizers.
- Spring return "Silent" check valves.
- High pressure and surge relief valves or VFDs with isolation valves, if warranted by system characteristics and transient analysis.
- Suction and discharge pressure gauges, with isolation valves, for each pump.
- Discharge pressure transducer for connection to SCADA.

- Mechanical pump seals.
- Water quality sampling ports.
- Interior and exterior of pipework coated to AWWA standards, or, alternatively, use stainless steel. Steel pipe in contact with potable water to use products that are NSF 61 certified.
- Pump system to be PLC-controlled and connected to SCADA system. PLC to conform to current *District* of Peachland standard.
- Hour meters and ammeters for each pump.
- Power factor correction, if required by power company.
- 120 V power outlet for small tools
- Noise attenuation to suit the location and local authority standards.
- Equipment to be CSA approved and have minimum one-year guarantee on parts and labour. All equipment must be tested prior to acceptance.
- Off*Road* vehicle parking.
- Four (4) copies of a comprehensive Operating and Maintenance Manual. Manual shall be hardbacked bound documents with the name of the facility printed on the cover. Manuals shall contain a table of contents with each section identified by a plasticized, labeled divider.

3.23 Pressure Reducing Valve (PRV) Stations

Prior to commencing detailed design of a PRV, the *Consulting Engineer* shall submit a preliminary design report that addresses the design considerations of this bylaw. Approval of the preliminary design report shall be obtained prior to the *Consulting Engineer* commencing detailed design.

a) Preliminary Design Parameters

- Design flows:
  - Peak hour
  - Maximum *Day* plus fire
  - Continuous, emergency or fire flow operation
  - Location
- Chamber details:
  - Structure and access
  - Controls and monitoring
  - HVAC
  - Lighting

b) Design Features

- Heated, above-ground building; minimum size: 3m x 4m x 2m (inside dimensions).
- Sump drain to drainage system.
- Structure and piping in accordance with Chambers, Reservoirs, 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, accessible from surface.
- Air release valves.
- Off-street parking.
- Strainers upstream of each control valve complete with flushing capability equipped with Kamlock connector.
- Upstream and downstream pressure gauges.
- Water quality sampling ports, located to ensure external sampling.
- Magnetic flowmeter with SCADA connection.
- Interior and exterior pipework coated to AWWA standards, or, alternatively, use stainless steel. Steel pipe in contact with potable water to use products that are NSF 61 certified.
- Forced air ventilation plus heat and light, subject to local authority review.
- External kiosk and antenna, 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
- Three (3) copies of a comprehensive Operating and Maintenance Manual. Manual shall be hardbacked bound documents with the name of the facility printed on the cover. Manuals shall contain a table of contents with each section identified by a plasticized, labeled divider.

3.24 Water Meters

a) The water distribution system shall be designed to incorporate water meters, to *District* specifications.

One water meter shall be installed at the following locations:

- each Single Detached Dwelling;
- each unit of a Duplex Dwelling;
- each *Multiple-Unit Residential Building* consisting of three or more *dwelling units;*
- each commercial, industrial or institutional building;
- at a single location just outside the boundary of each *Manufactured Home Park*;
- at a single location just outside the boundary of a bare land strata plan consisting of more than three strata *Lot*s.

b) For clarification, only one water meter is required to measure the flow of water to a *Single Detached Dwelling* containing a *Secondary Suite*, or a *Lot* containing a *Single Detached Dwelling* and a *Garden Suite;* provided the one meter is located to measure the flow of water to both the *Single Detached Dwelling* and the *Suite*.

c) For all new *construction*, the water meter shall be provided in an insulated underground meter chamber just outside *lot* line adjacent to the water main.

d) Irrigation service with a meter may be required by the *District*. The irrigation meter shall be installed within a meter chamber just outside the *lot* line.

e) Flow metering with electronic connection to the *District* SCADA system may be required, as determined by the *District*.

f) Water meters installed for agricultural uses may not be used for domestic industrial and commercial uses unless otherwise permitted by the *District*.

g) Water meters must be compatible with the *District*'s radio-read program or *District* approved alternative.

h) Where water services multiple-unit residential, commercial, industrial or institutional property, the water meter must be capable of metering both domestic and onsite fire flow, and be located within a heated meter room or other *District*-approved heated location above ground.

SCHEDULE 4
SANITARY SEWER

DESIGN STANDARDS

Schedule 4. SANITARY SEWER

4. SANITARY SEWER

4.1 Sanitary Sewer

Sanitary sewer systems shall be designed in accordance with the standards and specifications set out in this Schedule, and the provisions of this bylaw.

4.2 Per Capita Flow

a) Sanitary sewer system design shall be based on an average daily dry weather flow (ADWF) of 250 liters per *day* per capita (L/c/d).

b) For residential areas, the land use densities in Table 3.1 shall apply.

c) The requirements for Single Family shall include *Single Detached Dwellings* with *Secondary Suites* and *Single Detached Dwellings* with *Garden Suites.*

Table 3.1

	People/Gross Ha.	People/Unit
Single Family	24-30	3
Multi-family Low	85	2
Multi-family Medium	(3 storey) 120	2
Multi-family High	(4-12 storey) 320-960	2
Mobile Home	45	2

4.3 Non-Residential Flows

a) 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:

Table 3.2

Land Use	Equivalent Population/Hectare (gross)
Commercial:	75 people/ha
Institutional:	50 people/ha
Industrial:	50 people/ha

4.4 Peaking Factor

a) A peaking factor using 70% of the Harmon Equation must be applied to the average flow.

$$PF = 1 + \frac{14}{4 + \sqrt{P}}$$

Where: PF = peaking factor
P = Population in thousands.

4.5 Infiltration/Inflow

Design flows shall include an infiltration allowance to cover groundwater infiltration and system inflows as follows:

- Pipes not in water table: 5,000l/ha/d

- Pipes in water table: 8,000l/ha/d
- Old pipes: 10,000l/ha/d

Design Flow

a) Peak design flows must be determined by applying the peaking factor to the average daily flow plus infiltration.

b) Pipe sizes must be selected so that sewers flow 2/3 to ¾ full at peak hour design flow.

4.6 Pipe Flow Formulas

a) Gravity Sewers

Use Manning's formula:

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

Where: Q = Design flow in m^3/s

A = Cross sectional area in m^2
R = Hydraulic radius (area/wetted perimeter) in m
S = Slope of hydraulic grade line in m/m
n = Roughness coefficient
→ concrete = 0.013
→ PVC = 0.011

b) Sewage Force Mains

Use Hazen-Williams formula:

$$Q = \frac{CD^{2.63}S^{0.54}}{278780}$$

Where: Q = Rate of flow in L/s

D = Internal pipe dia. in mm
S = Slope of hydraulic grade line in m/m
C = Friction coefficient = 120

4.7 Flow Velocities

a) Gravity Mains: The minimum velocity shall be 0.6m/s. There is no maximum velocity. However, consideration shall be given to scour problems and the dynamic loading on manholes where flow exceeds 3.0m/s.

b) Force Mains: At the lowest pump delivery rate anticipated to occur at least once per *day*, a minimum cleansing velocity of 1.0m/s shall be maintained. Maximum velocity should not exceed 3.5m/s.

4.8 Minimum Grades

a) Gravity Mains: The grade of any sewer is governed by the minimum required velocity of 0.6m/s. However, the last section of a main that will not be extended in the future shall have a minimum grade of 1.0% where 150mm diameter pipe is proposed. Notwithstanding the above, the minimum grade for all pipes must be 1.0% unless restricted by topography or other factors approved by the *Approving Officer*. There must be no change in grade between manholes.

b) Where the slope of the sewer main exceeds 20%, anchorage is recommended. Where the slope is 30% or greater, anchorage must be incorporated in the design.

c) Forcemains shall be graded at a minimum of 0.5%. Grading shall be designed to minimize high points. Provide air release valves at high points.

4.9 Minimum Pipe Diameter

a) Gravity Mains:

- For residential lands – 200mm
- For commercial and industrial – 250mm

Terminal pipe section, upstream of the last intersection of mains, and where no further extension is planned, shall be:

- For residential lands – 150mm at a minimum 1.0% grade
- For commercial and industrial – 200mm at a minimum 0.60% grade

b) Forcemains:

- 100mm

c) Service Connection:

- Residential – 100mm
- Multi-family/commercial/institutional – 150mm

4.10 Alignment

Sewer mains must be designed to follow straight alignment between manholes unless approved by the *Approving Officer*. Where permitted, horizontal curves will require a constant offset and must be uniform throughout the curve. In no case shall the radius of curvature be less than 300 times the outside diameter of the pipe barrel. The design velocity must exceed 0.90m/s, the minimum grade must be 1.0% and curve midpoint and two ¼ points are to be located by survey and shown on the as-*constructed* drawings with an elevation and offset of the invert at each point.

Routing of the sewers must be approved by *the Approving Officer*.

4.11 Manholes

a) Locations

Manholes are required at:

- Every change in grade, except as permitted for curved sewers
- Every change in direction, except as permitted for curved sewers
- Every change in pipe size
- Downstream end of curved sewers
- Every pipe intersection except for 100mm and 150mm service connections and junctions with trunk sewers 900mm and larger
- 150m maximum spacing
- Every future pipe intersection
- Upstream end of every sewer main
- Temporary clean-outs may be provided at terminal section of a main provided that:
  - Future extension of the main is proposed or anticipated.
  - The length of sewer to the downstream manhole does not exceed 45m.
  - The depth of the pipe does not exceed 2.0m at the terminal point
  - Clean-outs are not to be considered a permanent structure.
  - Design of the anticipated extension is completed to the next manhole to ensure the *works* will not require realignment when extended.
- Sanitary manhole rim elevations outside of paved roadways shall be designed to be:
  - Above the adjacent storm manhole rim elevation
  - Above the surrounding ground so that infiltration from ponding will not occur.
  - The 100 year return runoff event.

4.12 Hydraulic Details

- Crown elevations of inlet sewers shall not be lower than crown elevation of outlet sewer.
- Minimum drop in invert elevations across manholes:
  - Straight run: 5mm drop
  - Deflections up to 45 degrees: 30mm drop
  - Deflections 45 to 90 degrees: 60mm drop

- Drop manhole and ramp structures shall be avoided where possible by steepening inlet sewers. Where necessary, provide drop structures as follows:

Invert Difference	Structure
Up to 0.45m	Inside Ramp
0.45 to 0.90m	Outside Ramp
Greater than 0.90m	Outside Drop*

- Inside drop may be used if specifically permitted by the *Approving Officer*.
- The maximum deflection angle in a junction shall be 90°.
- Force main discharges shall be directed into the receiving manhole outflow pipe. Manhole benching shall be extended a minimum 200mm above the force main crown. If a manhole drop cannot be avoided, an inside drop pipe is required.

4.13 Depth and Cover

- Depth shall be defined as the distance from the finished ground surface to the top of pipe.
- Sewers shall be of sufficient depth to
  - Permit gravity sewer service to the basements of properties adjacent to the roadway or sewer right-of-way
  - Prevent freezing
  - Meet the minimum depth requirements of 1.2m
  - Clear other underground utilities
  - Prevent damage from surface loading
  - Allow for future extension of the sanitary sewer system to service upstream tributary lands at ultimate *development*, as defined by the *Approving Officer*.
- Maximum cover depth is 4.5m, except under special circumstances and with permission of *Approving Officer*.

4.14 Rights-Of-Way (R.O.W)

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

Rear yard sewers are discouraged and will only be allowed with the permission of the *Approving Officer*.

Where location of a municipal utility in a statutory right-of-way is permitted by the *Approving Officer*, 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 [4.5m minimum width]
• Two services within the same trench	R.O.W. width =	twice the depth from surface to the crown of the deeper pipe [5.5m 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 [6m minimum width]

- When the service is within a *road* allowance, and the distance from the *Lot* 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 *Lot*.

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 centerlines plus 2 times the depth to the crown of the deeper sewer.

The *Consulting Engineer* 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 shall be sufficiently wide and structurally adequate to support the maintenance vehicles for which the access is intended. Maximum allowable grade of the maintenance access is 15%.

4.15 Utility Separation

Requirements for separation of sanitary sewers from water mains are as follows, unless otherwise indicated by the local public health authority.

a) Horizontal Separation

At least 3.0m horizontal separation shall be maintained between a water main and a sanitary sewer.

In special circumstances, specifically in rock or where the soils are determined to be impermeable, lesser separation than 3.0m may be permitted provided that:

- The sewer main and water main are installed in separate trenches and the water main invert is at least 0.5m above the crown of the sanitary sewer and the joints are wrapped with heat shrink plastic or packed with compound and wrapped with petrolatum tape in accordance with the latest version of AWWA Standards C217, and C214 or C209; or,
- The pipes are installed in the same trench with the water main located at one side on a bench of undisturbed soil at least 0.5m above the crown of the sanitary sewer and the joints of the water main are wrapped with heat shrink plastic or packed with compound and wrapped with petrolatum tape in accordance with the latest version of the AWWA Standards C217, and C214 or C209.
- There must be a minimum lineal horizontal separation of 1.0m between the municipal water and sewer main and other proposed underground services on the *Lot*.

b) Vertical Separation

Where a sanitary sewer crosses a water main, the sewer shall be below the water main with a minimum clearance of 0.5m and the joints of the water main, over a length extending 3m either side of the sewer main, are to be wrapped with heat shrink plastic or packed with compound 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 local public health authority approval, the following details shall 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.

c) Sewers in Common Trench

Sanitary and storm 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 1.0m and the horizontal clearance between manholes shall be no less than 0.3m.

4.16 Service Connections

Every *lot* and each unit of a residential duplex shall be provided with a separate service connection fitted with a rectangular Brooks box.

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

Every *Lot* shall be provided with a separate service connection; except that each strata plan with more than three strata *Lots* shall be provided with a single connection. Service connections shall be provided to each *lot* fronting the main. Service connections shall not be extended at an angle that exceeds 45° from perpendicular to the main, and in no case shall a service connection be placed so that it extends in front of any *Lot* other than the one being serviced.

Each *Lot* is permitted only one service connection except:

i. that a strata plan with more than three strata *Lots* shall be provided with a single connection; and

ii. where the servicing of all buildings on existing properties is not feasible, two (2) services may be permitted if authorized by the Director of Engineering.

For clarity, a *Secondary Suite* and a *Garden Suite* shall be connected to the same sanitary sewer connection that serves the principal *Single Detached Dwelling.*

Connections to new mains shall be made using standard wye fittings. Connections to existing mains shall use wye saddles or, where permitted by the *Approving Officer*, inserta-tees may be used. All services shall enter the main at a point just below the springline.

The minimum grade from the main to the *Lot* line shall be 2.0%.

The minimum depth of a service at the *Lot* line must be 1.2m 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 1.0m 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.

Inspection chambers are required for all service connections, except when the sewer main is in a right-of-way and the service is less than 2.5m long and ties into a manhole.

Control manholes are required for all industrial and light industrial connections. Control manholes will be required for commercial connections at the discretion of the *Approving Officer*.

Service connections shall be installed at the lower (downstream) portion of the *lot* for larger *lot*s or *Lot*s of land at an offset of 3.0m from the *Lot* pin. For residential *development*, connections shall be as noted on the Standard Drawings.

The maximum length of any service connection is 30m, unless permitted otherwise by the *Approving Officer*.

4.17 Pump Stations

The use of pump stations shall be avoided where possible. Any proposed use of pump stations shall receive prior approval from the *Approving Officer*. Prior to commencing detailed design of a pump station, the *Consulting Engineer* shall submit a preliminary design report that addresses all pertinent design considerations.

The Applicant must provide three sealed sets of mechanical drawings and three sets of sealed electrical line diagrams for review by the *Approving Officer*. Two sealed copies of design calculations shall be provided for documentation.

Approval of the preliminary design report shall be obtained prior to the *Consulting Engineer* commencing detailed design. Larger capacity sewage lift stations or lift stations with special design criteria or siting requirements may require additional assessment and review of criteria.

a) Preliminary Design Requirements

- System Layout: Select location(s) to minimize long-term total number of pump stations.
- Location: Within right-of-way adjacent to *road*, outside the required *road* dedication.
- Capacity: Dependent upon the *development* and catchment area. Designs must be designed to handle the ultimate flows of the designated catchment.
- Configuration: Gorman-Rupp pump or pre-approved equivalent.

Other basic criteria include:

- *Construction* dewatering requirements.

- Access for *construction* and maintenance.
- Aesthetics, noise, odour control and landscaping.
- Type of station and impact on neighbors.
- Waterhammer and/or column separation prevention measures.
- Security against vandalism and theft.
- Station uplift design must be based on minimum load level and maximum flood elevations.
- Proximity of receiving sewers, water mains, and power supply.
- Minimizing energy requirements.
- Type of controls:
  - PLC compatible with Regional *District* of Central Okanagan Control System
  - Ultrasonic and backup float controls
  - SCADA connection or capability
- Standby power or emergency storage.
- Soils. Sub-surface investigations must be undertaken prior to site approval.
- Convenience of operation and maintenance including service vehicle access.
- Safety for operators and public.
- Capital costs and operation and maintenance costs.
- Corrosion control.
- Vehicle loads adjacent to and/or on station structure.
- Davit and lifting arms for pumps and fall arrests.
- Station to be complete with an Uninterruptible Power Supply (UPS) to serve alarms and controls.

b) Design Features

1) Pump stations shall be designed with a minimum of two pumps, capable of handling the maximum flow condition with any one pump off line.

   Where the design flow exceeds the capacity of a single, commonly available pump, use three or more pumps with capacities such that there is always one pump available for standby.

2) Pump requirements:
   - Capable of passing solids up to 75mm in size.
   - Maximum motor speed: 1750 RPM.
   - Explosion proof.

- Operate on a 3 phase 600 volt electrical source. Lower voltage (208 V, 3 phase or single phase) may be considered depending upon service voltage available from the power company.
- Suitable for use with a variable speed drive.
- Easily removed for maintenance.
- Able to operate alternately and independently of each other.
- Able to meet maximum flow condition with one pump in failure mode.
- Sized so that each motor does not cycle more than six times in one hour under worst case operating conditions or as recommended by pump manufacturer.
- Motor over temperature and leak detection system.

3) Minimum storage between the high level alarm and the start of overflow under the more critical of:

- Minimum 2 hour in wet well at average weather flow.
- Minimum 1 hour in wet well and influent pipes at peak wet weather flow.

4) Ball type check valves or swing check with outside lever and weight required on each pump discharge

5) Gate valves required outside pump station on influent line and a plug valve on each pump discharge line. The valves must be outside the station and be complete with square operating nut, riser, rock guard and nelson box.

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

7) Minimum wet well size: 2440mm diameter, smaller sizes may be permitted by the *Approving Officer*.

8) Wet well bottom to be benched to direct solids to pump suction. Wet wells to be designed in accordance with the latest edition of the Hydraulic Institute Standards.

9) Pump station lids to be waterproof and provided with suitable locks. Covers may be either aluminum or fiberglass. Minimum 900 mm x 900 mm in size. Fasteners to be 316 stainless steel. Lids to be 200 mm to 300 mm above ground level.

10) The access hatch shall have:

- An aluminum 6.4mm tread plate
- A perimeter drain
- A perimeter sealing gasket

- A slam lock with an aluminum removable sealing plug and opening tool
- A flush lift handle
- A gas spring assist cylinder
- A 90 degree hold open arm
- A flush fitting padlock tang
- Hatch safety grate

11) The hatch shall be reinforced for 1465 kgs/m² (300 lbs./sq.ft.) or withstand a loading of H-20 where subject to vehicular traffic. All fasteners to be made of 316 stainless steel.

12) Station access shall be by aluminum ladder. Ladder to be located to avoid interference with removal and installation of pumps. Ladder to be provided with extension and lock at least 600mm above station lid. Fiberglass grating platform to be provided above high water level for wet well access. Access, ladder and platform to meet WorkSafe BC standards.

13) Wet well ventilation shall be designed to address odor control, and confined space entry to WorkSafe BC and NFPA Standard 820.

14) The entrance must be at ground level where feasible but, in no case, more than 300mm above ground. An explosion-proof light with a protective cover should be located in a suitable location in the station and the light should be activated by the entrance cover shall be located 0.6m above 200-year flood level or 1.0m above highest recorded flood elevation.

15) A removable lifting arm and davit socket shall be incorporated into the design of the pump station to facilitate the removal and installation of the pumps.

16) Metal stations shall be provided with impressed current cathodic protection.

17) Steel and fiberglass surfaces to receive minimum two coats of two-component white epoxy enamel. Concrete stations to be designed to prevent sulphide attack.

18) When a kiosk is used to house auxiliary equipment and control panels, kiosk to be weatherproof and adjacent to station. Kiosk to be located not less than 2m and nor more than 3m from station lid.

19) Kiosk to contain separate compartment for pump station ventilation fan.

20) Wiring in station and fan compartment to be explosion-proof, Class 1, Division 2. Electrical design and installation subject to approval by Provincial Safety Inspector.

21) Power and control cables to be continuous from within the pump station to within the kiosk. In no instance shall a cable be spliced.

22) Control kiosk to be designed to contain control and telemetry equipment on front panel and power equipment on rear panel. Concrete base to be minimum 75mm above finished grade.

23) The control panel must incorporate a Crouse Hinds receptacle and a transfer switch for a standby power source. Underground electrical wiring is required. Pump stations to include automatic generator sets for standby power in case of power failure. Generator set enclosures to be weatherproof and to include noise control. For small pump stations, emergency storage may be considered in place of standby power. Emergency storage is to be based on 8 hours of average *day* flows plus infiltration.

24) Control panel to include hour meter and ammeter for each pump, switchable.

25) Pump control panel to incorporate operator interface (Panelmate or equivalent), and the panel must be complete with a lamp text button.

26) Unless otherwise permitted by the *Approving Officer*, all lifts stations must be equipped with telemetry connected to the Regional *District* telemetry system and *District* of Peachland SCADA.

27) Levels to be controlled by a level transmitter, plus emergency high and low level floats.

28) Station to include magnetic flow meter with local display and connections to SCADA.

29) A complete set of spare circuit cards are to be provided where modular card-type pump controllers are used.

30) 110V outlet for hand tools.

31) Noise levels for facilities must not exceed 65 dB at *Lot* line or 20m away whichever is closer.

32) A 38mm water connection with standpipe and cross-connection protection must be provided on-site for cleaning purposes.

33) Area around station and related equipment or building is to be graded, asphalted and fenced with security lighting. The fence must be made of black chain link. Size of area to be determined by maintenance requirements and clearance to structures with doors opened. Layout of structures and gates is to provide for clearances for pump removal by hoist truck with a 1.8m boom.

    Landscaping acceptable to the *Approving Officer* and shall be provided to include irrigation.

34) Design in accordance with appropriate seismic standards.

35) Equipment to be CSA approved and have a minimum one-year guarantee on parts and labour. All equipment must be tested prior to acceptance, with all pumps being factory tested prior to installation.

36) Provide four (4) copies of a comprehensive Operating and Maintenance Manual, in hardback bound format with name of facility printed on cover. Manuals shall contain a table of contents with each section identified by a plasticized, labeled divider. The manual must contain:

- As *constructed* shop drawings;
- Equipment layout drawings;
- Electrical, control, and alarm wiring diagrams;
- Operating instructions for all equipment;
- Maintenance instructions for all equipment, including frequency of maintenance tasks;
- Equipment data sheets;
- Spare circuit cards for critical components;
- Certified head/capacity curves for pumps;
- Equipment parts list;
- Emergency operating procedures.

4.18 Corrosion and Odour Criteria

a) Dissolved sulphide maximum limit at any point in the system is to be 0.5mg/l. However, for new tie-ins to the *District* of Peachland system, the maximum limit is 0.3mg/l.

b) Odour Criteria:

- At 10m from any gravity main, force main, manhole and lift station or other sewer facility (summer conditions, winds between 2-10 km/h), 1.0 odour units.
- Where sewer facilities are close to houses, parks or walkways, 0.0 odour units.

c) Analysis for odour and sulphides is required.

d) Wet well size, forcemain diameter and length, as well as other pertinent factors must be considered in optimizing system operations to avoid odours.

SCHEDULE 5
STREET LIGHTING

DESIGN STANDARDS

Schedule 5. STREET LIGHTING

5. STREET LIGHTING

5.1 General

Design of street lighting systems shall be prepared by the *Consulting Engineer*. A copy of the lighting calculations shall be submitted to the *Approving Officer*. The drawing is to note the types of refractors to be used. Streetlighting shall be designed in accordance with the requirements of this Schedule, the *MMCD* 2019 Edition of the Master Municipal Construction Documents Design Guideline Manual and the provisions of this bylaw. The design must encourage the reduction of light pollution wherever possible and avoid excessive light pollution to residences.

5.2 Design Criteria

a) The preferred layout of poles and luminaries shall be on both sides of the *highway*s in a staggered pattern. Exceptions shall be on divided median *highway*s and at intersections.

b) All luminaires to be Phillips *Road* Focus LED Cobra heads complete with 7-pin receptacles.

c) Design must result in uniform lighting of roadways and sidewalks with maximum spill light cut-off beyond the sidewalk.

d) Design must meet ANSI /IES RP-8-14 practices and requirements.

e) 3000K color temperature fixtures to be used on all roadways unless otherwise approved by the *District*.

f) Anti-theft devices must be incorporated into the design.

5.3 Minimum Levels of Illumination

a) The minimum level(s) of illumination in average lux shall be as follows:

Table 5.1
Zone

Road	**Residential**	**Industrial**	**Commercial**
Arterial *Road*s	10.0	13.0	17
Collector *Road*	6.0	10.0	13.0
Local *Road*s	4.0	7.0	9.0
Walkways & Pathways	4.0		
*Lane*s	4.0	2.0	2.0

b) At all major intersections involving arterial or collector *Road*s, the values noted in the above table shall be increased by fifty percent. The illumination of all major intersections shall be at least equal to the sum of the illumination values provided on the streets forming the intersection.

c) The lowest lux value of any point on a *Road*way shall not be less than one-third of the average value, with the exception of residential *Road*ways where it may be as low as one-fifth of the average value, using a maintenance factor of .75.

Table 5.2	
***Road* Classification**	**Uniformity (Average: Minimum)**
Arterial	3 : 1
Collector	4 : 1
Local	5 : 1
Walkways and Pathways	6 : 1

5.4 Streetlight Pole Locations

a) Generally, streetlight poles shall be designed as follows:

Table 5.3			
***Road* Type**	**Pole Location/Spacing**	**Pole Type**	**Lamp Standard Height**
Arterial	Opposite or Staggered	Davit	9.1m
Collector	Spaced on One Side	Davit	8.2m
Local	Spaced on One Side of *Road*s & *Lane*s	Davit	8.2m
Walk & Pathways	Entrance & Exit Points	Davit or Post	7.6m

b) Streetlights in rural areas shall only be required at intersections.

5.5 Underground Ducts

Underground wiring for streetlighting shall be designed in accordance with the requirements of the local power authority and shall conform to the rules and regulations of the Canadian Electrical Code (Part 1), the Provincial Electrical Inspection amendments and any municipal codes or bylaws and other authorities having jurisdiction shall be followed.

The standard off-set for the location of the underground streetlighting ducts in *Road* rights-of-way shall conform to the applicable Standard Drawing.

The minimum depth for the underground ducts shall be installed as per the Canadian Electrical Code.

It is the *Owner*'s responsibility to ensure that the supply service to the streetlighting system receives approval from the local power authority.

5.6 Lamp Standards

In designated *Development* Permit Areas, decorative lamp standards may be considered by the *Approving Officer*.

SCHEDULE 6
RETAINING WALL SYSTEMS AND ALTERATIONS

DESIGN STANDARDS

Schedule 6. RETAINING WALL SYSTEMS AND ALTERATIONS

6. RETAINING WALL SYSTEMS AND ALTERATIONS

6.1 Conditions Requiring Retention

Retention of land shall be required in the following conditions:

a) Where it is deemed necessary, by the *Approving Officer* to provide stability to existing or altered slopes or to control potential erosion.

b) Where the slopes either existing or altered are steeper than their natural geological angle of repose or steeper than 2 horizontal to 1 vertical whether terraced or otherwise.

c) Where it is deemed necessary to protect *Works and Services* or provide access to *Works and Services*.

d) Where it is deemed necessary to retain other land or structures.

e) Where it is deemed necessary to control surface drainage by altering the contours of the land.

6.2 Design and Inspection

a) The design and inspection of any retention system or structure shall be prepared and carried out by the *Consulting Engineer* who shall be responsible to acquire geotechnical consultation and advice where conditions present the need for it.

b) Consideration shall be given to the aesthetic appearance of retention structures. Where practical, retaining walls shall be rock gravity walls designed to be consistent with the natural surroundings of the area and not be dominating or fortress-like. The color pallet of the retaining wall must be submitted to the *District* for approval, preference will be given to earth tones. The following types of structures shall not be permitted as permanent structures:

   i) LOCK BLOCKS (concrete blocks approximately 750mm x 750mm x 1,500mm) unless:
      - No more than one half of the top course of blocks are exposed with the top surface being flat without locking stubs; and
      - Ends of the system include sloping transition blocks where topography is sloping; and
      - Exposed faces and surfaces, including the top surfaces of such system, are faced or surfaced with either exposed aggregate or granite finish;
      - Precast Concrete *constructed* in accordance with CAN/CSA-A23.1;
      - Continuous reinforced concrete footings are installed;
      - Geogrid reinforcing is installed between each horizontal row of blocks.

ii) GABION (wire baskets filled with rocks) except for in-stream or waterfront erosion protection, not more than two (2) baskets high, Drip Irrigated Vegetative Strip is required.

iii) WOOD CRIB (over 1.0m high or terraced at a slope steeper than two (2) horizontal to one (1) vertical).

c) Guardrails or Fences

i) Guardrails or fences shall be required at the top of retention structure where the difference in elevation between adjacent levels exceeds 1m.

ii) Landscaping alternative may be used providing it is of a dense thorny type to discourage access to the top of the retention structure area and providing the difference in elevation between adjacent levels does not exceed 1.22m.

d) Where the height of a retaining wall exceeds 1.22m, the wall shall be stepped with a minimum horizontal distance of 1.0m between walls. This requirement may be varied by the *Approving Officer* with the provision of additional detailed information and/or investigations, including but not limited to:

i) Structural,

ii) Geotechnical,

iii) Hydrogeological,

iv) Visual Impact with respect to:

- height and mass
- not significantly obstructing views of neighbouring properties
- maintaining the hillside aesthetic and minimizing the disruption of hillside contours
- not being dominating or fortress

v) Landscape Treatment, and

vi) Manufacturer Product Information.

6.3 Building Permits for Retention Structures

a) *Building Permit*s are required for all retention structures which are more than 1.22m high and/or terraced at a slope steeper than 2 horizontal to 1 vertical.

b) *Building Permit Applications* shall be accompanied by the following documentation signed and sealed by the *Consulting Engineer*.

i) Scaled structural, geotechnical and drainage details.

ii) Scaled site plan showing the location of the retention structures in relation to any *Lot* lines. Rights-of-way or easements, tanks, other structures, underground works or services or natural features and confirmed by a *Surveyor* if deemed necessary.

iii) Letters of Assurance of Design and Field Review.

c) Geological reports shall define hazards/risks, suggest remedial measures and shall show the locations of retaining structures on a scaled map.

6.4 Completion of Retention Works

a) The *Owner* shall take all necessary measures, temporary and permanent to provide any necessary protection.

b) All required retention works are required to be completed prior to:

i) *Substantial Performance* of a *subdivision*, or

ii) Occupancy of a building in a *Development*.

c) In the event that an extension of time is necessary, the *Owner* shall provide to the *District*:

i) A security deposit in an amount equal to the cost of the outstanding work, accompanied with

ii) An agreed upon time schedule to complete the work.

d) The *Building Inspector* may withhold occupancy of any *Building Permit* if the incomplete works present a safety hazard or are not secured by a deposit and accompanying schedule as described in 5.4(c) above.

e) Retaining walls will not normally be permitted within utility rights-of-way.

SCHEDULE 7
LANDSCAPING

DESIGN STANDARDS

Schedule 7. LANDSCAPING

7. LANDSCAPING

7.1 Objectives

These design standards are intended to promote water conservation, enhance the safety, aesthetics and sustainability of *Public Lands* and to ensure efficiency and effectiveness of maintenance and operations of these lands. Landscaping shall be designed in accordance with the requirements of this Schedule, and the provisions of this bylaw.

7.2 Related Standards

This standard shall be referenced to and integrated with, at minimum, the following:

- BC Landscape Standard, Current Edition.
- National Guide to Sustainable Municipal Infrastructure (Canada).
- Irrigation Association – Turf and Landscape Irrigation Best Management Practices.

7.3 Application of Standard

These standards apply to the following types of *Public Lands*:

- Parks and Public Open Spaces.
- Boulevards.
- Medians.
- Roundabouts, Traffic Circles and *Cul-de-sac* Islands.
- Recreation Corridors.
- *Public Access Routes.*
- Stormwater Management Facilities.
- Erosion Control.
- Trails.

7.4 Landscape Consultant

The *Owner* shall retain a Landscape Consultant to be directly supervised by a Landscape Architect or a Registered Irrigation Designer. All Landscape drawings and specifications shall be sealed by a professional Landscape Architect. Irrigation drawings and specifications shall be prepared by a Registered Irrigation Designer.

7.5 Landscape Plan

The Landscape Designer shall consider, at minimum, the following criteria:

- The functional relationship of the landscape design to existing and proposed land uses, utilities, flood patterns, drainage facilities, *Roads*, driveways and pedestrian facilities.

- Accessibility as it relates to pedestrians, cyclists and people with limited physical or visual abilities.
- Horticultural use of plant material, including plant suitability, survival rate, growth habit, size, disease resistance and water demand.
- Appearance of the proposed plant material and site landscape, including appropriateness, aesthetics, visual screening and site lines.
- Protection of existing trees.
- Protection of the natural environment and restoration or enhancement of natural habitat.
- Site drainage, water levels, ponding and overland flow.
- Minimization of the opportunity for crime and undesirable behaviour.
- Weed control.
- Erosion control.
- Fire hazard reduction.
- The estimated costs and efficiency of maintenance practices that will be required for the *Public Land*.
- Restoration of disturbed areas.

Preference shall be given to water conservation and sustainable landscape designs which:

- Use drought tolerant plants.
- Use native plants
- Irrigation systems, if required, being temporary and removed after planting is established.
- Adaptable to the changing climatic conditions of the Okanagan Valley.

7.6 Boulevards

a) Boulevards within public *road* rights-of-way having an urban cross-section:

i. For boulevards of collector roads the landscape treatment shall include:

- Grass surface with street trees, if the land use of the adjacent *Lot* is commercial, industrial, institutional or multi-family, and including complete irrigation system provided and maintained by the *Owner*(s) of the adjacent *Lot*; or
- Grass surface with street trees, if the land use of the adjacent *Lot* is one, two-family residential or park and if the boulevard is accessible for maintenance (i.e., mowing, watering) from the adjacent *Lot*; or
- Exposed aggregate concrete surface with street trees in tree wells with structural soil. Provision of irrigation and tree grates shall be at the discretion of the *Approving Officer*.

ii. Underground utilities in boulevards shall be aligned and buried to provide a continuous 1.0m deep utility-free trench to accommodate tree planting, except as required for utility crossings, service connections, boxes and vaults.

b) Boulevards within public *road* rights-of-way having a rural cross-section shall be filled with topsoil to a minimum depth of 300mm and re-naturalized with an approved Hydroseed mix.

7.7 Medians

Landscape treatment shall generally include continuous exposed aggregate concrete surface with irrigated trees in concrete tree wells with structural soil or, where appropriate, with a central band of irrigated landscaping (i.e., groundcovers and/or low shrubs with regularly spaced trees) as lines of sight permit.

7.8 Roundabouts, Traffic Circles and Cul-de-sac Islands

The following guidelines are the minimum requirements for all landscape *Works and Services* in roundabouts, traffic circles and *Cul-de-sac* islands:

- The central area may, as lines of sight permit, feature a single specimen tree or a group of like trees with low groundcovers and/or shrub plantings.
- For landscaped roundabouts, traffic circles and *Cul-de-sacs* a complete and working automatic irrigation system shall be provided.
- Lighting of trees or public art in a traffic circle shall be provided as required by the *Approving Officer*.

7.9 Stormwater Management Facilities

a) Wet Ponds

- Between the normal water level and the top of bank the side slopes shall be naturalized with low maintenance riparian plantings in 100mm minimum depth growing medium.
- Above the top of bank the ground surface shall be turf on 50mm depth smooth growing medium, with a maximum slope of 4 (horizontal) to 1 (vertical), except as required for vehicle access and pedestrian surfaces.
- Shrubs and trees shall be selected, planted and maintained to provide screening, habitat, shade and aesthetics as required.
- Irrigation system per 7.12.

b) Dry Ponds

- The bottom of dry ponds and infiltration basins shall be turf on 50mm depth smooth growing medium or, if approved or required by the *Approving Officer*, hard-surfaced recreational surface.
- Side slopes with a 4 (horizontal) to 1 (vertical) or shallower slope shall have a turf surface on 50mm minimum depth smooth growing medium. Side slopes steeper than 4 (horizontal) to 1 (vertical) slope shall be naturalized with low maintenance riparian plantings in 100mm minimum depth growing medium.
- Above the design high water level the ground surface shall be turf on 50mm depth smooth growing medium, with a maximum slope of 4 (horizontal) to 1 (vertical), except as required for vehicle access and pedestrian surfaces.
- Shrubs and trees shall be selected, planted and maintained to provide screening, habitat, shade and aesthetics as required.
- Irrigation system per 7.12.

7.10 Erosion Control

Land proposed as *Public Land* where there is evidence of active or historic erosion that may have maintenance or liability implications for the *District* shall not be accepted by the *District* as *Public Land*.

The *Owner* shall be responsible for undertaking erosion control and restoration works on proposed *Public Land* as necessary for the long-term prevention and control of erosion.

At the discretion of the *Approving Officer*, the *Owner* may be required to prepare and submit an erosion control plan covering some or all of the proposed *Public Land*.

The *Owner* is responsible for preventing and controlling erosion, and for restoring sites impacted by erosion, for the term of the *Maintenance Period*.

7.11 Fire Management

At the discretion of the *Approving Officer*, the *Owner* may be required to prepare and submit a Fuel Management Plan covering some or all of the proposed *Public Land*.

The Fuel Management Plan shall be prepared by a Forester and shall follow industry standards such as the FireSmart Guidelines endorsed by the BC Ministry of Forests. The Fuel Management Plan shall include but is not limited to the following aspects:

- Map(s) showing existing and proposed vegetation, structures, trails, access points, and firebreaks on *Public Lands* and vegetated land adjacent to the site, including an assessment of the fuel hazard in these areas.

- Priority *zones*, per the FireSmart Guidelines, around all existing or planned structures. Fuel modification prescriptions for these *Zones* shall be developed based upon proximity to structures and target stand conditions.
- Establishment of strategic firebreaks adjacent to structures and hazardous fuel types, which may also serve as recreational trails. Breaks shall be a minimum of 1.5m wide with a 100mm minimum gravel base.
- Deciduous trees shall be retained where possible.
- Access points shall be provided between *lot*s to provide access to *Public Land* containing natural vegetation from the roadway as required for land maintenance and fire hazard management.
- Access points shall enable access for emergency and maintenance vehicles. Hydrants shall be located in the *Road* dedication adjacent to the access point.

7.12 Irrigation

An irrigation system shall be designed, installed, operated and maintained to provide sufficient application of water to maintain the plants and grass of the landscaping in a healthy and growing condition for the irrigation of *Public Land* to be maintained by the *Owner*(s). If an irrigation system is not required at the time of *Construction*, but will be required in the future, sufficient design, servicing and *Construction* shall be performed to enable the irrigation system to be readily installed, connected and operated in future.

Where *Public Land* is to be maintained by the *District*, an irrigation system shall be designed to be compatible with the *District* of Peachland's SCADA operated irrigation system, operated and maintained until the end of the *Maintenance Period*. One (1) metered water service and one (1) metered electrical service (120 volts, 60 amps) shall be provided for each park, open space, drainage facility, boulevard, median, roundabout, traffic circle and *Cul-de-sac* island at a location acceptable to the *Approving Officer*. The service shall include the establishment of water and electrical service accounts, testing and certification of the backflow prevention device, a plumbing permit, an electrical permit, and all materials, labour, *fees* and utility costs necessary to provide the service until the end of the *Maintenance Period*.

7.13 Landscaping Security

Landscaping security may be required to ensure that remediation or restoration of landscaping occurs where it is required and to ensure landscaping is adaptable for changing conditions.

SCHEDULE 8
QUALITY CONTROL AND ASSURANCE

DESIGN STANDARDS

Schedule 8. QUALITY CONTROL AND ASSURANCE

8. QUALITY CONTROL AND ASSURANCE

This Schedule sets out the *District*'s minimum standards for quality in design, quality in *Construction* and quality in record-keeping for the *Works and Services* to be designed and *constructed* in accordance with this bylaw.

Minimum design standards are set out in Schedules 1 to 7.

8.1 Engineering Requirements

a) The *Owner* shall demonstrate to the satisfaction of the *Approving Officer* that the *Owner* has retained or shall retain the services of a *Consulting Engineer* to undertake the design, inspection, testing and record-keeping for the *Works and Services*.

b) The *Owner* shall complete and provide the *Approving Officer* with the following information in the *Owner/Consulting Engineering* confirmation letter to demonstrate that the *Consulting Engineer* is qualified to undertake the *Works and Services* and more particularly, has successfully undertaken projects similar in scope, nature and value to the *Works and Services*:

- The name and address of the *Consulting Engineer* and a summary of the projects that the *Consulting Engineer* has undertaken that are similar in scope, nature and value to the *Works and Services*.
- The names of the individuals assigned to various aspects of the project by the *Consulting Engineer* together with a summary of the projects that the individual engineers have undertaken that are similar in scope, nature and value to the *Works and Services*.
- The names and the curriculum vitae for the person(s) that the *Consulting Engineer* proposes/has retained to undertake the inspections and testing on its behalf during the *Construction* of the *Works and Services* together with a summary of the projects that the person(s) has completed that are similar in scope, nature and value to the *Works and Services*.
- The names and addresses of all sub-consultants that the *Consulting Engineer* has/proposes to retain and a summary of the projects that the sub-consultants have completed that are similar in scope, nature and value to the *Works and Services*.
- The *Owner* shall ensure the *Consulting Engineer* designs all *Works and Services* in accordance with this bylaw.
- The *Owner* shall also confirm that the *Consulting Engineer* will provide the Design, *Construction* and Record-keeping Quality Control and Assurance Plans described herein. A copy of the agreement shall be filed with the *Approving Officer*.

8.2 Construction Requirements

a) The *Owner* shall demonstrate that to the satisfaction of the *Approving Officer* that the *Owner* has or shall retain the services of one or more qualified Contractors to undertake the *Construction* of the *Works and Services*. The *Owner* shall provide the *District* with the name and address of its Contractor(s) together with a summary of the projects that the Contractor(s) has undertaken that are similar in scope, nature and value to the Works prior to awarding the contract(s) to the Contractor.

In the case where the Contractor has not performed similar *Works and Services* in the *District* of Peachland, the *Approving Officer* may require that the *Owner* provide a list of projects and references from other municipalities that demonstrates that the Contractor(s) is qualified to undertake the *Works and Services*.

b) The *Owner* shall ensure that its Contractor(s) *constructs* the *Works and Services* in accordance with the design, drawings, plans and specifications approved for *Construction* by the *Approving Officer*.

c) The *Owner* shall provide to the satisfaction of the *Approving Officer* a *Construction* Schedule indicating the planned start and completion dates of major activities of the work.

8.3 Quality Control and Assurance Plans

a) Design Quality Control and Assurance Plan

- The *Owner* shall submit or cause the *Consulting Engineer* to submit a Design Quality Control and Assurance Plan to the *District* for approval coincident with submission of the first *Design Drawings*.
- The *Owner*'s proposed Design Quality Control and Assurance Plan shall detail the procedures that will be used to ensure and verify that the design for the *Works and Services*, including all plans, drawings and specifications, shall be completed in accordance with the minimum design standards set out in this bylaw.
- In the case of design items related to pump stations, structures, structural fills, geotechnical or hydro-geotechnical items or any item not described in Schedule 1 to 7, the Design Quality Control and Assurance Plan shall show such specialist and/or sub-consultants with suitable experience in these works.

b) *Construction* Quality Control and Assurance Plan

- The *Owner* shall submit or cause the *Consulting Engineer* to submit a *Construction* Quality Control and Assurance Plan to the *Approving Officer* coincident with submission of the first *Design Drawing* to the *District*.
- The *Owner*'s proposed *Construction* Quality Control and Assurance Plan must detail the procedures that will be used to ensure and verify that the *Works and Services*

shall be *constructed* in accordance with the *Consulting Engineer's* design, plans, drawings and specifications. The *Construction* Quality Control and Assurance Plan must include:

- A proposed *Construction* Schedule showing milestone dates and the dates of *Provisional* and *Final Performance* of the *Works and Services*.
- The nature and frequency (periodic or full-time resident) of the proposed site inspections during *Construction* to ensure that all *Works and Services constructe*d satisfy the intent of the design and conform to the drawings, plans and specifications.
- The nature and frequency of the proposed field and laboratory testing requirements for the *Works and Services* including what materials and equipment are to be tested, what types of tests will be performed and when these tests are to take place.
- Such information as the *Approving Officer* may stipulate from time to time.

c) Record-keeping Quality Control and Assurance Plan

- The *Owner* shall submit or cause its *Consulting Engineer* to submit a Recordkeeping Quality Control and Assurance Plan to the *Approving Officer* coincident with submission of the first *Design Drawings*.
- The *Owne*r's proposed Record-keeping Quality Control and Assurance Plan shall detail the procedures that will be used to ensure and verify that proper records will be kept and maintained throughout the design, *Construction* and warranty phases of the *Works and Services*. The Record-keeping Quality and Assurance Control Plan shall ensure that the following records are kept as a minimum:
  - Quality Manual and Standards.
  - Details of any field design or *Construction* changes to the drawings, plans and specifications to which changes are approved in writing by the *District*.
  - Deficiency Identification Forms (Items of the Works that are either not supplied or *Constructed* in accordance with the design (drawings, plans and specifications) or that require remedial or corrective action).
  - Deficiency Disposition/Verification Forms (List of the foregoing Items of the Works that have been corrected).
  - Inspection and Test Records.
  - Field measurement records of completed *Works and Services* that have been used by the *Consulting Engineer* to accurately prepare reproducible as-built drawings that are filed with the *District*.

- Notwithstanding the generality of the foregoing, the *Owner* shall ensure that its *Consulting Engineer* provides the *District* with the following at the times and in the manner set out below:
  - Certification prior to paving that it has inspected those items of the *Works and Services* that are below areas to be paved such as *Roads*, walkways, driveways and parking *lots*, and that same comply with the design (drawings, plans and specifications). Such certification shall be accompanied by all test and inspection reports and by video tapes and reports on pipe lines.
  - The *Owner* shall ensure that the *Construction* any *Works and Services* required within the *District*'s right-of-way will be paved within 48 hours of completion of any trench backfill or finish grading of base gravels.
  - Certification prior to acceptance by the *District* that surface works including paving, drainage, curbs and gutters, sidewalks, street lights, etc. have been *Constructed* in accordance with the design (drawings, plans and specifications).

d) *Record Drawing* Deficiency Holdback

Pursuant to Section 7-9 of the Bylaw, the *Owner* shall provide security in the amount of $2,500 per drawing sheet (based on approved drawings) for provision of approved *Record Drawings*, service cards, inspection reports and videos, and all testing results and certifications.

SCHEDULE 9
SUPPLEMENTAL SPECIFICATIONS

DESIGN STANDARDS

Schedule 9. SUPPLEMENTAL SPECIFICATIONS

This schedule contains supplemental specifications to be applied in conjunction with the Specifications portion of the *MMCD* 2019 Edition of the Master Municipal Construction Document (*MMCD*), which shall apply to all *Works and Services Constructed* within the *District* of Peachland.

Supplemental Specifications contained within this Schedule supplement or supersede the Master Municipal Construction Document (*MMCD*). Where the *District* of Peachland Supplemental Specifications are in conflict with the *MMCD*, the *District* of Peachland Supplemental Specifications shall take precedence.

Section number and clause numbers in the *District* of Peachland Supplemental Specifications coincide with the *MMCD* numbering protocol.

Index

ROADWAY LIGHTING

2.0 PRODUCTS

2.7 Poles and Anchor Bolts

Replace 2.7.1 with the following:

2.7.1 Luminaire Poles: Lincoln Steel Standards or approved equal. Factory painted internally and externally with one coat metal prime gloss black paint.

Add 2.19 Photocells

Add 2.19.1 as follows:

2.19.1 Photocell units shall be rated at one thousand (1,000) volt amperes 120 or 240 volt operation and shall have a built in surge protection and lighting arrestor.

Each photocell unit shall have a twist lock base for mounting on the luminaire.

END OF SECTION

AGGREGATES AND GRANULAR MATERIALS

2.8 Select Granular Sub-base

.1 **Delete 2.8.1 and replace with:**

To be well graded granular material, substantially free from lumps and organic matter, screened if required to conform to the following gradations:

Sieve Designation (mm)	Percent Passing
150	100
100	85 – 100
50	65 – 100
19	40 – 100
4.75	20 – 70
0.150	0 – 20
0.075	0 – 8

.2 **Add 2.8.2 as follows:**

Maximum aggregate particle size to be no more than 50% of total thickness of sub-base layer.

2.10 Granular Base

.1 **Delete 2.10.1 and replace with the following:**

To be 19 mm crushed gravel conforming to the following gradations:

Sieve Designation (mm)	Percent Passing
25	100
19	80 – 100
9.5	60 – 90
4.75	35 – 70
2.36	25– 50
1.18	15 – 35
0.300	5 – 20
0.075	2 – 8

2.11 Recycled Aggregate Material

.3 **Revise 2.11.3 as follows:**

Material retained on the 4.75mm sieve to be not more than 20% recycled material. Minimum size of processed recycled material is to be retained on the 4.75mm sieve.

.7 **Add 2.11.7 as follows:**

Recycled material and granular sub-base material is to be mechanically blended to produce a homogeneous mixture prior to delivery to site. Blending on-site will not be permitted.

.8 **Add 2.11.8 as follows:**

Acceptable recycled material to be used in sub-base material only.

END OF SECTION

EXCAVATING, TRENCHING AND BACKFILLING

3.0 EXECUTION

3.6 Surface Restoration

.7 Permanent Pavement Restoration:

.5 Modify 3.6.7 (5) to read as follows:

Restore pavement width to minimum full lane width (for a multi-Lane roadway) or to centreline of the roadway for a 2 *Lane* roadway as detailed on Standard Detail Drawing G5. Where the trench edge extends past the centreline or *Lane* edge, it should be extended to the far edge of that travel *Lane*. In the case of two longitudinal trenches in the roadway, the existing asphalt shall be removed, and the entire area paved in conjunction with the paving of the two trenches. This surface restoration is to be completed within 48 hours of the base gravel being approved for paving.

If thickness of existing pavement permits, grind 35mm depth along edge of pavement. Dry if necessary and paint clean, dry edge with asphalt emulsion (tack coat). All longitudinal trenches must be paved with a paving machine.

END OF SECTION

CONTROLLED DENSITY FILL

2.0 PRODUCTS

2.1 Materials

.7 Add 2.1.7 as follows:

2.1.7 RHEOCELL® RHEOFILL admixture.

2.2 Mixes

.2 Modify 2.2.2 to read as follows:

Controlled density fill mix:

.1 Cement – 30 kg
.2 Fly ash – 89 kg
.3 Sand – 1,364 kg
.4 RHEOFILL – 1.4 bags
.5 Water – 124 to 178 kg
.6 Target comprehensive strength 0.5 MPa to 0.7 MPa.

END OF SECTION

HOT-MIX ASPHALT CONCRETE PAVING

2.1 Materials

.1 Delete 2.1.1 and replace with the following:

Asphalt cement to CGSB-16-3-M90, Grade 80-100, Class A.

2.2 Mix Design

Delete 2.2 and replace with the following:

.1 The *Contractor*, at their cost, must retain an independent testing consultant to perform trial mix designs and to submit the job mix formula. The trial mix design must be performed in accordance with ASTM D1559 (75 blows per face) and must include five (5) separate trial values of asphalt content. *Contractor* must pay for trial mix designs and submissions.

.2 Mixes for *Construction* of asphalt base course may contain up to 20% of RAP, provided that the properties of RAP material are considered in the trial mix design. Submissions for RAP mixes must contain all data relevant to RAP utilized in the mix design.

.3 Include the following data with the trial mix design submission:

.1 Aggregate bulk specific gravity and water absorption.
.2 Sand equivalent values.
.3 Asphalt cement properties including mixing and compaction temperatures, based on temperature viscosity properties of asphalt cement.
.4 Aggregate gradations and blending proportions.
.5 Maximum theoretical density of trial mixes.
.6 Asphalt absorption values.
.7 Mix physical requirements to meet Table 2.2.3.
.8 Do not change job-mix without prior approval to *Contract Administrator.* Should change in material source be proposed, new job-mix formula to be submitted to *Contract Administrator* for review and approval.

Table 2.2.3 - Specified Physical Requirements of Hot Mix Asphalt		
Property	**Mix Type**	
	Lower Course(1)	**Surface Course**
Stability @ 60°C, kN (min)	8.0	9.0
Flow Index, 0.25mm units	8 – 14	8 – 14
Voids in Mineral Aggregate % (min)	12.0	14.0
Air Voids, % (2)	3 – 6	3 – 5
Index of Retained Stability after Immersion in Water for 24 hrs @ 60°C, % (min)	75	85

Notes:
1) If lower course mix is used in staged *Construction*, i.e. exposed for at least one winter, specified properties for surface course mix must apply.
2) Percent air voids in compacted trail mixes must be determined in accordance with ASTM D3203, with asphalt cement absorbed into the aggregate compensated for in the calculation.

3.1 Plant and Mixing Requirements

3.1.1 Batch and continuous mixing plants:

(3) **Delete 3.1.1 (3) and replace with the following:**

Before mixing, dry aggregates to a moisture content not greater than 1% by mass or to a lesser moisture content if required to meet mix design requirements.

(9) (5) **Add 3.1.1 (9) (5) as follows:**

RAP must not be fed through the aggregate dryer system.

(11) (3) **Add 3.1.1 (11) (3) as follows:**

Mixing period and temperature to produce a uniform mixture in which particulates are thoroughly coated, and moisture content of material as it leaves mixer to be less than 0.2%.

3.1.4 Mixing Tolerances:

(1) **Delete 3.1.4 (1) and replace with the following:**

Permissible variation in aggregate gradation from job mix (percent of total mass):

(1)	4.75mm sieve and larger	± 4.5
(2)	2.36 and 1.18mm sieve	± 4.0
(3)	0.600mm sieve	± 3.5
(4)	0.300mm sieve	± 2.5
(5)	0.150mm sieve	± 1.5
(6)	0.075mm sieve	± 1.0

3.2 Equipment

.1 **Delete 3.2.1 and replace with the following:**

Pavers: must be capable of placing a standard mat width not less than 3m and must be capable of paving wider widths in 150mm and 300mm increments by means of equipment supplied by the manufacturer of the equipment. The screed must include a tamping bar or strike-off device.

Control of the screed must be by automatic sensing devices. Longitudinal control must be by a sensor that follows a string-line, ski or other reference. The grade sensor must be movable and mounts provided so that grade control can be established on either side of the paver. A slope control sensor must be provided to maintain the proper transverse slope of the screed.

3.6.2 Compaction

(1) Delete 3.6.2 (1) and replace as follows:

Provide sufficient compaction equipment to ensure that the compaction rate meets or exceeds the placement rate and to ensure that specified density is achieved before the temperature of the mat falls below 100°C.

3.7 Joints

.7 **Add 3.7.7 as follows:**

When placing final pavement layer against concrete curbing, compacted pavement must meet the gutter at the same elevation or a maximum of 10mm above and along the entire lip of the gutter.

ADD 4.0 COMPLIANCE WITH SPECIFICATIONS AND PAYMENT ADJUSTMENT FOR NON-COMPLIANCE

4.0 COMPLIANCE WITH SPECIFICATIONS AND PAYMENT ADJUSTMENT FOR NON-COMPLIANCE

4.1 Hot Mix Asphalt Concrete

.1 A Marshall analysis will be performed from a sample obtained at the paving site on a frequency of one analysis per *Day*, with at least one analysis required per project or 700 tonnes of asphalt.

.2 When analysis identifies non-conformance with specified properties, the *Contractor* must immediately initiate remedial measures, and submit, at its expense, evidence that compliance exists with the approved mix design. Failure to do so will result in suspension of plant mixing operations.

4.2 Aggregate Gradation

.1 When the aggregate fails to comply with tolerances set forth in Section 3.1.4.1 of this specification, the *Contract Administrator* will initiate the following action:

.1 When two (2) consecutive gradation analyses identify non-compliance with the specified tolerances, the *Contractor* must be served notice and a third test will be initiated.

.2 If continued non-compliance is indicated from the third test, the *Contractor* must suspend production. It must not commence *Construction* again until it has demonstrated that corrective action has been taken and that the aggregate gradation is within the specified tolerance limits.

4.3 Asphalt Cement

.1 Payment adjusted for non-compliance with the tolerance specified:

Table 4.3.1

Asphalt Content Deviation from Design %	Payment Adjustment Factor
0.30 or less	0.00
0.31 to 0.40	0.20
0.41 to 0.50	0.75
0.50 or greater	Remove and replace

.2 Adjustment for asphalt cement content non-compliance to the amount payable for Hot Mix Asphalt Paving equals the unit bid price times the payment adjustment factor times the quantity to which the factor is to be applied, i.e.:

$$A_c = P\ (F_c)\ (Q_n)$$

Where:

A_c = Adjustment for asphalt cement content non-compliance
P = Unit bid price
F_c = Payment Adjustment Factor for Asphalt Cement Content non-compliance
Q_n = Asphalt measured for payment which was produced during the production period to which a test applies

4.4 Pavement Thickness

.1 Pavement of any type found to be deficient in thickness by more than 10mm must be removed and replaced by pavement, of specified thickness, at the *Contractor*'s expense.

.2 Pavement of any type found to be deficient by less than 10% of its specified compacted thickness will not be subject to payment adjustment for thickness non-compliance.

.3 Pavement of any type found to be deficient in thickness by more than10% of its specified thickness but not more than 10mm shall give rise to an adjustment in the amount to be paid to the *Contractor*. The adjustment shall be subtracted from the amount otherwise payable to the *Contractor*, and the amount of the adjustment will be paid to the *District*. The adjustment shall be calculated as follows:

$$At = \frac{Td \times P \times Qt}{Ts}$$

Where:

A_t = Adjustment for thickness deficiency
T_d = Deficiency in thickness measured in mm and being greater than 10% of specified thickness but not greater than 10mm
T_s = Specified thickness in mm
Q_t = Asphalt measured for payment lying within a unit of work area defined in 5.2.2, where the thickness deficiency has been identified
P = Unit Bid Price

Note: No allowance will be made for the tolerance provided for in Section 4.4.2.

The adjusted price will be applied to all asphalt measured for payment which lies within a unit of work area defined in 5.2.2 where the thickness deficiency had been identified, or to such less area as may be defined in accordance with the provisions of 5.2.2.

4.5 Density

.1 The minimum specified density for acceptance, without payment adjustment, must be 97% of the 75 blow Marshall density as most recently determined by the appointed testing agency.

.2 Payment adjustment for density non-compliance will be as follows:

Table 4.5.2

Density (% of 75 Blow Marshall)	Payment Adjustment Factor
97 and greater	0.0
95.0 to 96.9	As per Density Payment Adjustment Factor Chart (see Standard Drawing SS-R24)
Less than 95.0	No Payment (subject to removal and replacement after review by the Engineer)

Adjustment for density specification non-compliance shall be determined as follows:

$$A_D = P\ (F_D)\ (Q_{nD})$$

Where:

A_D = Adjustment for density non-compliance
P = Unit Bid Price for Hot Mix Asphalt Cement paving
F_D = Payment Adjustment Factor for density non-compliance
Q_{nD} = Asphalt measured for payment within a unit of test area as defined in 5.3

4.6 Adjusted Payments

.1 The total adjustment arising from pavement deficiencies identified in the foregoing shall be determined as follows:

$$A_r = A_c + A_t + A_D$$

Where:

A_r = Total Adjustment
A_c = Adjustment for asphalt cement content non-compliance
A_t = Adjustment for thickness deficiency
A_D = Adjustment for density non-compliance

The total adjustment (A_r) shall be paid to the *District*.

ADD 5.0 TESTING FREQUENCY AND PROCEDURES

5.0 TESTING FREQUENCY AND PROCEDURES

5.1 Aggregate Gradation and Asphalt Cement Content

.1 One test per production period as defined in Section 4.1.1. Asphalt content shall be determined in accordance with ASTM D2172 or D6307. Gradation analysis of extracted aggregate shall be performed in accordance with ASTM C136 and C117.

5.2 Thickness

.1 The actual pavement thickness, for each unit of work area, will be determined on the basis of the average thickness of three (3) cores. The cores shall be spaced at intervals of 150m of paved *Lane* width or less. If the deficiency of any individual core exceeds 10mm, three (3) additional cores may be extracted in proximity to the location of the core of excessive deficiency, to identify the extremities of the pavement area to be removed and replaced. The *Contractor* will initiate and pay for such additional coring.

.2 A unit of work area is defined as 1,500 m² or fraction thereof, representing pavement placed in an individual placement day.

.3 Sampling and testing for thickness determination shall be in accordance with ASTM D3549.

5.3 Density

.1 Density of compacted pavement shall be determined on the basis of tests on core samples taken at a maximum interval of 150m of paved *Lane* width. A test area shall be that area lying between longitudinal joints and between transverse lines located midway between test cores or between such transverse lines and the beginning or end of placement.

.2 With prior approval of the *Contract Administrator*, the in situ density of a compacted layer of pavement may also be determined by nuclear methods in accordance with ASTM D2950. Spacing of tests shall be as stated above, and tests shall be taken in the vicinity of the core samples extracted for testing of the thickness of the pavement layer. In a situation where the in situ density of the lift does not meet specification, according to D2950, then the density of the extracted cores shall be determined and will take precedent over the in situ density. Where the specified compaction has not been met, as confirmed by the direct measurement of the core, then an additional three cores shall be taken in the immediate area and the average of the three cores shall be used.

END OF SECTION

TRAFFIC SIGNS

1.0 GENERAL

.1 Section SS 02578 refers to those portions of the work that are unique to the supply and installation of traffic signs. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Related Work

.1	Painted Pavement Markings	Section 32 17 23
.2	Cast-In-Place Concrete	Section 03 30 53
.3	Precast Concrete	Section 03 40 01

2.0 PRODUCTS

2.1 Materials

.1 Signs shall be mounted on sheet aluminum, 0.018” minimum, alloy 5052-H38.

.2 Signposts shall be Telespar 50mm square perforated galvanized tubing with a 57mm square perforated galvanized tubing break away base set in concrete.

.3 Concrete shall be 32 MPa compressive strength.

3.0 EXECUTION

3.1 General

.1 Layout and confirm the locations of all signs with the *Contract Administrator* prior to installation.

.2 Install signs, posts, and concrete bases in accordance with *Contract Documents.*

END OF SECTION

2.0 PRODUCTS

2.2.1 Mainline Pipe, Joints and Fittings

(3) **Add 2.2.1 (3) as Follows:**

Wrap: Ductile iron pipe to be installed with a polyethylene encasement conforming to AWWA C104.

2.3.2 Valves and Valve Boxes

(7) **Delete 2.3.2 (7).**

2.5 Service Connections, Pipe, Joints and Fittings

.1 Delete 2.5.1 and replace with the following:

Pipe diameter 19mm to 50mm to be Type K annealed copper, to ASTM B88M, and pipe diameter 25mm to 50mm may be Pressure Class 160 Polyethylene tubing, certified to CSA B137.1.

2.6 Hydrants

.2 **Delete 2.6.2 and replace with the following:**

Colour: All hydrants are to be painted *red* in accordance with the standard drawings.

3.6 Pipe Installation

.1 **Delete 3.6.1 and replace with the following:**

Handle pipe in accordance with pipe manufacturer's recommendations. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends. Unless approved by the *Owner*, all pipe to be delivered from manufacturer with weatherproof plugs/bagging to prevent contamination while being delivered and during storage. Pipe to remain this way until placed into trench and installed.

3.12 Hydrants

.6 **Delete 3.12.6 and replace with the following:**

For hydrants not in service, place an orange bag over the entire hydrant, secured at the bottom with tape and labeled in black "Not In Service". Remove bag once the watermain has been accepted by the *District*.

3.17 General Procedure Flushing, Testing and Disinfection

.2 **Delete 3.17.2 and replace with the following:**

Perform all tests in presence of *Contract Administrator* or a designated representative. Notify the *Contract Administrator* 24 hours in advance of proposed test. Upon satisfactory completion of the testing and disinfection, and prior to allowing the main to be used for active service, the *Contract Administrator* shall provide the *Owner* with written certification that the flushing, testing and disinfection has been performed in accordance with AWWA, *MMCD*, and *District* of Peachland requirements, and has been substantiated with Total and Fecal Coliform results of zero colonies per 100 ml.

3.20 Disinfection, General

.2 **Delete 3.20.2 and replace with the following:**

Disinfect and flush pipes and appurtenances in accordance with Section 3.21 of AWWA C651.

3.23 Connections to Existing Mains

.1 **Delete 3.23.1 and replace with the following:**

Contractor to complete tie-ins for the *District* water system in the presence of *District* Personnel and after appropriate *District* approvals are obtained. For watermains, the *District* Engineering Technologist must approve the successful pressure testing, chlorination and flushing prior to authorizing the *Contractor* to proceed with the tie-in. The *Contractor* will coordinate with *District* staff to open and close existing water valves.

Add 3.23.2 to 3.23.5 as follows:

.2 The *Contractor* will be responsible for notifying all affected parties as per the requirements of Section 01535 1.14 Public Notices.

.3 The *District* of Peachland Public Works staff will be responsible for opening and closing any existing mainline water valves.

.4 Proposed works required for tie-ins shall be disinfected by swabbing in accordance with AWWA C-651 followed by line flushing immediately after installation work is complete and placed back into service.

.5 All pipes, fittings, couplings, miscellaneous materials and sufficient equipment and labour shall be made available at the tie-ins to ensure the tie-in can be completed within the maximum duration of water service disruption permitted.

END OF SECTION

MANHOLES AND CATCHBASINS

2.0 PRODUCTS

2.1 Materials

.7

(1) Modify 2.1.7 (1) to read as follows:

Frame and cover must conform to ASTM A48 and be designed to withstand, in an adjusted position, H20 loading, with a 2:1 safety factor prior to the addition of concrete support.

(4) Add 2.1.7 (4) as follows:

Cover to be marked “SANITARY” or “STORM” to suit.

(5) Add 2.1.7 (5) as follows:

Cover to be marked “RDCO Sanitary” where specified on Contract Drawings.

(6) Add 2.1.7 (6) as follows:

Frame to be adjustable to within 5mm of design elevation and grade.

(7) Add 2.1.7 (7) as follows:

Frame to be designed to eliminate any point loading on the concrete riser ring.

(8) Add 2.1.7 (8) as follows:

Support ring must be designed to provide proper alignment of frame and cover over manhole opening.

(9) Add 2.1.7 (9) as follows:

Frame to be designed so as to provide a minimum 25mm gap between support ring and adjustable frame base for proper placement of concrete and to eliminate concrete sloughing into the manhole.

(10) Add 2.1.7 (10) as follows:

All components to be reusable.

.11 Delete 2.1.11 and replace with the following:
Catchbasin leads to be minimum 200mm diameter and PVC DR 35 unless noted otherwise on the *Contract Drawings*.

.15 Mortar

(3) Add 2.1.15 (3) as follows:

Support concrete to be non-shrink type, minimum 20 MPa @ 28 days, maximum 10mmØ aggregate.

.16 Adjusting rings: to ASTM C478

(3) Add 2.1.16 (3) as follows:

Steel riser rings welded to the top of existing manhole frames is not permitted.

3.0 EXECUTION

3.3 Manhole Installation

.9

(1) Add 3.3.9 (1) as follows:

'Conseal' continuous joint sealer is permitted.

.19 Add 3.3.19 as follows:

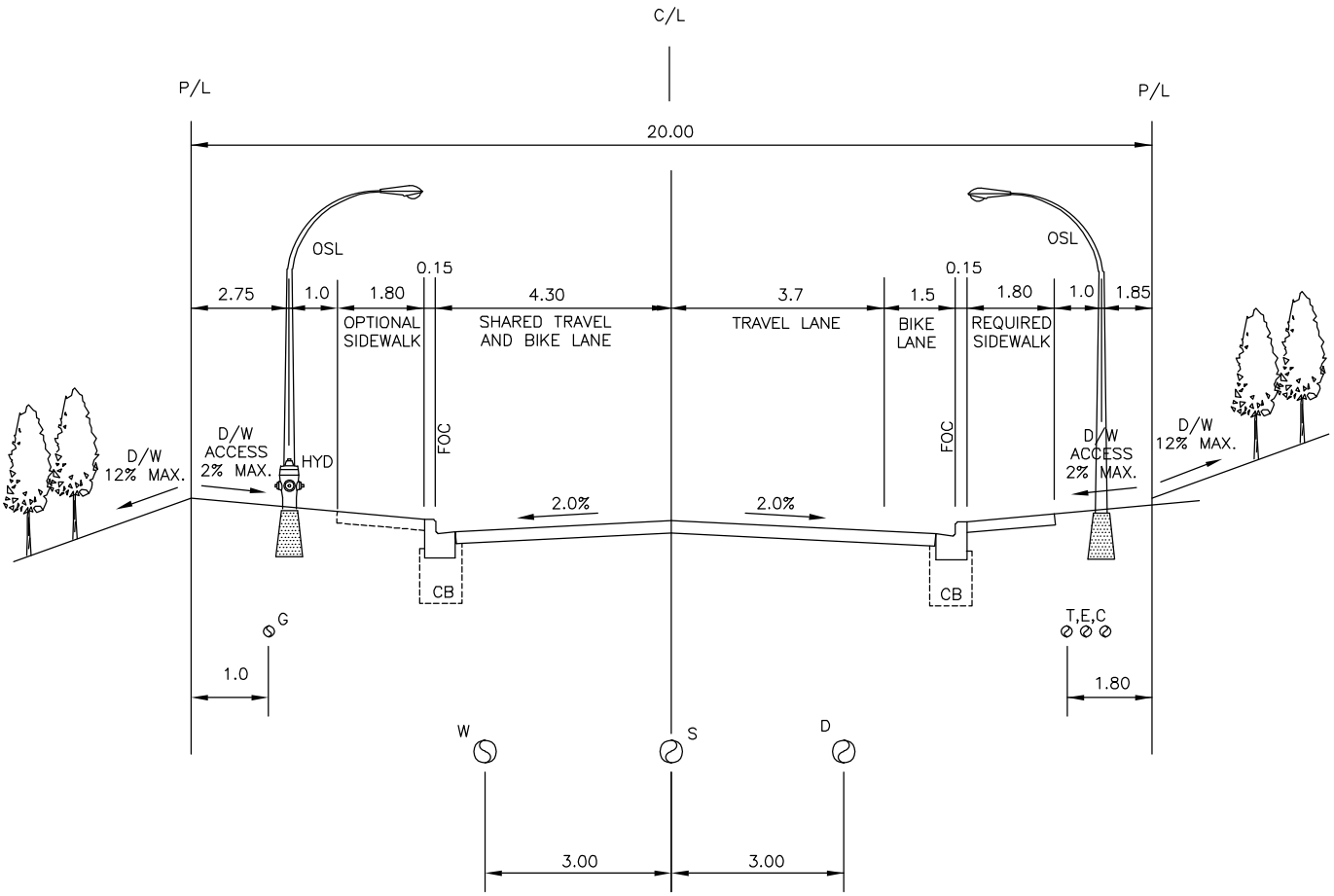
Where manholes are to be installed in new or re-constructed roadways that require two lifts of asphalt, interim adjustment of manhole frames and covers is to occur after lower course asphalt is in place when lower course asphalt is intended for traffic use. Final adjustment of manhole frames and covers is to occur after the surface course asphalt is in place.

END OF SECTION

SCHEDULE 10
STANDARD DRAWINGS

Schedule 10. STANDARD DRAWINGS

SD-R1	Princeton Ave. Arterial Cross-Section
SD-R2	Beach Ave. Arterial Cross-Section
SD-R3	Downtown Urban Standard Cross-Section
SD-R4	Collector Cross-Section – Urban
SD-R5	Collector Cross-Section – Rural
SD-R6	Local Cross-Section – Urban
SD-R7	Local Cross-Section – Rural
SD-R8	Lane Cross-Sections
SD-R9	Hillside Cross-Sections – Local
SD-R10	Hillside Cross-Sections - Collector
SD-W1	Walkway and Multi-Use Pathway
SD-W2	Reinforced Concrete Stairs
SD-W3	Rural Walkway Cross Sections
SD-W4	Rural Walkway Stair Detail
SD-L1	Tree Planting Detail – Softscape
SD-L2	Tree Planting Detail – Hardscape
SD-S1	Drainage Drywell
SD-S2	Drainage Drywell Installation
SD-S3	Catch Basin Trapping Hood
SD-S4	Manhole Frame and Cover
SD-S5	*Lot* Servicing Locations
SD-HS1	Plan View of Parking Pullout Areas for Hillsides
SD-HS2	Residential Driveway Access Culvert and Outlet Construction Detail



LEGEND

C – CABLEVISION
T – TELEPHONE
G – GAS
E – ELECTRICAL
W – WATER
S – SANITARY SEWER
D – STORM SEWER

HYD – HYDRANT
P/L – PROPERTY LINE
C/L – CENTER LINE
R/W – RIGHT–OF–WAY
SWK – SIDEWALK
C – CURB
FOC – FACE OF CURB
CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1) HYDRANT VALVES ON TEE.
2) WATER SERVICE VALVES 0.3 FROM P/L.
3) STREET LIGHTS ON BOTH SIDES ALTERNATING.
4) 1.5m BIKELANE ON THE UPHILL SLOPE (OPTIONAL)

DISTRICT OF PEACHLAND

NTS

DATE DRAWN: NOV.2009

LATEST REVISION DATE: JAN.2023

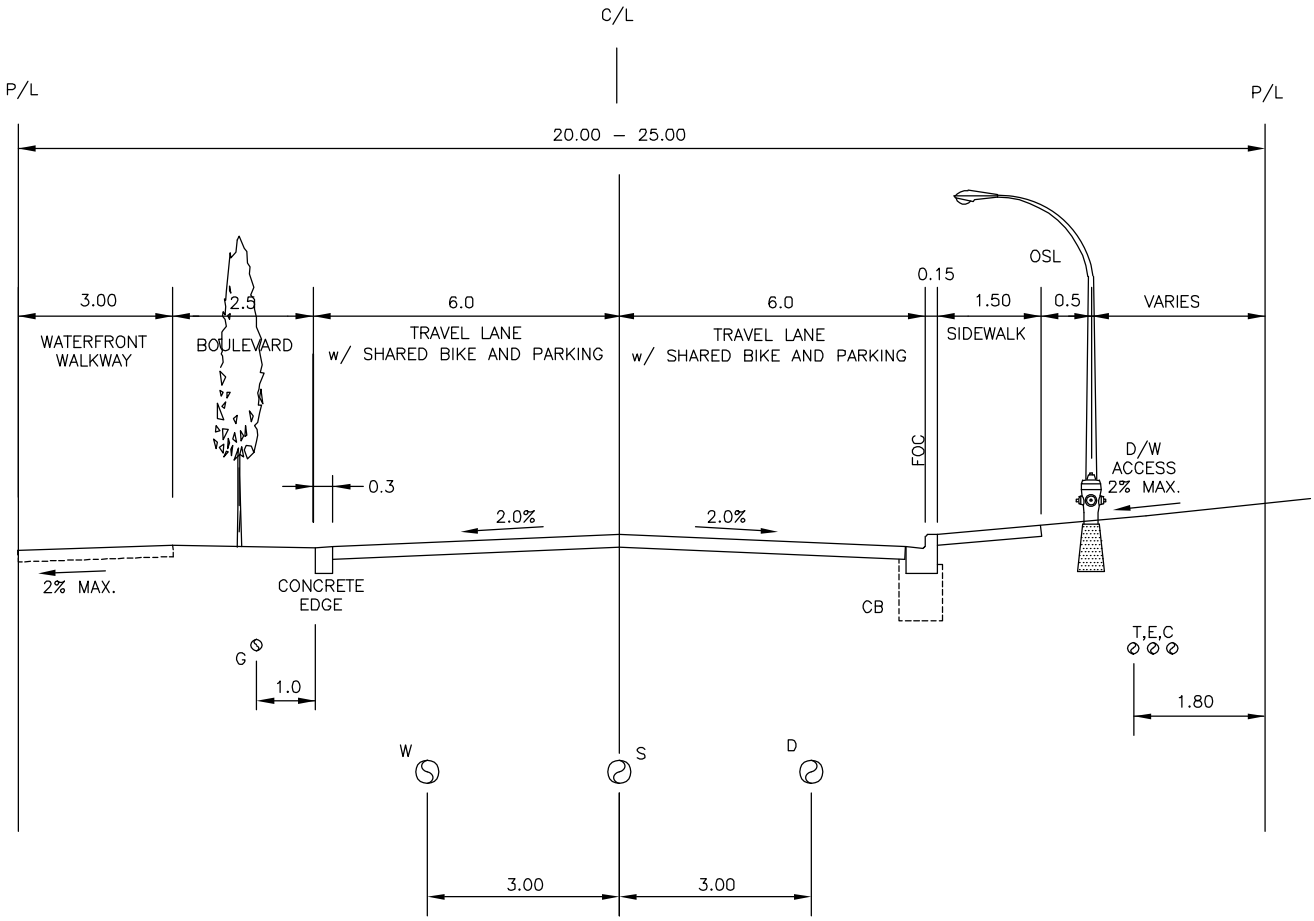
APPROVED BY: –

PRINCETON AVE. ARTERIAL CROSS–SECTION

SECTION: – –

REVISION No. –

DWG.No. SD–R1



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NOTES:

1) HYDRANT VALVES ON TEE.
2) WATER SERVICE VALVES 0.3 FROM P/L.
3) STREET LIGHTS ON BOTH SIDES ALTERNATING.

DISTRICT OF PEACHLAND

NTS

DATE DRAWN: NOV.2009

LATEST REVISION DATE: JAN.2023

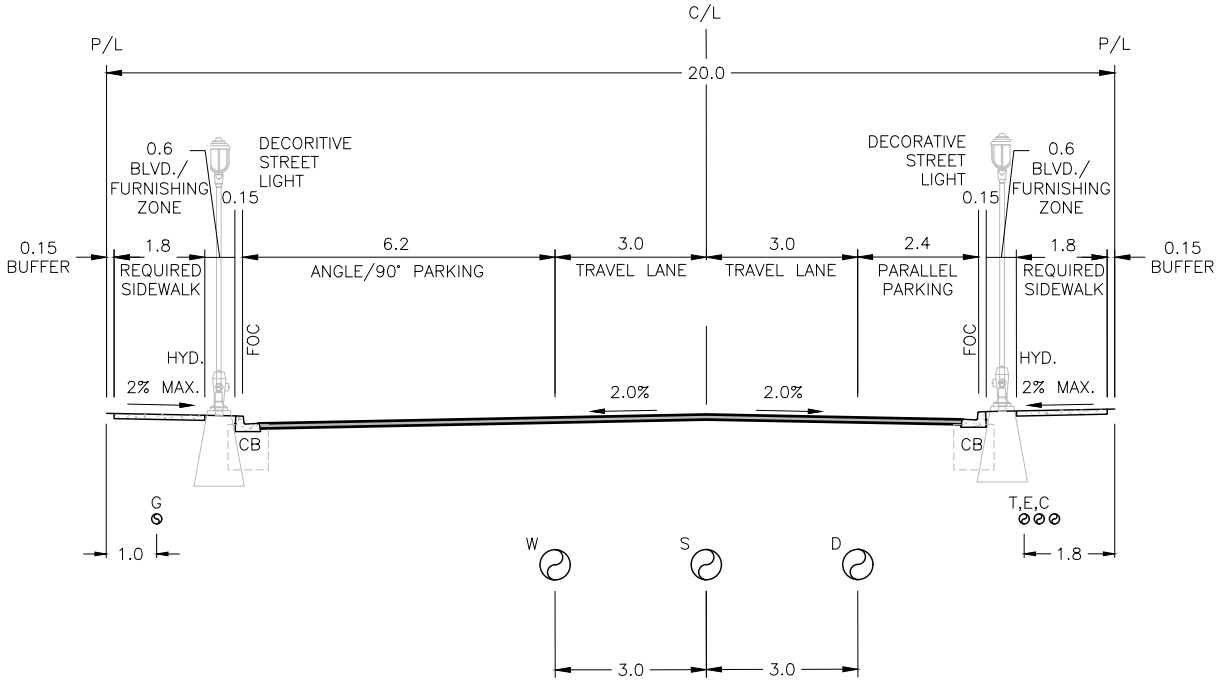
APPROVED BY: –

BEACH AVE. ARTERIAL CROSS–SECTION

SECTION: – –

REVISION No. –

DWG.No. SD–R2



LEGEND:

C – CABLEVISION
T – TELEPHONE
G – GAS
E – ELECTRICAL
W – WATER
S – SANITARY SEWER
D – STORM SEWER

HYD – HYDRANT
P/L – PROPERTY LINE
C/L – CENTRE LINE
R/W – RIGHT–OF–WAY
SWK – SIDEWALK
C – CURB
FOC – FACE OF CURB
CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1) HYDRANT VALVES ON TEE.
2) WATER SERVICE VALVES 0.3m FROM P/L.
3) STREET LIGHTS ON BOTH SIDES ALTERNATING.
4) ALL UTILITIES TO BE UNDERGROUND.
5) DECORATIVE STREET LIGHTS TO BE PROVIDED.

DISTRICT OF PEACHLAND

SCALE: NTS

DATE DRAWN: OCT.2022

LATEST REVISION DATE: OCT.2022

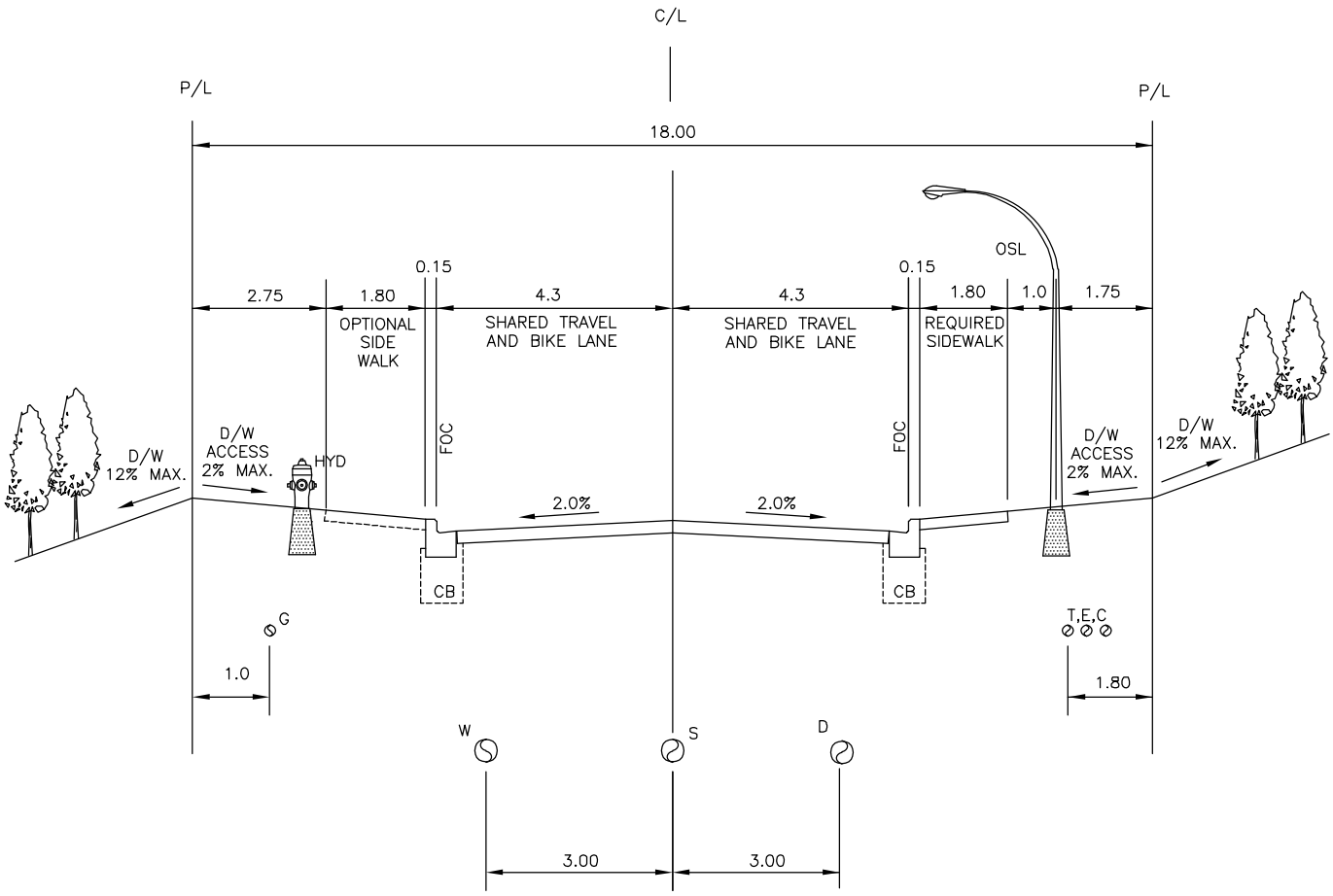
APPROVED BY: –

TITLE: DOWNTOWN URBAN STANDARD CROSS–SECTION

SECTION: – –

REVISION No. 0

DWG.No. SD–R3



LEGEND

C – CABLEVISION
T – TELEPHONE
G – GAS
E – ELECTRICAL
W – WATER
S – SANITARY SEWER
D – STORM SEWER

HYD – HYDRANT
P/L – PROPERTY LINE
C/L – CENTER LINE
R/W – RIGHT–OF–WAY
SWK – SIDEWALK
C – CURB
FOC – FACE OF CURB
CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1) HYDRANT VALVES ON TEE.
2) WATER SERVICE VALVES 0.3 FROM P/L.
3) FOR OFF–STREET PARKING OPPORTUNITIES, INCREASE ASPHALT WIDTH BY 1.4m EACH SIDE

DISTRICT OF PEACHLAND

NTS

DATE DRAWN: NOV.2009

LATEST REVISION DATE: JAN.2023

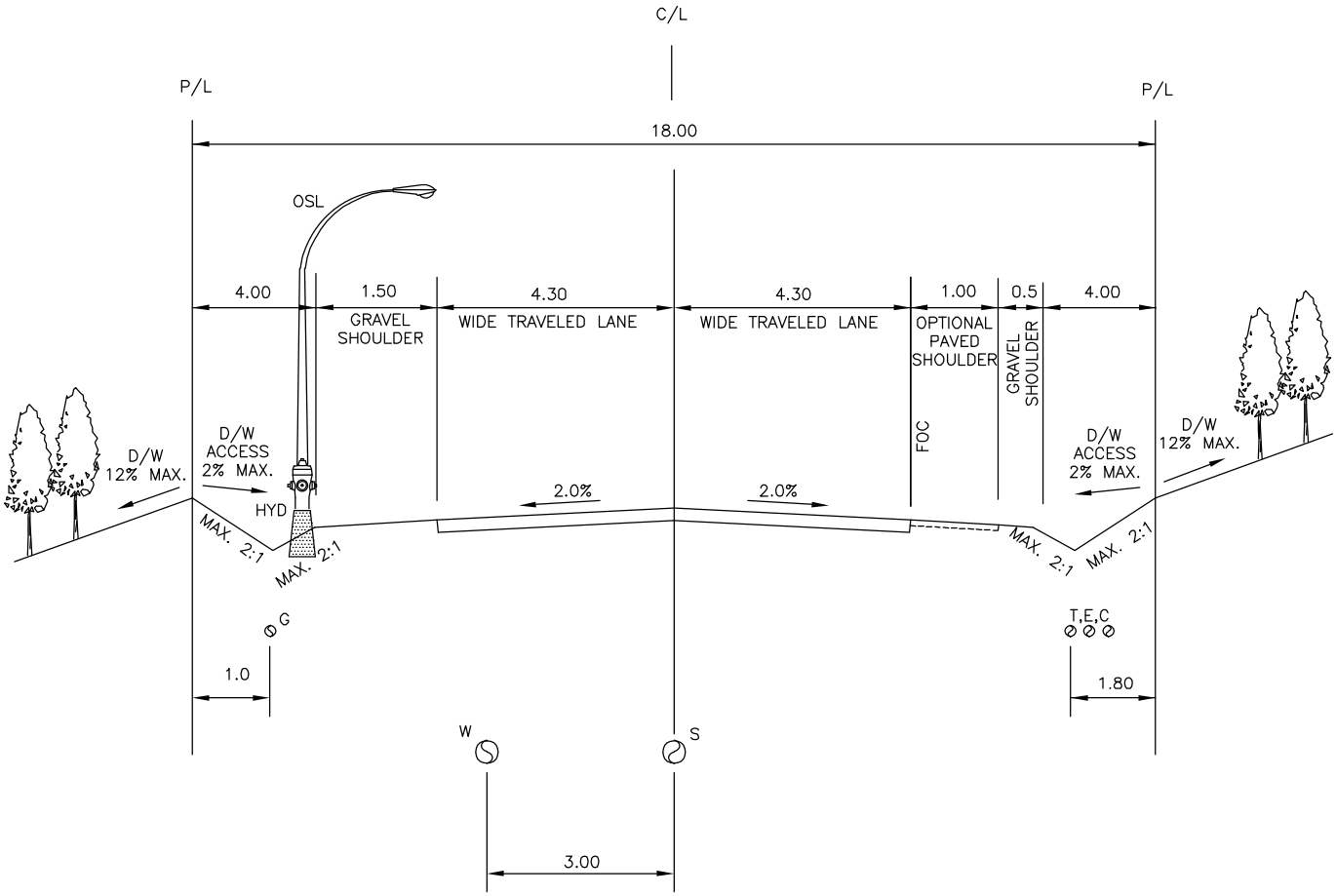
APPROVED BY: –

COLLECTOR CROSS–SECTION URBAN

SECTION: – –

REVISION No. –

DWG.No. SD–R4



LEGEND

C – CABLEVISION
T – TELEPHONE
G – GAS
E – ELECTRICAL
W – WATER
S – SANITARY SEWER
D – STORM SEWER

HYD – HYDRANT
P/L – PROPERTY LINE
C/L – CENTER LINE
R/W – RIGHT–OF–WAY
SWK – SIDEWALK
C – CURB
FOC – FACE OF CURB
CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1) HYDRANT VALVES ON TEE.
2) WATER SERVICE VALVES 0.3 FROM P/L.
3) DRAINAGE TREATMENT VARIES DEPENDING ON SITE SPECIFIC GROUND CONDITIONS.
4) FOR OFF–STREET PARKING OPPORTUNITIES INCREASE ASPHALT WIDTH BY 1.4m EACHSIDE

DISTRICT OF PEACHLAND

NTS

DATE DRAWN: NOV.2009

LATEST REVISION DATE: JAN.2023

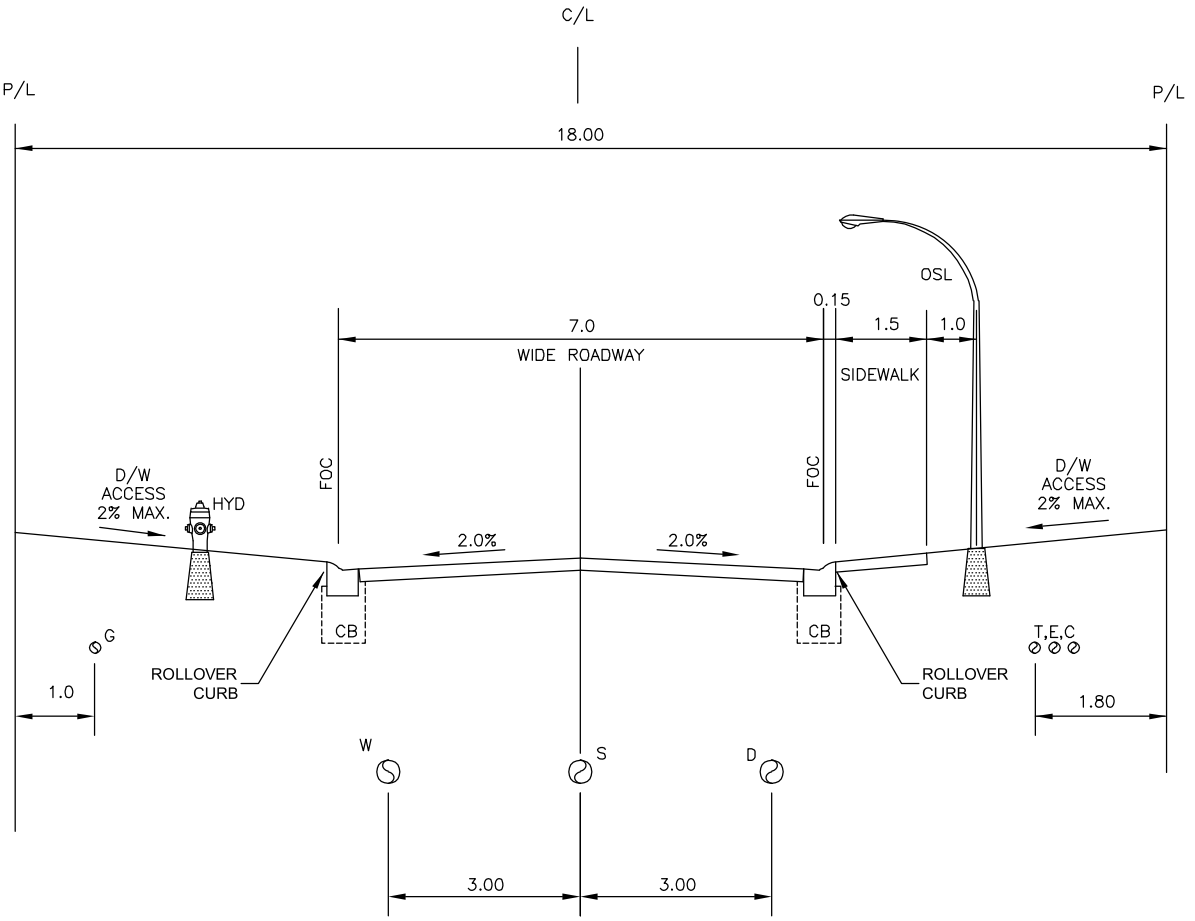
APPROVED BY: –

COLLECTOR CROSS–SECTION RURAL

SECTION: –
–

REVISION No. –

DWG.No. SD–R5



LEGEND

C – CABLEVISION
T – TELEPHONE
G – GAS
E – ELECTRICAL
W – WATER
S – SANITARY SEWER
D – STORM SEWER

HYD – HYDRANT
P/L – PROPERTY LINE
C/L – CENTER LINE
R/W – RIGHT–OF–WAY
SWK – SIDEWALK
C – CURB
FOC – FACE OF CURB
CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1) HYDRANT VALVES ON TEE.
2) WATER SERVICE VALVES 0.3 FROM P/L.
3) RIGHT OF WAY MAY BE REDUCED TO 15.0m DEPENDING ON GEOTECHNICAL CONSIDERATIONS, SLOPE ANALYSIS, OR CUL–DE–SAC DESIGN.
4) PARKING ADD 1.4m PAVED SURFACE EACH SIDE

DISTRICT OF PEACHLAND

NTS

DATE DRAWN: NOV.2009

LATEST REVISION DATE: JAN.2023

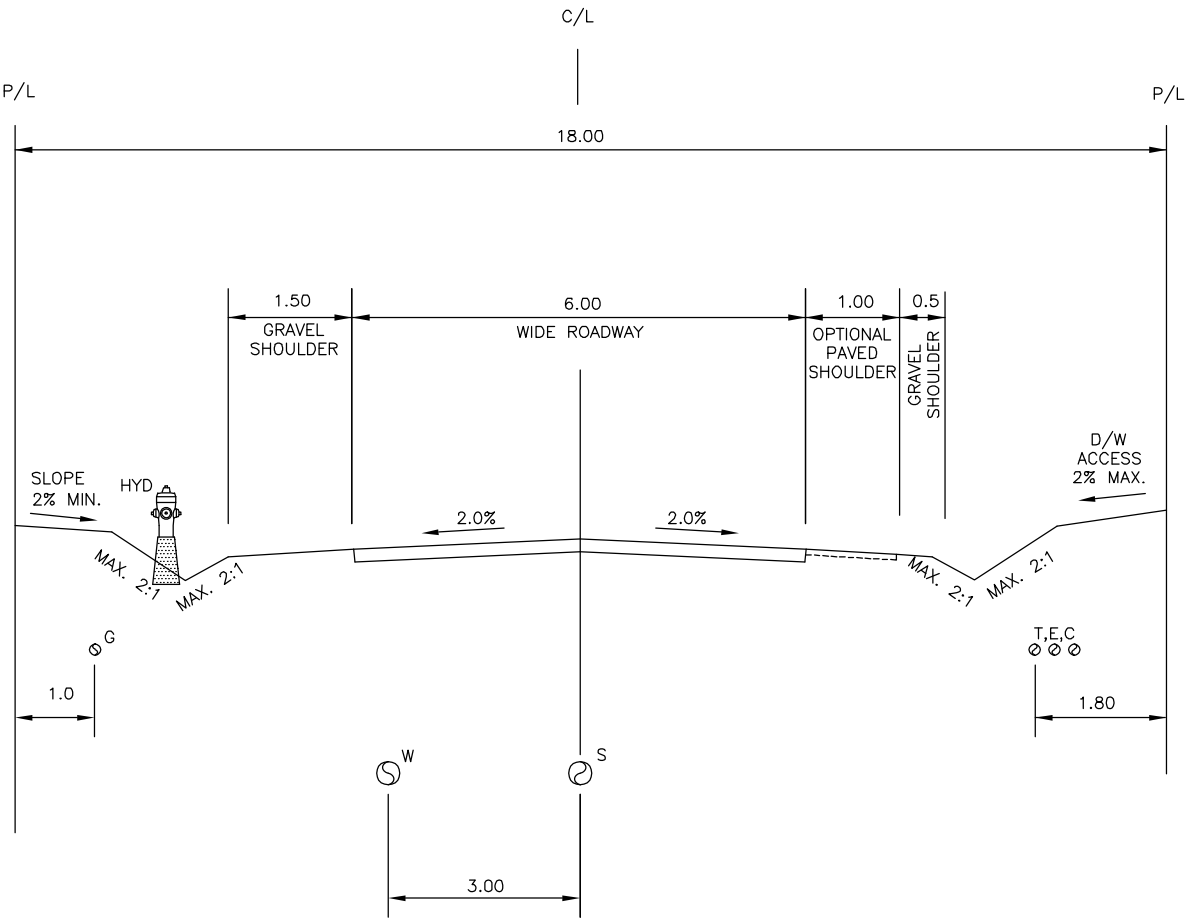
APPROVED BY: –

LOCAL CROSS–SECTION URBAN

SECTION: – –

REVISION No. –

DWG.No. SD–R6



LEGEND

C – CABLEVISION
T – TELEPHONE
G – GAS
E – ELECTRICAL
W – WATER
S – SANITARY SEWER
D – STORM SEWER

HYD – HYDRANT
P/L – PROPERTY LINE
C/L – CENTER LINE
R/W – RIGHT–OF–WAY
SWK – SIDEWALK
C – CURB
FOC – FACE OF CURB
CB – CATCH BASIN
OSL – STREET LIGHT

NOTES:

1) HYDRANT VALVES ON TEE.
2) WATER SERVICE VALVES 0.3 FROM P/L.
3) DRAINAGE TREATMENT VARIES DEPENDING ON SITE SPECIFIC GROUND CONDITIONS.
4) RIGHT OF WAY MAY BE REDUCED TO 15.0m DEPENDING ON GEOTECHNICAL CONSIDERATIONS, SLOPE ANALYSIS, OR CUL–DE–SAC DESIGN.

DISTRICT OF PEACHLAND

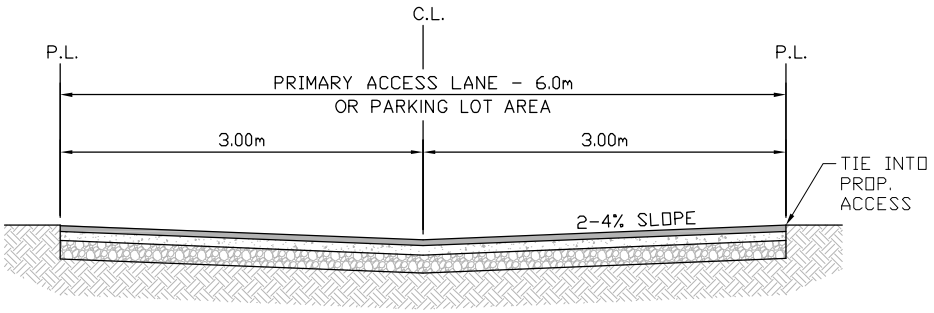
NTS

DATE DRAWN: NOV.2009 | LATEST REVISION DATE: JAN.2023

APPROVED BY: –

LOCAL CROSS–SECTION RURAL

SECTION: – – | REVISION No. – | DWG.No. SD–R7



COMMERCIAL/MULTI-FAMILY PRIMARY ACCESS LANE OR PARKING LOT

OR

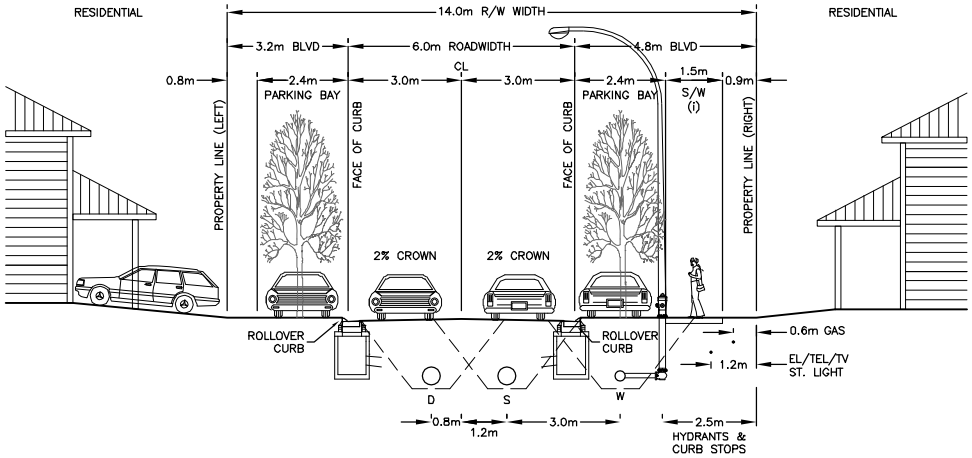
RESIDENTIAL, EMERGENCY AND PRIVATE ACCESS ROADS

Notes:

1) **Finished surface to be hot-mix asphalt paved with catch basins and stormwater system**
2) **Lane to be crowned or installed with cross-fall with District approval**
3) **Curb and gutter may be required by Approving Officer**

DISTRICT OF PEACHLAND	NTS	LANE CROSS-SECTIONS	
	DATE DRAWN: NOV.2009 / LATEST REVISION DATE: JAN.2023		
	APPROVED BY: –	SECTION: – –	REVISION No. – / DWG.No. SD-R8

Ⓐ



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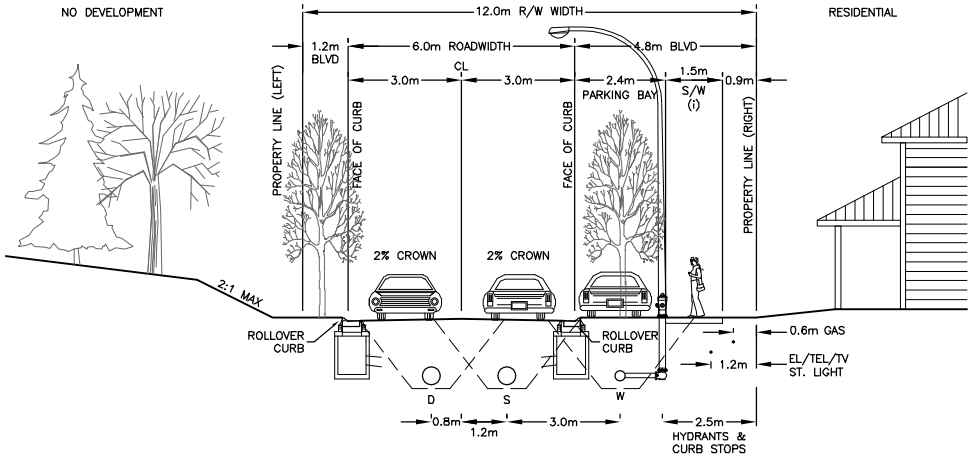

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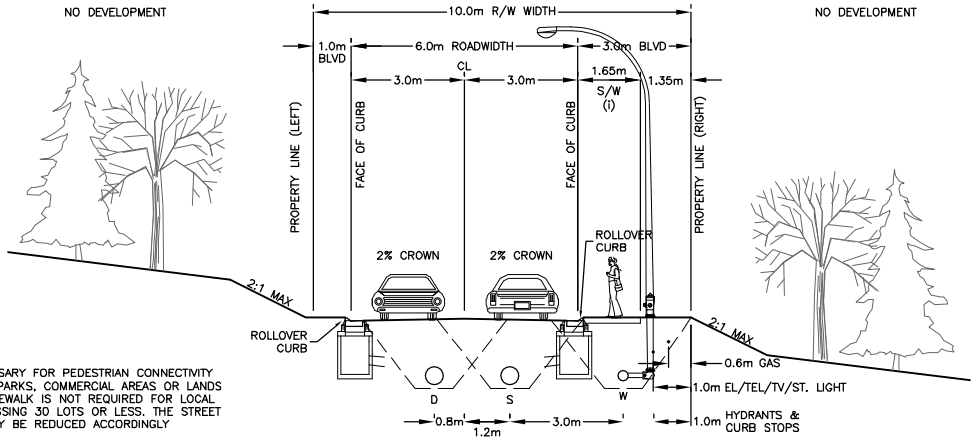
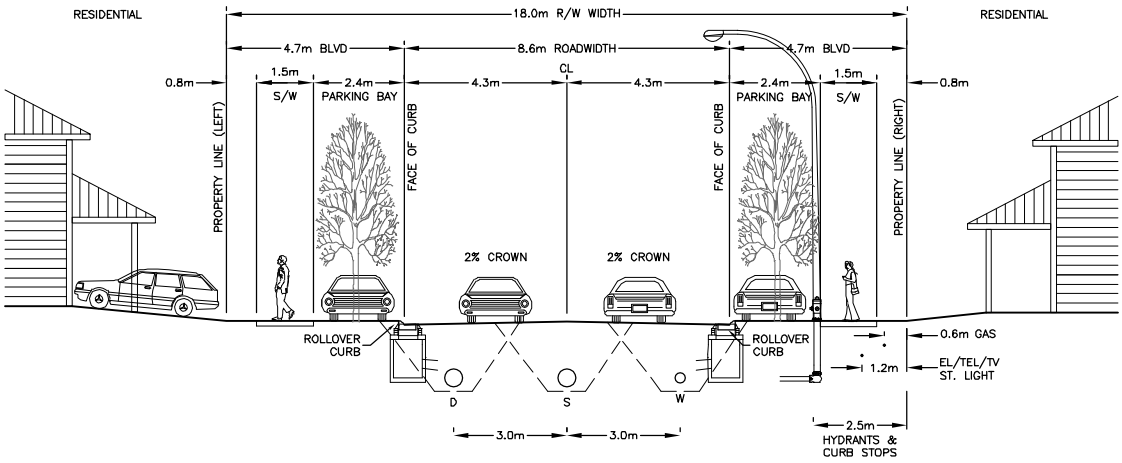


(i) – UNLESS NECESSARY FOR PEDESTRIAN CONNECTIVITY TO SCHOOLS, PARKS, COMMERCIAL AREAS OR LANDS BEYOND, A SIDEWALK IS NOT REQUIRED FOR LOCAL STREETS ACCESSING 30 LOTS OR LESS. THE STREET ROW WIDTH MAY BE REDUCED ACCORDINGLY

DISTRICT OF PEACHLAND

SCALE: NTS	TITLE: HILLSIDES – LOCAL
DATE DRAWN: OCT.2009	LATEST REVISION DATE: JAN.2023
APPROVED BY: –	SECTION: – –
REVISION No. –	DWG.No. SD–R9

Ⓐ



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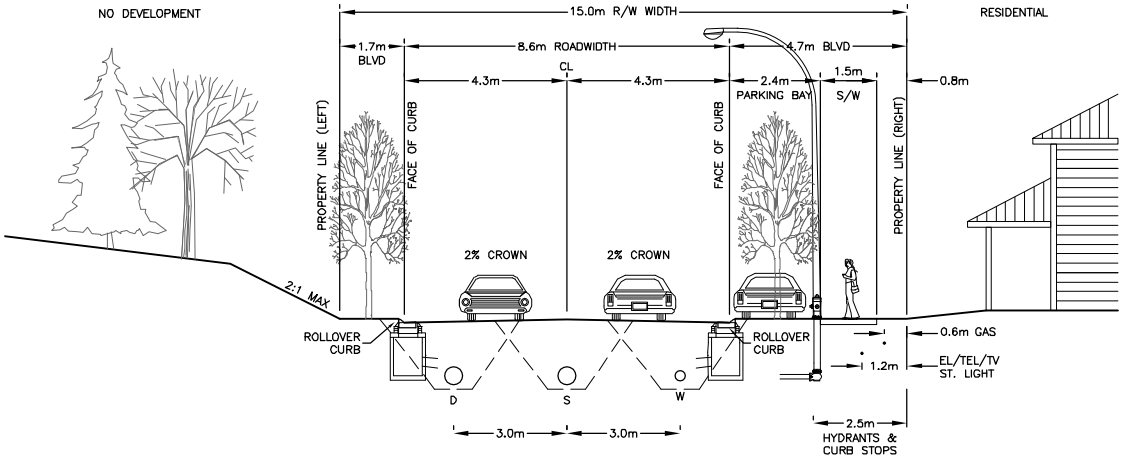

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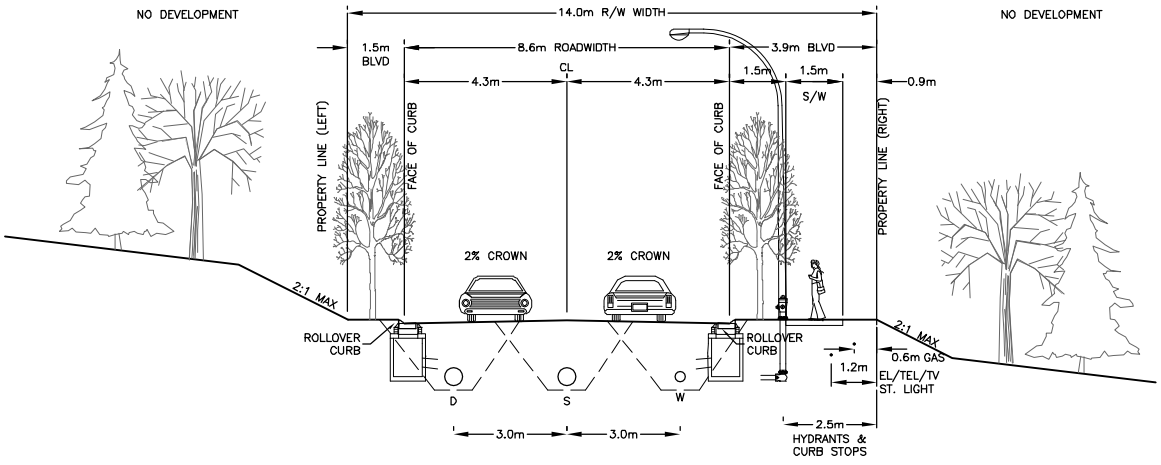
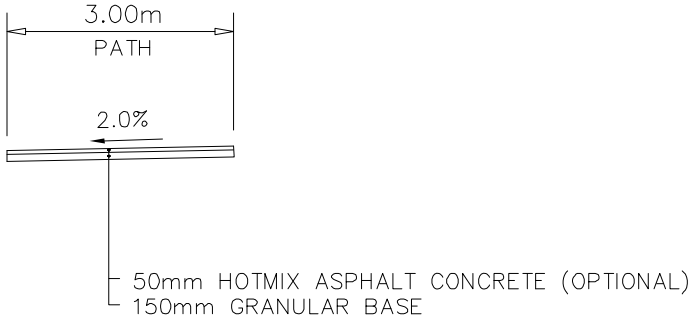
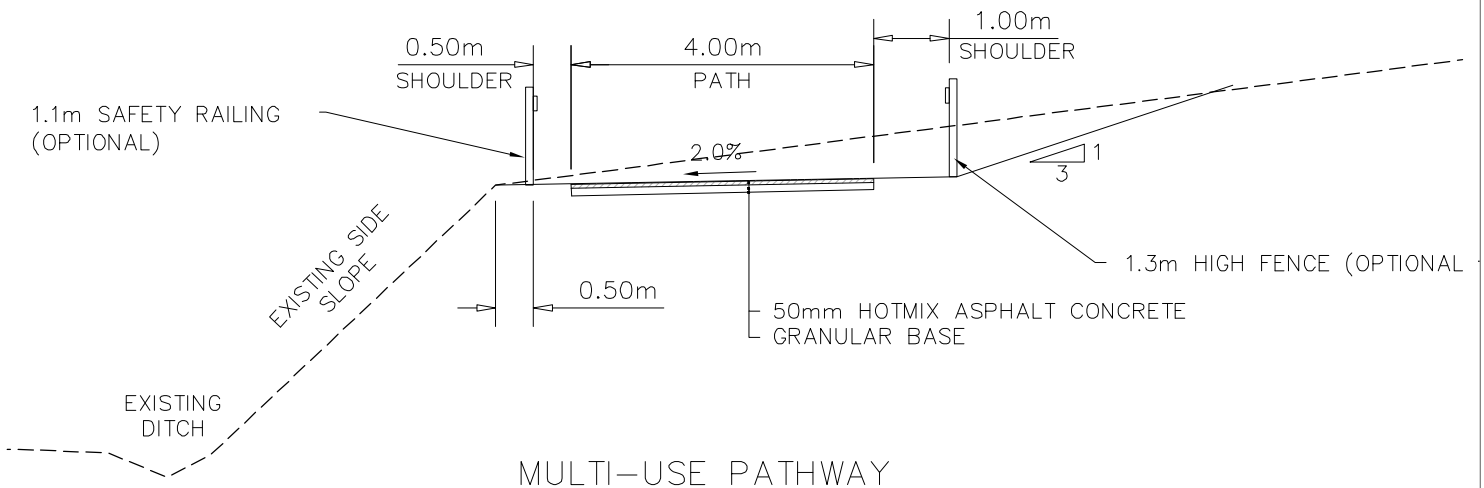


DISTRICT OF PEACHLAND

SCALE: NTS		TITLE: HILLSIDES – COLLECTOR
DATE DRAWN: OCT.2009	LATEST REVISION DATE: JAN.2023	
APPROVED BY: –		
SECTION: – –	REVISION No. –	DWG.No. SD-R10



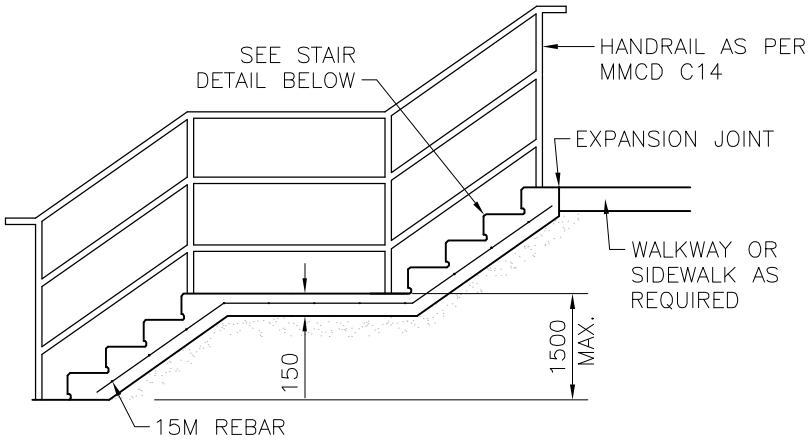
WALKWAY

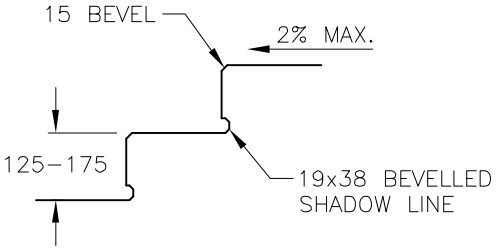


MULTI–USE PATHWAY

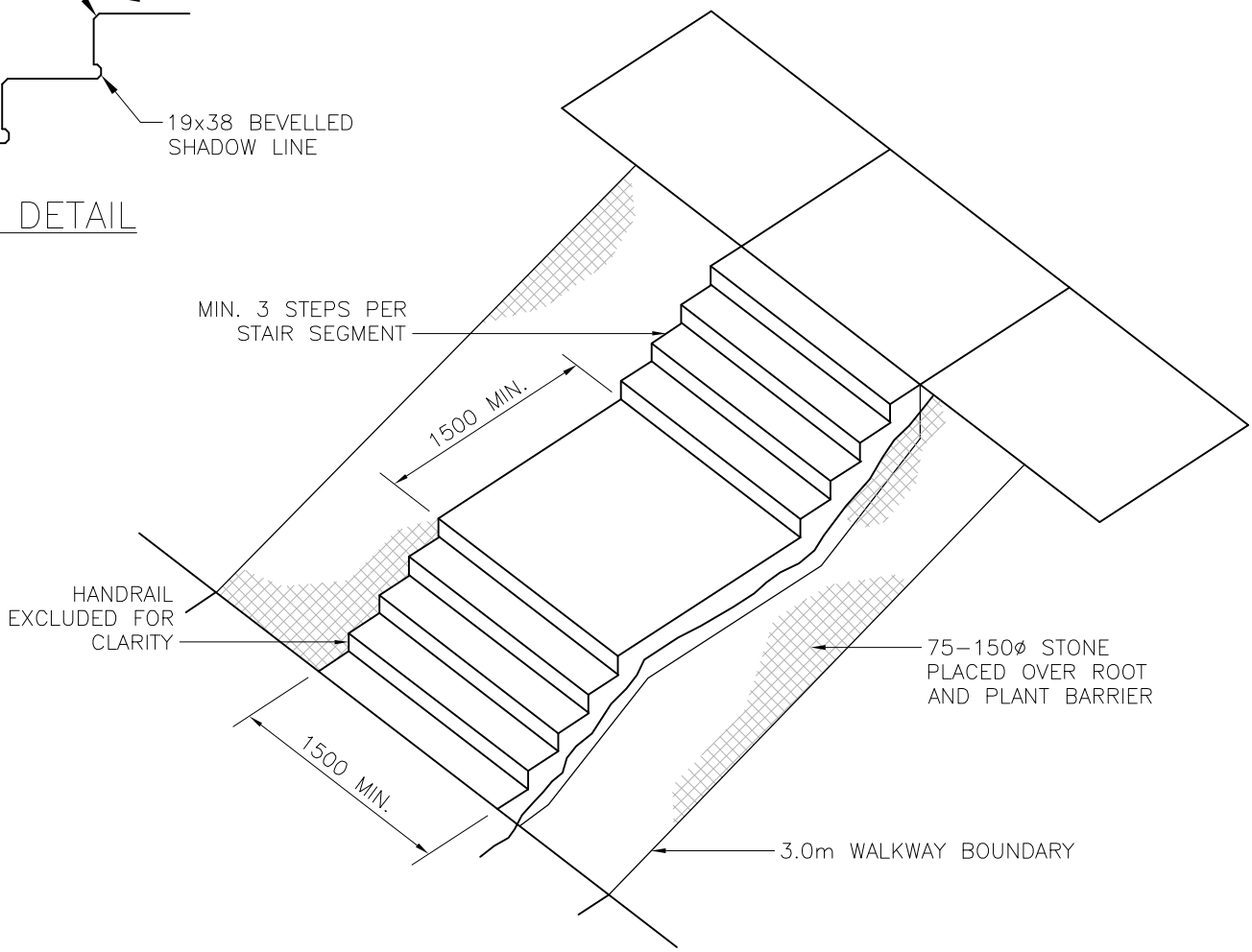
*NOTE: ACTUAL PATHWAY STRUCTURE TO BE DETERMINED BY A GEOTECHNICAL ENGINEER

DISTRICT OF PEACHLAND	SCALE: 1:100	TITLE: WALKWAY & MULTI–USE PATHWAY
	DATE DRAWN: NOV.2009 / LATEST REVISION DATE: JAN.2023	
	APPROVED BY: –	SECTION: – / REVISION No. – / DWG.No. SD–W1





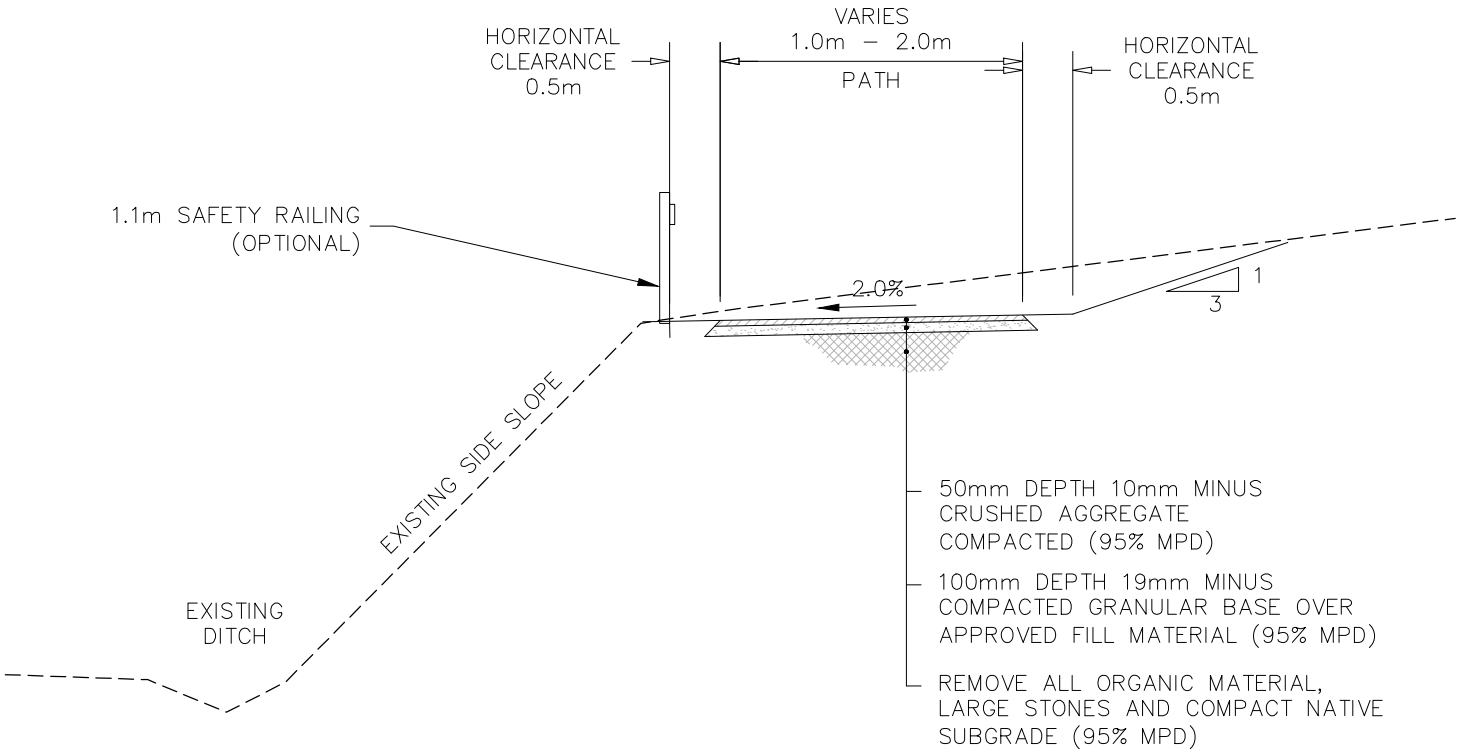
STAIR DETAIL



NOTE:

1. TREAD TO RISER RATIO SHALL BE (TREAD WIDTH+(2x RISER HEIGHT))=650–675mm

DISTRICT OF PEACHLAND	SCALE: NTS	TITLE: REINFORCED CONCRETE STAIRS	
	DATE DRAWN: NOV.2009 / LATEST REVISION DATE: JAN.2023		
	APPROVED BY: –	SECTION: – –	REVISION No. – / DWG.No. SD–W2

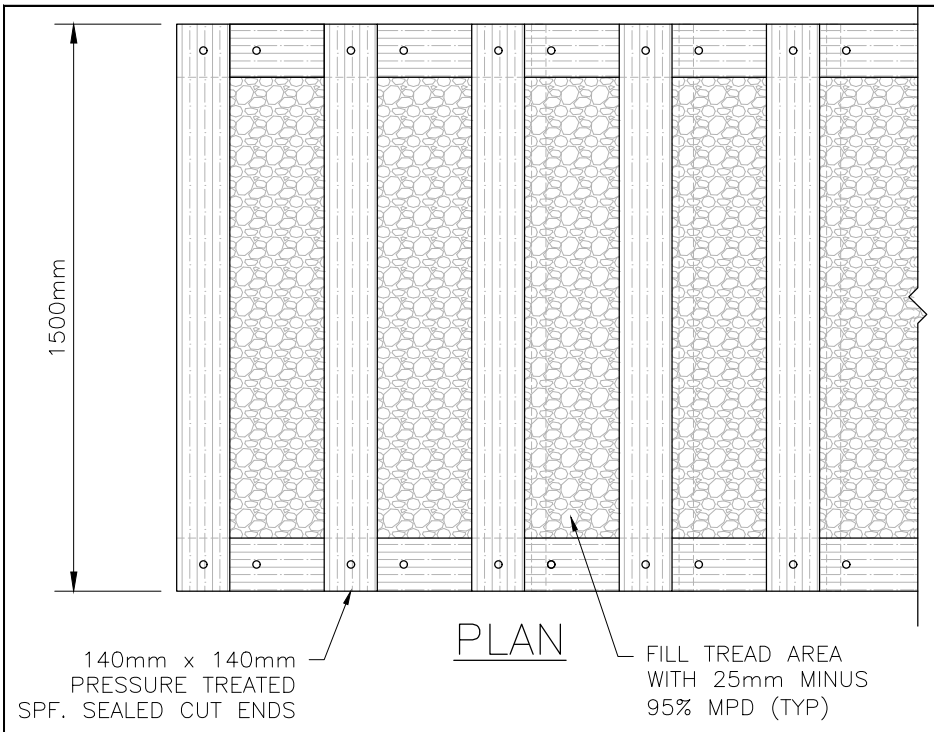


*NOTES:

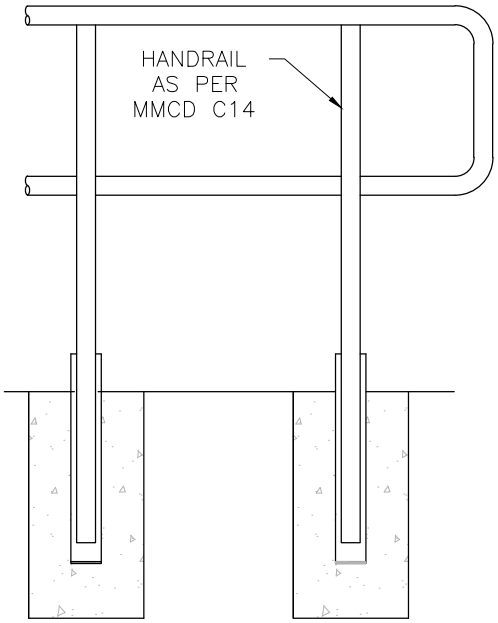
1. PROVIDE DRAINAGE SWALE AS REQUIRED

DISTRICT OF PEACHLAND

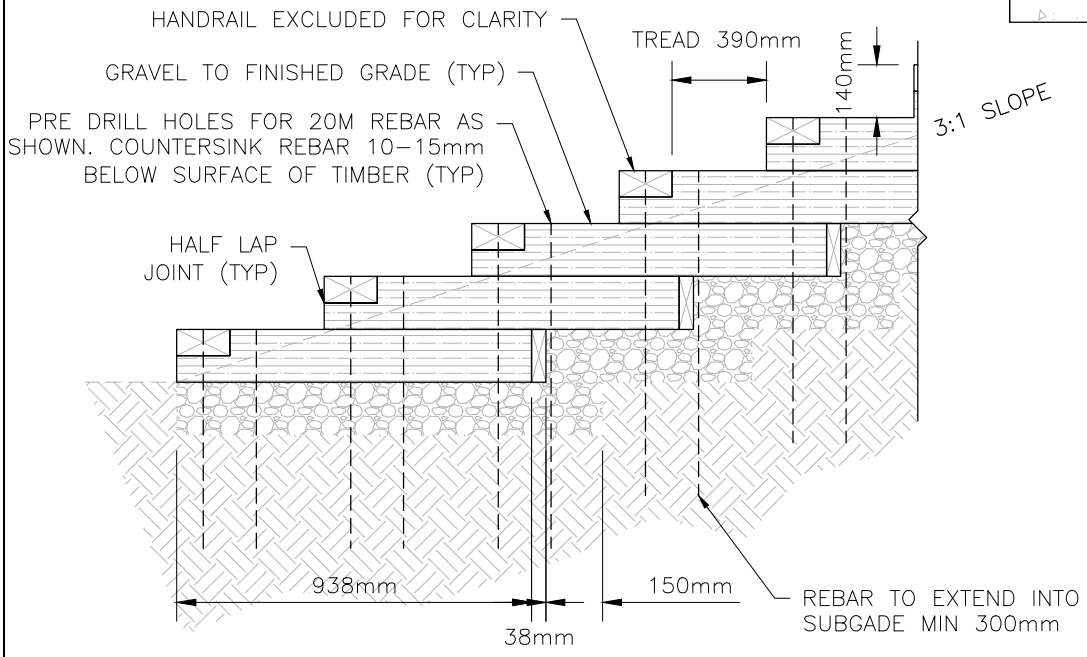
SCALE: 1:75		TITLE: RURAL WALKWAY CROSS SECTION
DATE DRAWN: MAY.2023	LATEST REVISION DATE:	
APPROVED BY: –		
SECTION: – –	REVISION No. –	DWG.No. SD–W3



PLAN



HANDRAIL



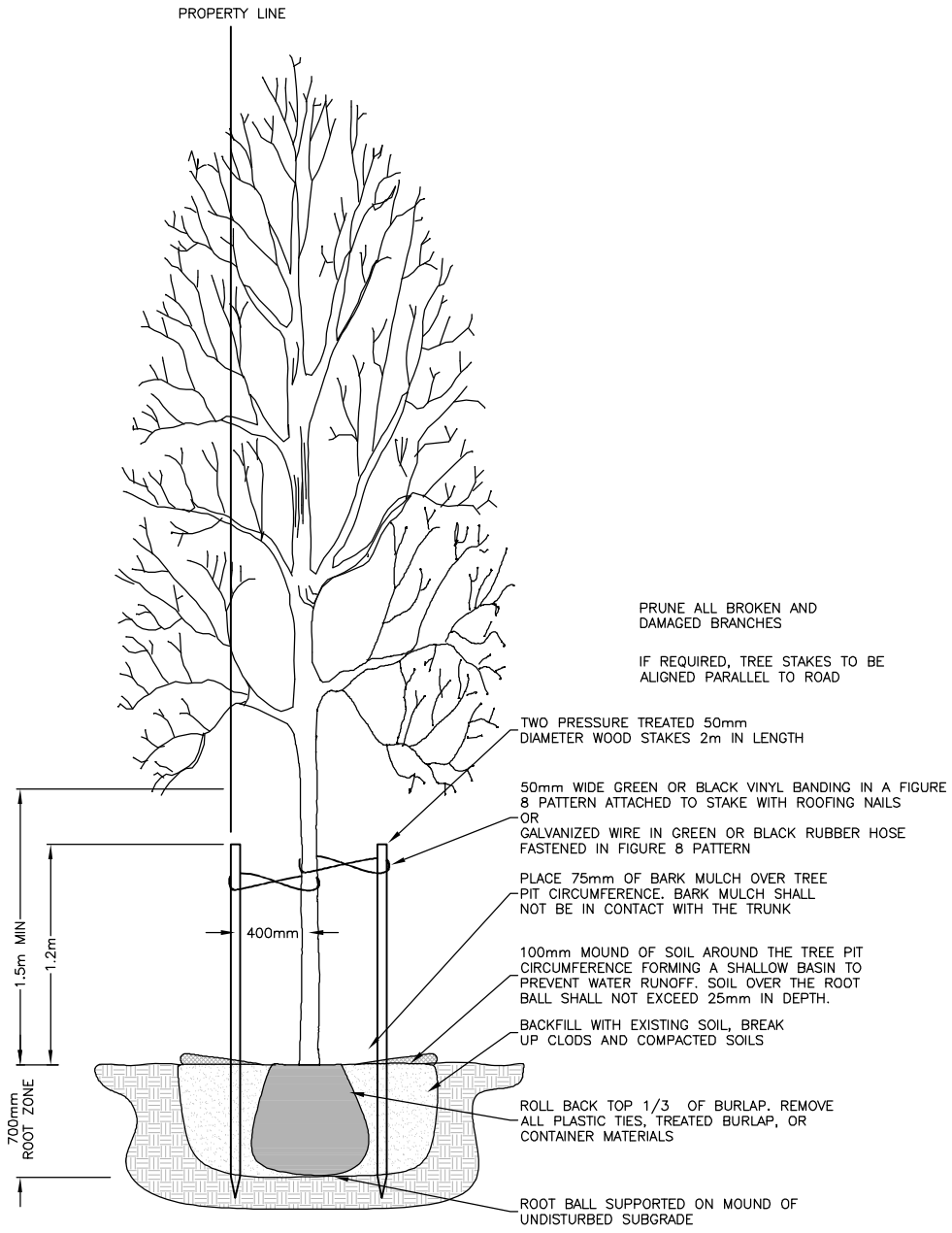
SECTION

NOTE:

1. ALL WOOD TO BE PRESSURE TREATED SPF.
2. STAIRS TO BE CONSTRUCTED TO DIVISION B – PART 3 OF THE BRITISH COLUMBIA BUILDING CODE.
3. A HAND RAIL IS REQUIRED ON ONE SIDE OF THE STAIRS.
4. A MINIMUM OF TWO SUPPORTS ARE REQUIRED BETWEEN LANDINGS.
5. HANDRAILS SHALL EXTEND HORIZONTALLY NOT LESS THAN 300mm BEYOND THE TOP AND BOTTOM OF THE STAIRWAY.
6. THE MAXIMUM VERTICAL RISE BETWEEN LANDINGS IS 3.7m.
7. TREADS AND LANDINGS MUST HAVE A DISTINCTIVE PATTERN ALONG THE LEADING EDGE THAT IS READILY VISIBLE FROM BOTH DIRECTIONS OF TRAVEL.
8. THE LENGTH OF ALL LANDINGS SHALL BE 1100mm.

DISTRICT OF PEACHLAND

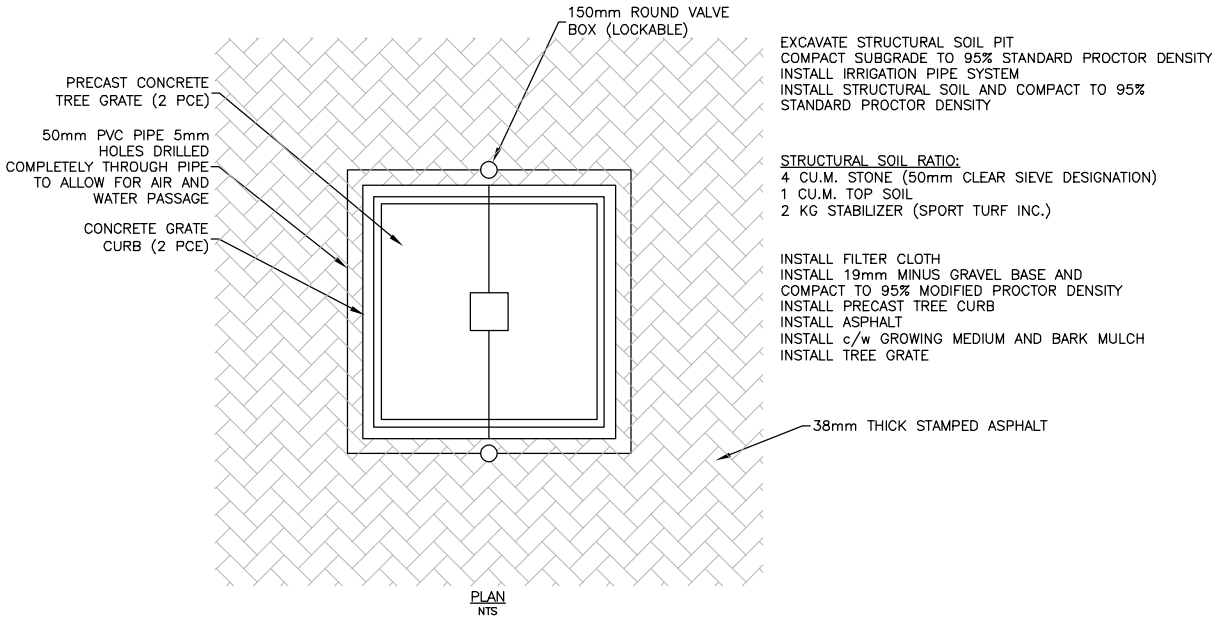
SCALE: NTS		TITLE: RURAL WALKWAY STAIR DETAIL
DATE DRAWN: MAY.2023	LATEST REVISION DATE:	
APPROVED BY: –		
SECTION: – –	REVISION No. –	DWG.No. SD–W4

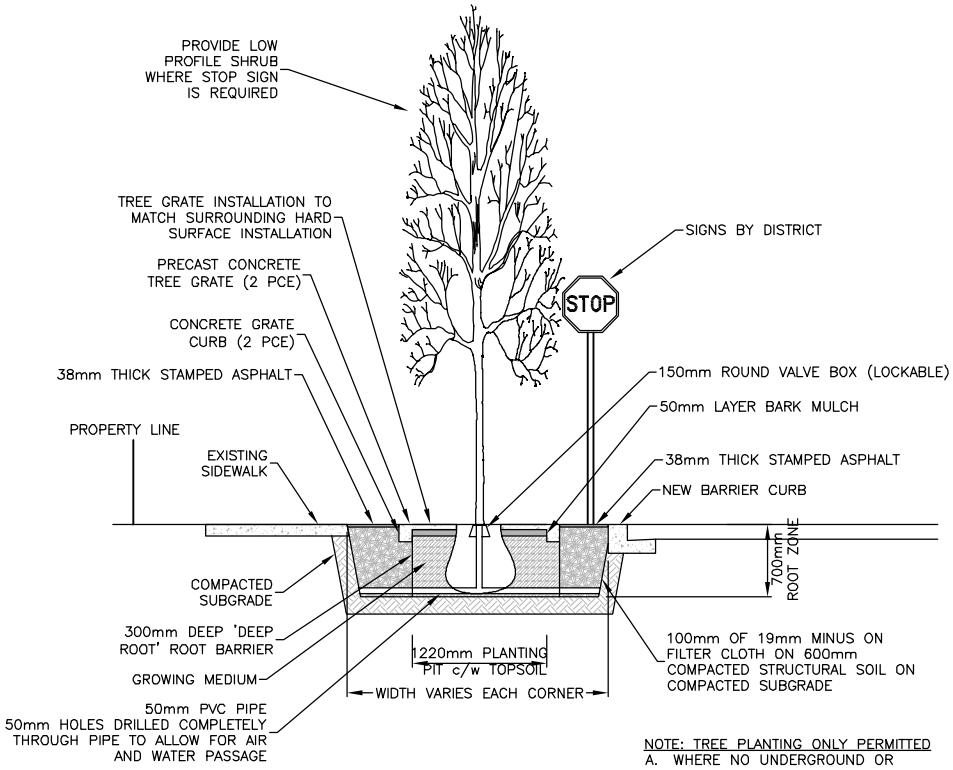


ALL PLANTING PITS SHOULD BE EXCAVATED BY HAND AS UNDERGROUND SERVICES MAY EXIST NEAR STREET TREE LOCATIONS

DISTRICT OF PEACHLAND

SCALE: NTS		TITLE: TREE PLANTING DETAIL – SOFTSCAPE
DATE DRAWN: NOV.2009	LATEST REVISION DATE: JAN.2023	
APPROVED BY: –		
SECTION: – –	REVISION No. –	DWG.No. SD–L1



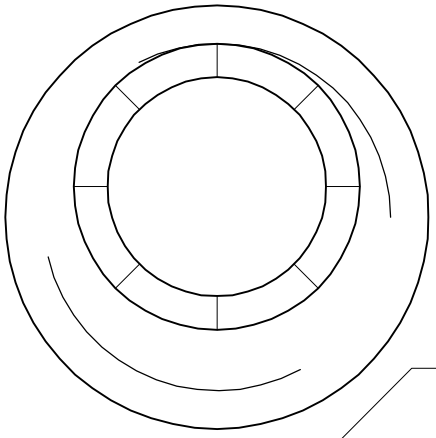


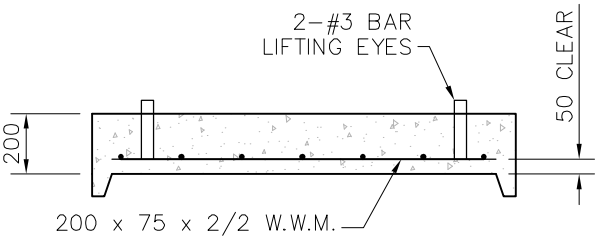
SECTION THROUGH PLANTER
NTS

NOTE: TREE PLANTING ONLY PERMITTED
A. WHERE NO UNDERGROUND OR OVERHEAD UTILITY CONFLICTS EXIST
B. NO TRAFFIC OR PEDESTRIAN SIGHT CLEARANCE CONFLICTS EXIST

DISTRICT OF PEACHLAND

SCALE: NTS		TITLE: TREE PLANTING DETAIL – HARDSCAPE
DATE DRAWN: NOV.2009	LATEST REVISION DATE: JAN.2023	
APPROVED BY: –		
SECTION: – –	REVISION No. –	DWG.No. SD–L2



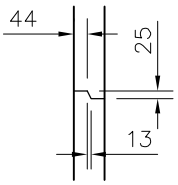


CONCRETE LID DETAIL

MANHOLE FRAME AND COVER
SEE STD. DRAWING

MIN. 100 BRICK
OR CONCRETE

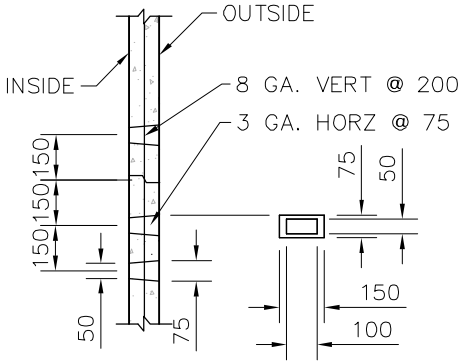
CONCRETE LID
SEE DETAIL THIS DRAWING

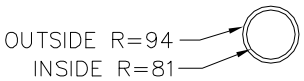


CONCRETE LID DETAIL

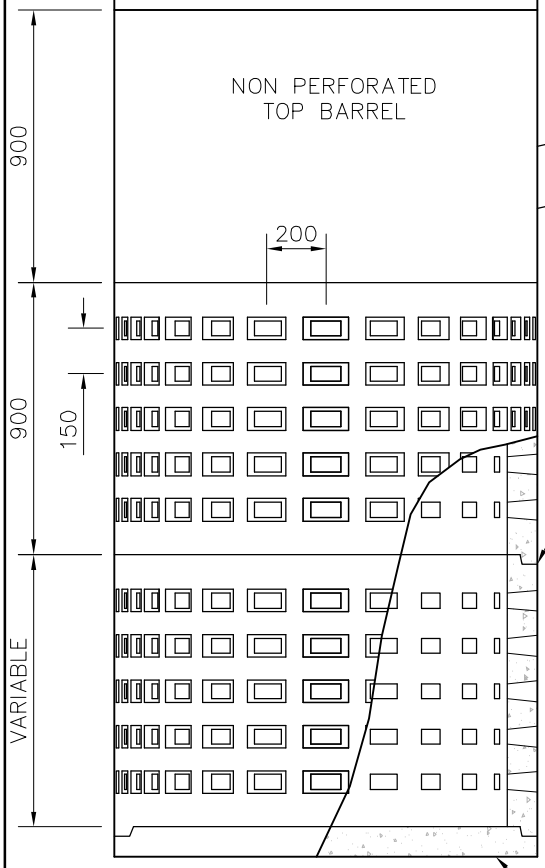
NON PERFORATED
TOP BARREL

200 DIA. INLET



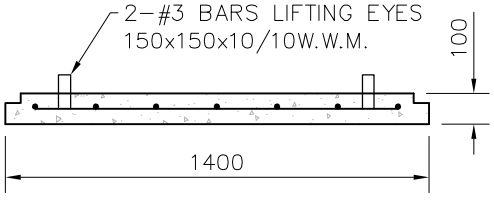


OPTIONAL HOLE SHAPE



PRECAST SECTIONS
1200 LD. x 100 WALLS
100–75x150 HOLES
SPACED VERT. 150
HORIZ. 200

SECTION–BARREL



BOTTOM SLAB DETAIL

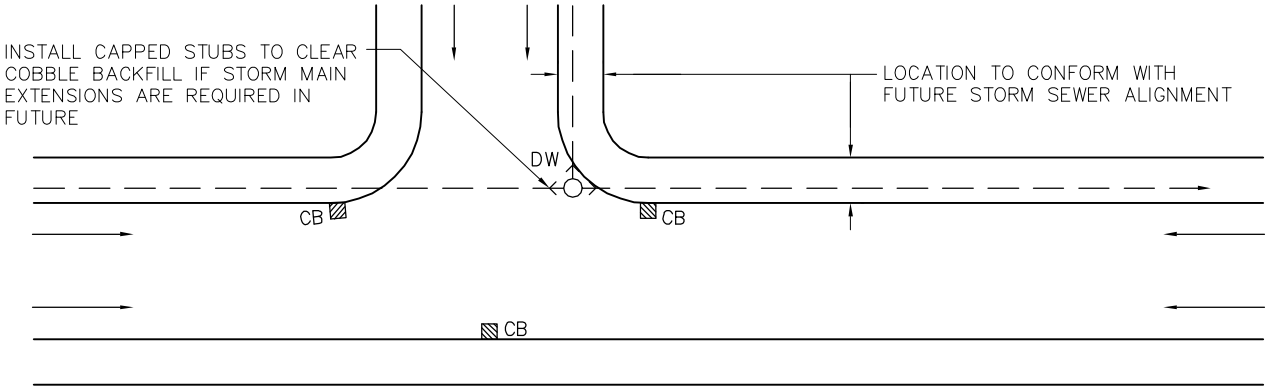
BOTTOM SLAB
SEE DETAIL

NOTE:

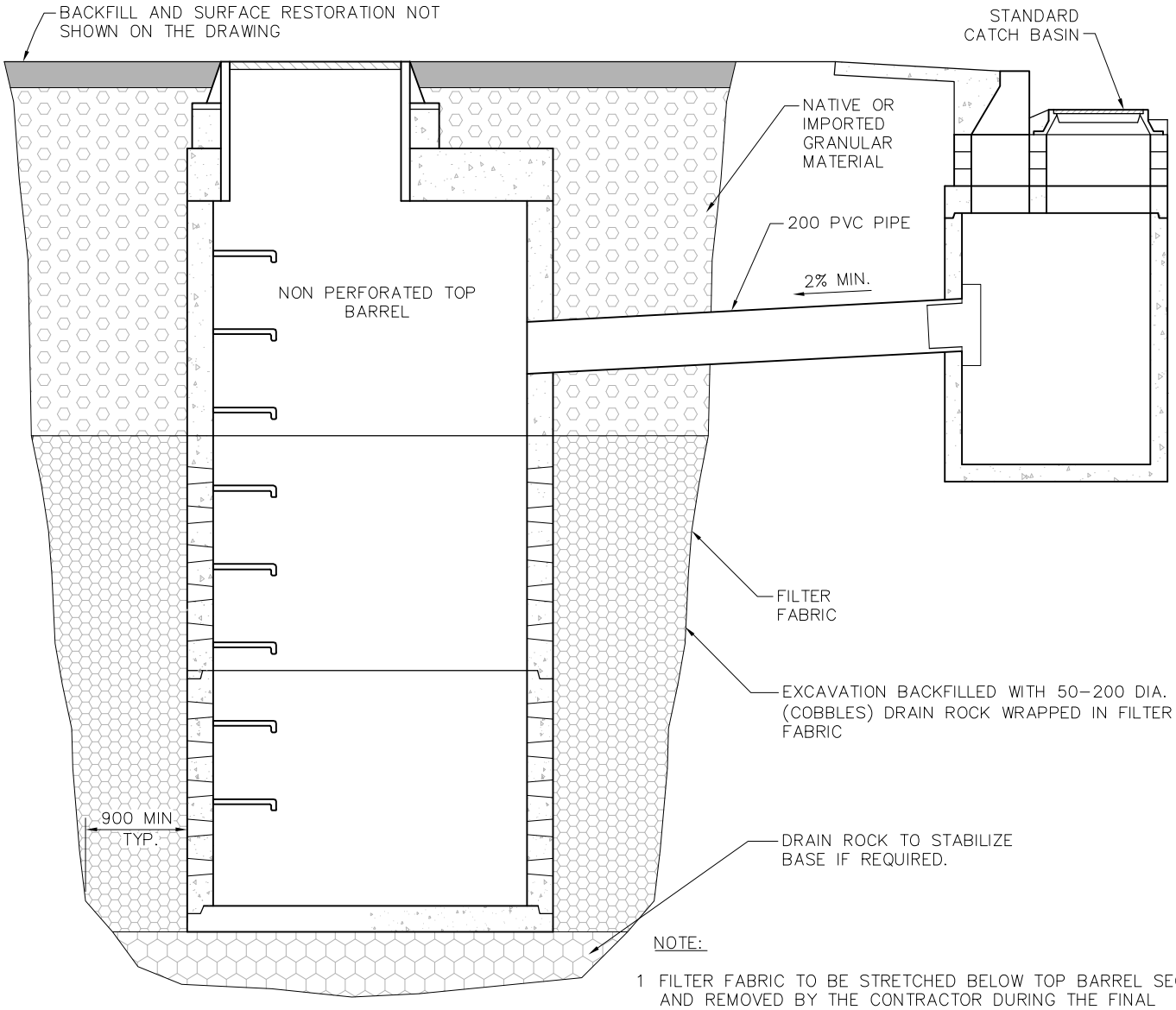
1. LADDER RUNGS ARE REQUIRED.
2. SEE MANHOLE STD. DWG FOR DETAILS.
3. SEE DRAINAGE DRYWELL INSTALLATION SD–S2.
4. DEPTH TO BE SPECIFIED WILL VARY DEPENDING UPON DRAINAGE REQUIREMENTS AND GROUND CONDITIONS. DEPTH TO WATER TABLE MUST BE SHOWN IF LESS THAN 3.6m.

DISTRICT OF
PEACHLAND

SCALE: 1:25		TITLE: DRAINAGE DRYWELL
DATE DRAWN: NOV.2009	LATEST REVISION DATE: –	
APPROVED BY: –		
SECTION: –	REVISION No. –	DWG.No. SD–S1



TYPICAL INSTALLATION

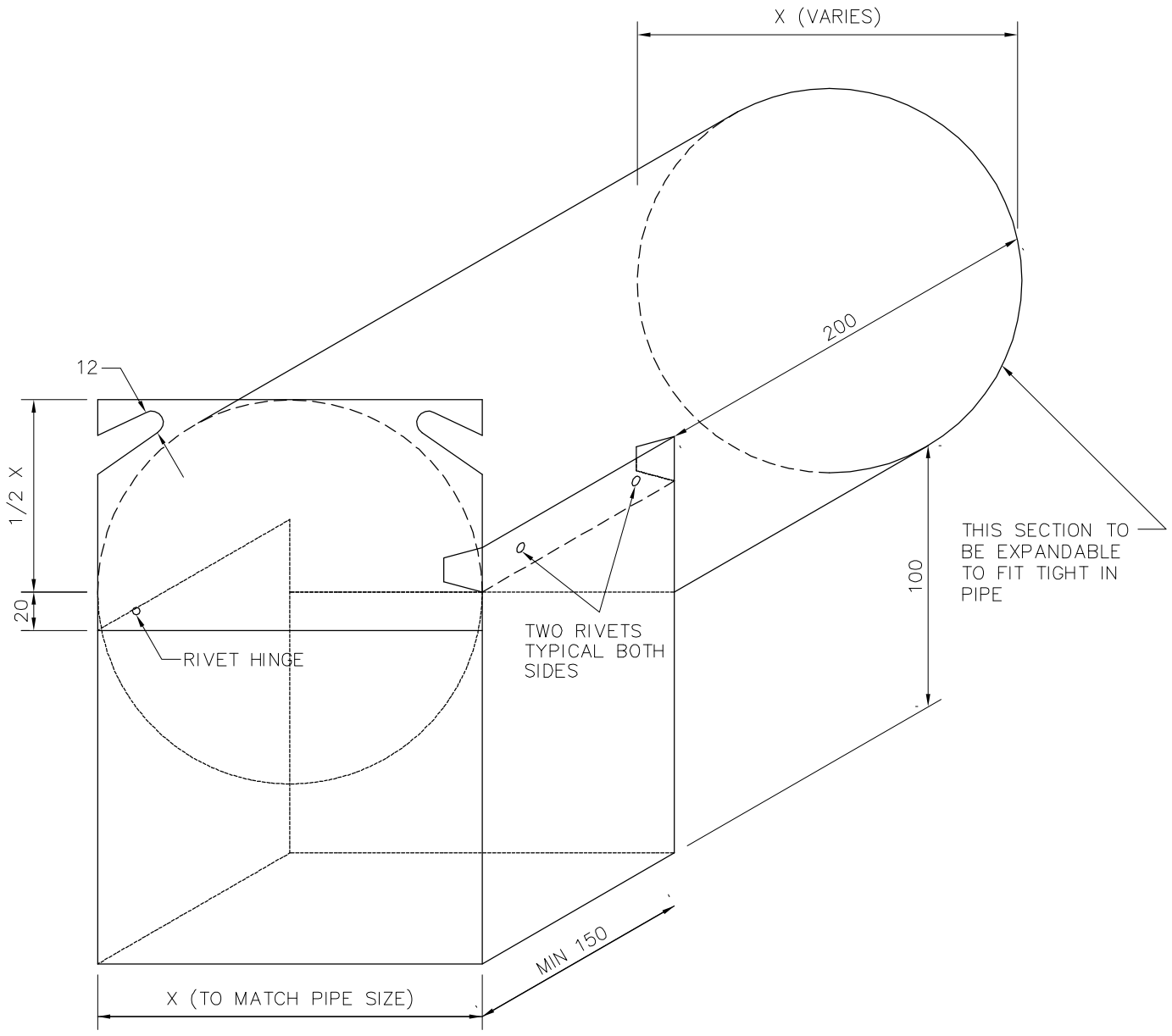


NOTE:

1. FILTER FABRIC TO BE STRETCHED BELOW TOP BARREL SECTION AND REMOVED BY THE CONTRACTOR DURING THE FINAL INSPECTION.
2. DEPTH TO BE SPECIFIED WILL VARY DEPENDING UPON DRAINAGE REQUIREMENTS AND GROUND CONDITIONS. DEPTH TO WATER TABLE MUST BE SHOWN IF LESS THAN 3.6m.

DISTRICT OF PEACHLAND

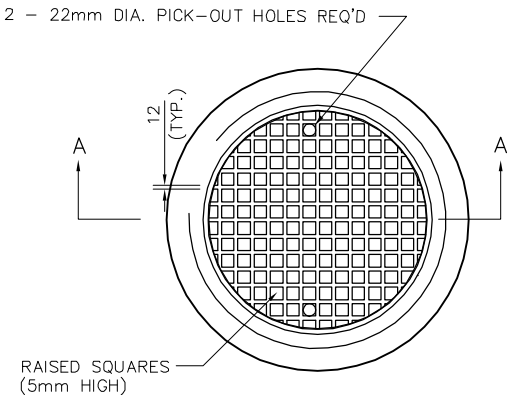
SCALE: N.T.S.	TITLE: DRAINAGE DRYWELL INSTALLATION	
DATE DRAWN: NOV.2009 / LATEST REVISION DATE: –		
APPROVED BY: –	SECTION: – –	REVISION No. – / DWG.No. SD–S2



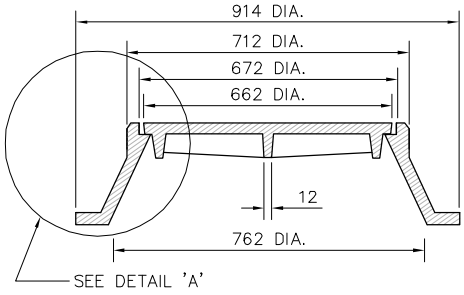
NOTES:

1. SEWER TRAPS SHALL BE MANUFACTURED FROM 16 GAUGE ALUMINUM.
2. BLIND RIVETS ONLY SHALL BE USED. RIVETS SHALL BE ALUMINUM EQUAL TO POP #AD64ABS.

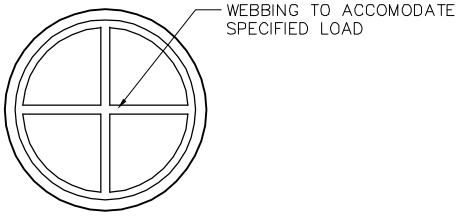
DISTRICT OF PEACHLAND	SCALE: N.T.S.	TITLE: CATCH BASIN TRAPPING HOOD	
	DATE DRAWN: 02/27/06 / LATEST REVISION DATE: 03/16/06		
	APPROVED BY: –	SECTION: – –	REVISION No. – / DWG.No. SD–S3



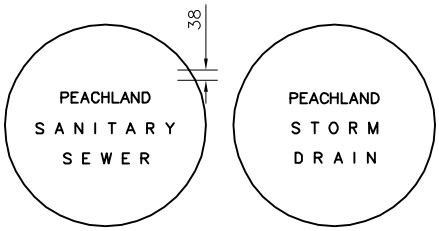
PLAN



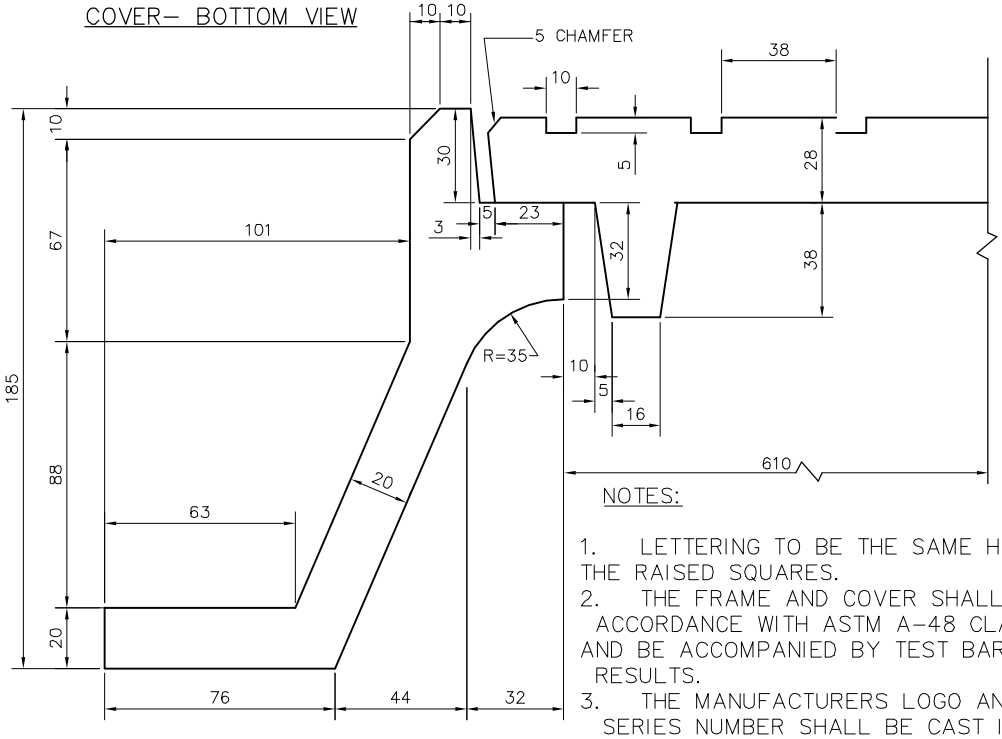
SECTION 'A–A'



COVER– BOTTOM VIEW



STANDARD LETTERING ON COVER



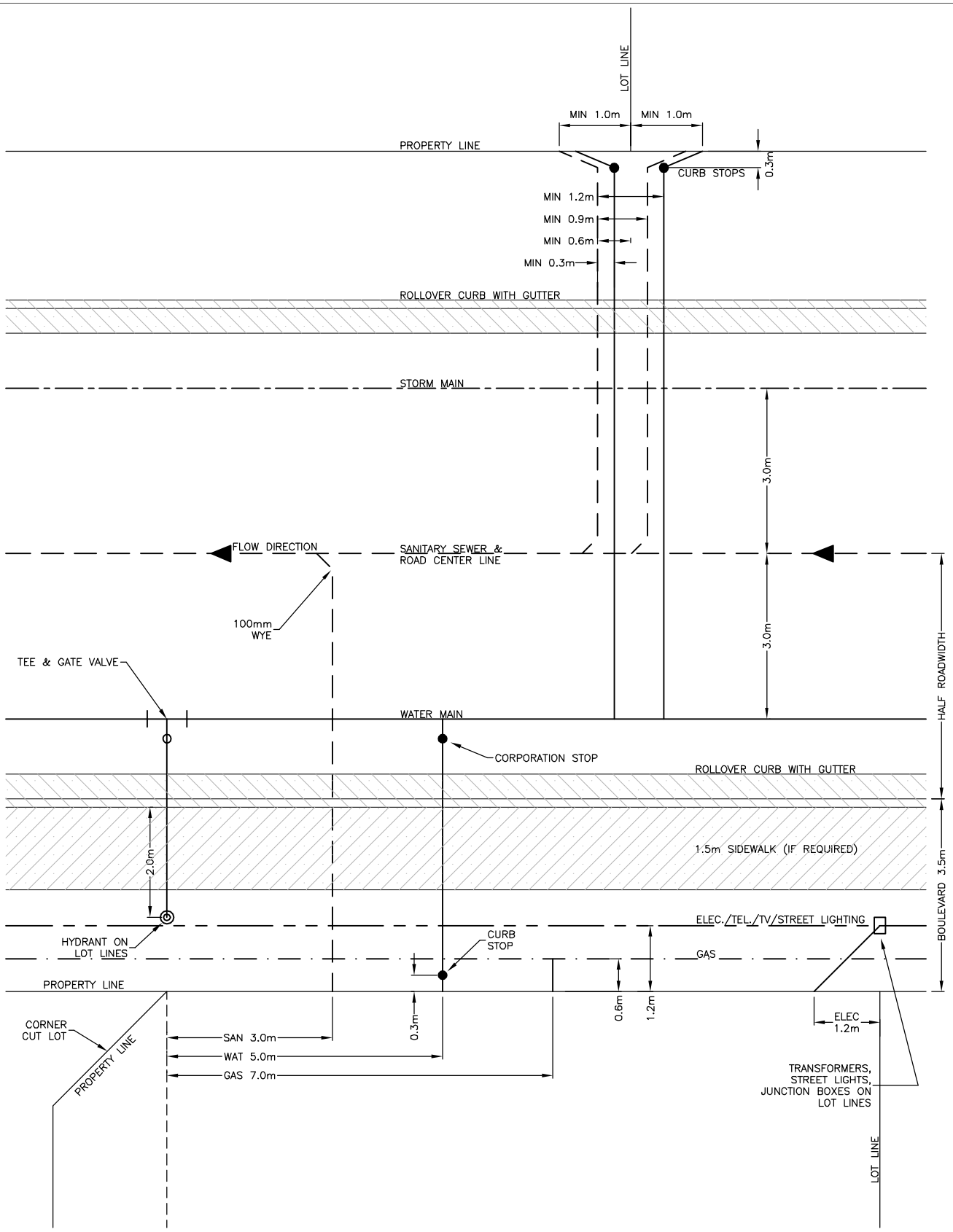
DETAIL 'A'

NOTES:

1. LETTERING TO BE THE SAME HEIGHT AS THE RAISED SQUARES.
2. THE FRAME AND COVER SHALL BE IRON IN ACCORDANCE WITH ASTM A–48 CLASS 308, AND BE ACCOMPANIED BY TEST BAR RESULTS.
3. THE MANUFACTURERS LOGO AND THE HEAT SERIES NUMBER SHALL BE CAST INTO THE FRAME AND COVER.
4. COVER AND FRAME TO BE ABLE TO WITHSTAND 175KN (40 000LBS) LOAD APPLIED AT THE CENTER OF THE COVER ON A 50mm THICK 250 x 250 RUBBER PAD.
5. THE CONTACT SURFACES BETEWEEN THE FRAME AND THE COVER ARE TO BE MACHINED SMOOTH.

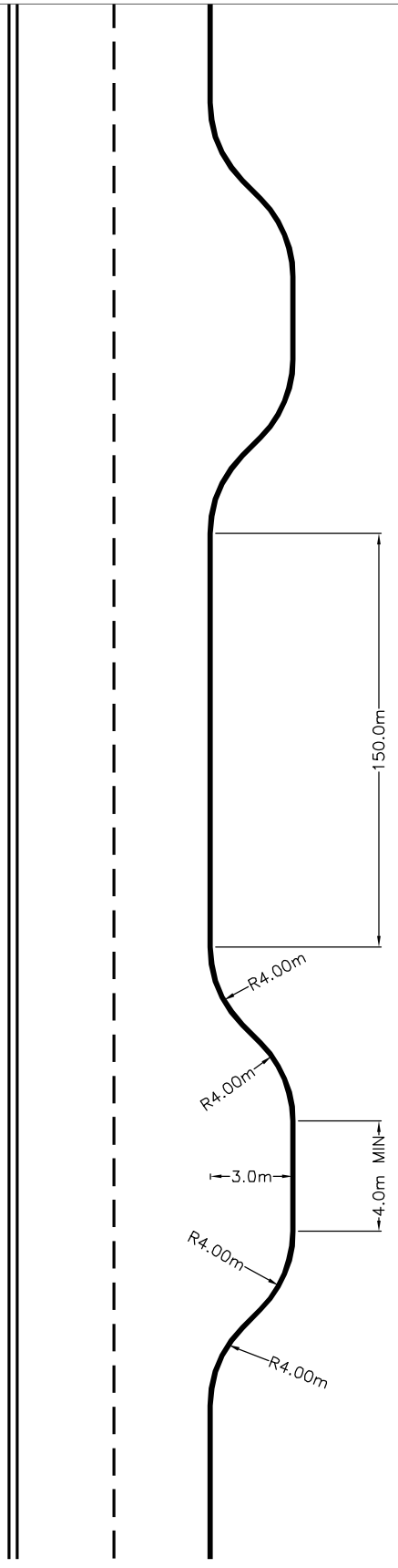
DISTRICT OF PEACHLAND

SCALE: 1:2.5		TITLE: MANHOLE FRAME AND COVER
DATE DRAWN: NOV.2009	LATEST REVISION DATE: –	
APPROVED BY: –		
SECTION: – –	REVISION No. –	DWG.No. SD–S4



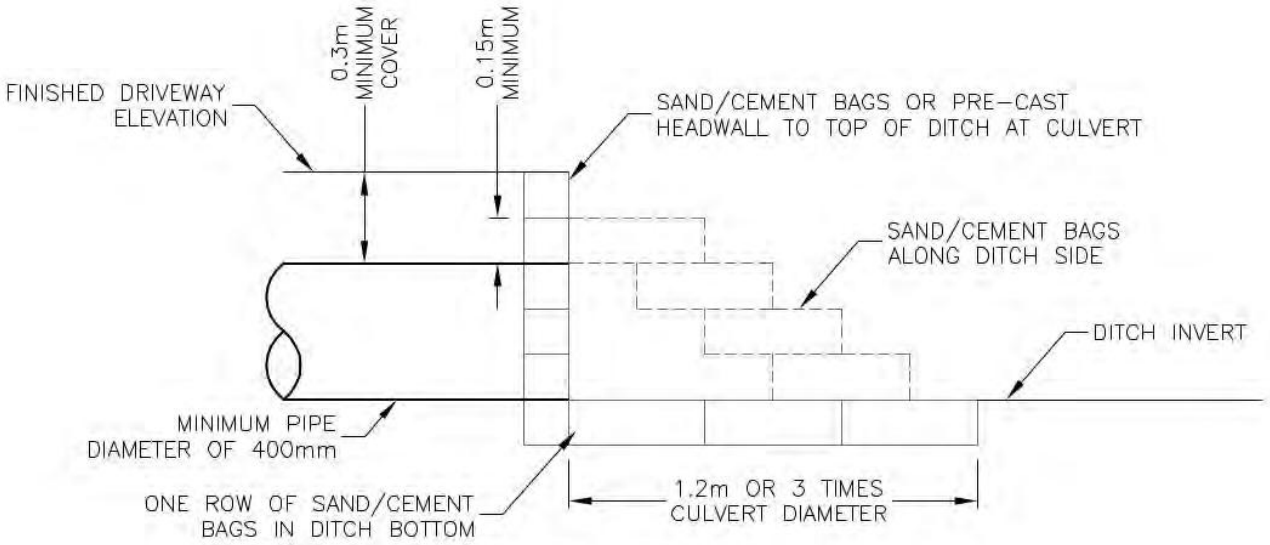
DISTRICT OF PEACHLAND

SCALE: NTS		TITLE: LOT SERVICING LOCATIONS
DATE DRAWN: OCT.2009	LATEST REVISION DATE: –	
APPROVED BY: –		
SECTION: – –	REVISION No. –	DWG.No. SD–S5



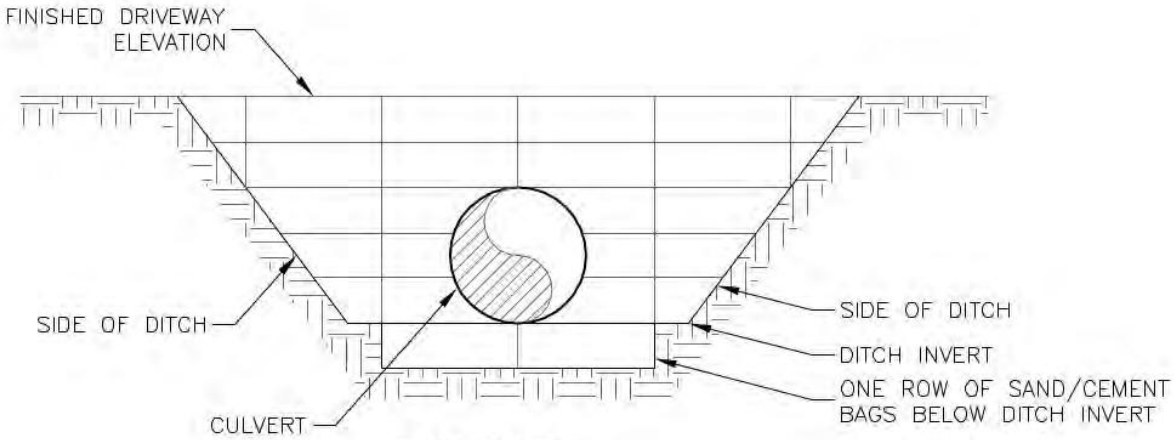
DISTRICT OF PEACHLAND

SCALE: NTS		TITLE: PLAN VIEW OF PARKING PULLOUT AREAS FOR HILLSIDES
DATE DRAWN: OCT.2009	LATEST REVISION DATE: JAN.2023	
APPROVED BY: –		
SECTION: – –	REVISION No. –	DWG.No. SD–HS1



SIDE VIEW

NOT TO SCALE



END VIEW

NOT TO SCALE

DISTRICT OF PEACHLAND	SCALE: NTS	TITLE: RESIDENTIAL DRIVEWAY ACCESS CULVERT INLET AND OUTLET CONSTRUCTION DETAIL	
	DATE DRAWN: OCT.2009 / LATEST REVISION DATE: JAN.2023		
	APPROVED BY: –	SECTION: – –	REVISION No. – / DWG.No. SD-HS2

SCHEDULE 11
ENGINEERING SUBMISSIONS

Schedule 11. ENGINEERING SUBMISSIONS

11.0 ENGINEERING DRAWING SUBMISSION

11.1 General

11.1.1 Introduction

This Policy outlines the minimum standards and requirements for *Design* and *Record Drawing* submissions for engineering work(s).

Where a standard drawing exists, it shall be sufficient to refer to the appropriate drawing by reference number and date of issue. Where a standard drawing does not exist, or is unsuitable for a particular case, detail drawings shall be prepared to accurately portray the various elements of the installation.

Where no standard is defined in this Policy for the preparation of a drawing to portray a particular service, structure, or other item, instructions and requirements may be obtained by discussion with *District* staff.

11.1.2 General Requirements

The *Owner* shall submit design plans, drawings and specifications for *Works and Services* required by this Bylaw in respect of the *Owner*'s *subdivision* or *development*, including any required studies such as, but not limited to, a *Functional Servicing Report* prepared by the *Owner*'s Engineer, all in accordance with the standards prescribed in the Schedules of this bylaw.

Drawings shall clearly show existing and proposed locations of all utilities using offsets from *Lot* lines or boundaries of rights-of-way.

All drawings shall be signed and sealed by a *Professional Engineer* registered in the Province of British Columbia and must show the engineer's Permit to Practice Number.

Elevations shall be referred to geodetic datum. Horizontal coordinates shall be referenced to UTM coordinate system NAD83.

The *Owner* shall also submit to the *District* a complete set of spatial data associated with the electronic drawings of the *Subdivision* or *Development* in ESRI Shape-file format. The spatial reference of the shape-files (i.e., the projection files) shall be in UTM 11N coordinate system NAD83. The data-type of the shape-files shall be in points, lines or polygons as indicated below. Each feature (for example, water lines) shall be in a separate shape-file. All features shall be in correct spatial relationship to each other for mapping purpose.

Description	Data-type
Properties *lot*-lines of the *subdivision* or *development*	Lines
Sewer Pipes	Lines
Sewer Structures (manhole, cap etc.)	Points
Water Lines	Lines
Water Structure (curbstop, hydrant, valve etc.)	Points
Storm Lines	Lines
Storm Points (Storm man-hole etc.)	Points
Street Lamps	Points
Statuary Right of Way	Polygons

11.1.3 *Functional Servicing Report* Basic Requirements:

1. The report must conform to all *District* bylaws and master plans, regional, provincial and federal legislation, regulations, applicable standards and best practices.

2. The report must identify and assess existing and proposed infrastructure required for the proposed *development*, *subdivision* or *building permit*.
3. The report must take into consideration existing off-site *developments* and the impact these *developments* may have on the subject property.
4. If the report is triggered by a rezoning application, the calculations for the proposed conditions must be based on the maximum build out potential of the proposed *zone* (at the highest capacity use), unless limited through other means.
5. The report shall outline the design assumptions, and the overall impact on the existing *District* service capacities, such as water distribution systems, reservoirs and pressure *zones*, water consumption requirements, lift stations, and local sanitary sewers.
6. The report shall clearly define available capacities, as well as any required offsite infrastructure improvements or system expansions necessary to support the proposed land use, *subdivision* or *development.*

11.1.4 Abbreviations

UTM	Universal Transverse Mercator
NAD83	1983 North American Datum
BOC	Back of Curb
EC	End of Curve
BC	Beginning of Curve
PI	Point of Intersection

11.2 Drafting Standards

11.2.1 Sheet Layout

Drawing sheet layout(s) shall conform to and include the following:

a) Sheet size to be ANSI D 558.8mm x 863.6mm (22in x 34in).

b) A north arrow shall be placed close to the top right side of each plan view on the sheet. Where feasible, the north arrow shall point to the top of the page.

c) A title block which describes the contents of the drawing (e.g., Key plan, *road*, etc.) and shall clearly indicate the location of the works by *road* name(s) and/or legal description.

d) Drawing scale, date, revision history block, and a detailed legend shall also be included on each sheet layout.

11.2.2 Dimensions and Units

The following conventions must be used:

a) Dimensions and units must be shown in metric. No imperial units are permitted.

b) All distances, elevations, and coordinates shall be given in meters to accuracy of 3 decimal places.

c) Grades shall be given as a percentage to accuracy of 2 decimal places.

d) Areas shall be in square meters rounded to the nearest square meter.

e) All pipe sizes shall be given in millimeters as per ASTM specifications using:

1" = 25mm

f) Existing imperial dimensions, except for pipe sizes, are to be soft converted using the factors:

1 inch = 25.4mm
1 foot = 0.3048m

11.2.3 Lettering

a) Lettering is to be an open style of Vertical Gothic (eg. Leroy or AutoCAD – 'romans').

b) All lettering to maintain a 1:10 ratio between plot

c) ted text height and plotted pen thickness.

d) The minimum plotted text height shall be 1.5mm.

e) The maximum plotted text height shall be 5.0mm.

f) The standard lettering height is 2.0mm.

11.2.4 Scales

The following scales shall be normally used:

a)	Location and Key plans	-	1:1000; 1:2500; 1:5000; 1:10000
b)	Composite Plans	-	1:500; 1:1000; 1:2500
c)	Plan/Profile Drawings	-	Horizontal 1:500 or 1:250 Vertical 1:50 or 1:25
d)	Cross Sections	-	Horizontal 1:100 Vertical 1:50
e)	Details	-	1:100; 1:20; 1:10

11.3 Drawing Standards (digital)

11.3.1 General Requirements

The *Owner* will be required to submit to the *District* a complete set of electronic drawings of the *Subdivision* or *Development* in AutoCAD DWG, ESRI Shape-file format and PDF format upon completion of the proposed works.

All drawing objects color and linetype properties shall be set to 'bylayer'.

All drawings must be purged and audited of all unnecessary information prior to submission to the *District*.

11.3.2 Drawing Conventions

11.3.2.1 Layer Names

The *District* uses the following convention for naming AutoCAD layers:

<Classification>-<Phase>-<Feature type>-<Description> (Optional)

The available classifications are defined in Table 3.2.1a; phases are defined in Table 3.2.1b; feature types are defined in Table 3.2.1.c. The description is optional.

For example, walk could be used to describe a 'Feature type' of a proposed sidewalk as in *ROAD*-P-WALK-CONCRETE where P signifies Proposed, or *ROAD*-P-WALK-TEXT would describe text associated with the proposed sidewalk.

Table 0-a

CLASSIFICATION	DESCRIPTION
ALGN	Alignments
LEGL	Legal Information
MISC	Miscellaneous (Landscape, Hatches, etc)
ROAD	Roads
SANI	Sanitary Sewer
STRM	Storm Sewer
STRL	Structural and Hard Surface Features
PNTS	Survey Points Information
TITL	Title Block information
UTIL	Shallow Utilities (Gas, Tel and Cable)
WATR	Water System

Some common layer examples are:

SANI-P-MH-1050mm
ROAD-E-EDGE-ASPHALT
WATR-A-PIPE-250mm

If required layer names may be suffixed as in Table 3.2.1b to signify either as *constructed*, existing, proposed, or future works.

Table 0-b

PHASE SUFFIX	DESCRIPTION	RANGE
A	As Constructed	Varies
E	Existing Features	8
P	Proposed Works	Varies
F	Future works	Varies

Table 3.2.1c has some example of Feature Type classification

Table 3.2.1-c

TYPE	DESCRIPTION
TEXT	Text
DWY	Driveway
HYD	Hydrant
WV	Water Valve
MH	Manhole
PIPE	Water, Storm or Sanitary main

11.3.2.2 Special Layers

Exceptions to the layer naming convention described above are described in Table 3.2.2a

Table 0-c

LAYER CATEGORY	CATEGORY DESCRIPTION	COLOUR PEN #	PLOT STATE
-VP	Viewports	30	No Plot
-IMAGE	Images	7	
-XCLIP	Xref clip boundary	7	No Plot
-XREF	External References	7	

11.3.2.3 Lineweight Conventions

Layers line weight is set by a Color-dependent plot style tables (CTB) as specified in Table 3.2.3a. The *District* will provide upon request, a digital copy of the CTB files for full size and half size line weights.

Table 3.2.3-a

CTB PEN SETTINGS			
PLOT STYLES	LAYER COLOR	LINEWEIGHT	PLOT COLOR
Color 1		0.25	Black
Color 2		0.50	Black
Color 3		0.13	Black
Color 4		0.35	Black
Color 5		0.70	Black
Color 6		0.35	Black
Color 7		0.35	Black
Color 8		0.18	Black
Color 9		0.35	Black
Color 10		0.70	Black
Color 11		0.50	Black
Color 13		0.35	Black
Color 20		0.25	Object Color
Color 30		Object Lineweight	Black
Color 35		Object Lineweight	Black
Color 84		0.25	Object Color
Color 85		0.18	Black
Color 90		Object Lineweight	Object Color
Color 94		0.18	Black
Color 150		0.18	Black
Color 170		Object Lineweight	Black
Color 190		0.18	Black
Color 253	Screening 40	Object Lineweight	Black
Color 254	Screening 20	Object Lineweight	Black

11.3.2.4 Layer list, Linetypes and Layer Color

LAYER NAMES	LAYER DESCRIPTION	LAYER COLOR	LINE TYPE	PLOT STATE
0		7 - White	Continuous	No Plot
DEFPOINTS		7 - White	Continuous	No Plot
VP-XREF				
-IMAGE	images	7 - White	Continuous	
-VP	All view ports in paper space	30 - Orange	Continuous	No Plot
-XCLIP	Xref clip boundary	7 - White	Continuous	No Plot
-XREF	Xrefs layer	7 - White	Continuous	
ALIGNMENT				
ALGN	alignment objects	3 - Green	CENTER	
ALGN-P-GUT	alignment for gutterline	1 - Red	CENTER	
ALGN-LABEL	alignment labels	7 - White	Continuous	
ALGN-LABEL-CURVE	alignment label for curves	2 - Yellow	Continuous	
ALGN-LABEL-GEOM	alignment label for geometries	7 - White	Continuous	
ALGN-P-ETW	alignment Edge of Travel Way	13 - Dark Pink	CENTER	
ALGN-P-EPS	alignment Edge of Paved Shoulder	13 - Dark Pink	CENTER	
ALGN-P-ROW	alignment Right of Way	4 - Cyan	CENTER	
ALGN-TABLE	alignment Table	7 - White	Continuous	
LEGAL				
LEGL-E-BLOCKLINE	non-cogo exterior *lot* lines	8 - Grey	Continuous	
LEGL-E-COGOBLOCKLINE	coordinate geometry exterior *lot* lines	8 - Grey	Continuous	
LEGL-E-COGOPROPLINE	coordinate geometry interior *lot* lines	8 - Grey	Continuous	
LEGL-E-EASE	registered easement lines	8 - Grey	DASHED	
LEGL-E-EASE-TEXT	easement text	8 - Grey	Continuous	
LEGL-E-LOTTEXT	legal *lot* text	9 - Grey	Continuous	
LEGL-E-LPUG	lead plug	10 - Grey	Continuous	
LEGL-E-PLANTEXT	legal plan text	11 - Grey	Continuous	
LEGL-E-PROPLINE	interior *lot* lines	12 - Grey	Continuous	
LEGL-E-ROADTEXT	existing *road* name text	13 - Grey	Continuous	
LEGL-E-STR_NUM	street number (address)	14 - Grey	Continuous	
LEGL-E-SUR-MON	survey monuments	15 - Grey	Continuous	
LEGL-E-WATERBOUDARY	lake boundary and creeks	16 - Grey	Continuous	
LEGL-E-WATERTEXT	lake boundary and creek text	17 - Grey	Continuous	
LEGL-P-EASE	proposed easement	4 - Cyan	DASHED	
LEGL-P-EASE-TEXT	proposed easement text	11 - Pink	Continuous	
LEGL-P-LOT	proposed *lot*s	2 - Yellow	Continuous	
LEGL-P-LOT-DIM	proposed *lot* dimension	7 - White	Continuous	
LEGL-P-LOT-FILL	proposed *lot* fill	253 - Grey	Continuous	
LEGL-P-LOT-LINE	proposed *lot* line	2 - Yellow	Continuous	
LEGL-P-NO-PLOT	No plot *lot*s	30 - Orange	Continuous	No Plot
LEGL-P-ROADTEXT	proposed *road* text - plan\profile	5 - Blue	Continuous	
LEGL-P-SROW	proposed Right of Way	4 - Cyan	Continuous	
LEGL-P-TABLE	proposed legal table	7 - White	Continuous	
LEGL-P-TEXT	proposed legal text	7 - White	Continuous	
MISCELLANEOUS				
MISC-E-HATCHLINES	lines used to create an existing hatch boundary	8 - Grey	Continuous	

LAYER NAMES	LAYER DESCRIPTION	LAYER COLOR	LINE TYPE	PLOT STATE
MISC-E-NOTES	existing general notes	8 - Grey	Continuous	
MISC-NARROW	North arrow	8 - Grey	Continuous	
MISC-MATCHLINE	Alignment matchline	2 - Yellow	Continuous	
MISC-MATCHLINE-TEXT	Matchline text	11 - Pink	Continuous	
MISC-P-TEMP	Temporary layer	2 - Yellow	Continuous	No Plot
MISC-P-NOTES	Proposed notes	11 - Pink	Continuous	
MISC-P-TEXT	Proposed text	11 - Pink	Continuous	
MISC-P-VIEWFRAME	Viewframe object	7 - White	Continuous	
MISC-P-VIEWFRAME-BORDER	Viewframe border	5 - Blue	Continuous	
MISC-P-VIEWFRAME-TEXT	Viewframe text	7 - White	Continuous	
MISC-P-DETAIL	all detail objects and text	7 - White	Continuous	
MISC-P-HATCHLINES	lines used to create a hatch boundary	1 - Red	Continuous	
MISC-P-NOTES	proposed general notes	7 - White	Continuous	
MISC-P-TYP-X	typical *road* section	7 - White	Continuous	
POINTS				
PNTS-ALL POINTS	survey points	8 - Grey	Continuous	
PNTS-E-CTRL	survey points	8 - Grey	Continuous	
PNTS-E-ELEC	survey points (elec boxes, power poles, etc.)	8 - Grey	Continuous	
PNTS-E-ELEC-GUY WIRE	survey points	8 - Grey	Continuous	
PNTS-E-ELEC-LARGE ELEC BOX	survey points	8 - Grey	Continuous	
PNTS-E-LEGL-IP	survey points	8 - Grey	Continuous	
PNTS-E-LEGL-LEFT LOT LINE	survey points	8 - Grey	Continuous	
PNTS-E-LEGL-RIGHT LOT LINE	survey points	8 - Grey	Continuous	
PNTS-E-LOT-CORNER	existing *lot* corner	1 - Red	Continuous	
PNTS-E-RAIL	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-ASPHALT DRIVEWAY	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-ASPHALT FLARE	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-ASPHALT LANE	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-ASPHALT SIDEWALK	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-BACK OF WALK	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-CARPORT	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-CL	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-CONCRETE DRIVEWAY	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-CROWN	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-EXTENDED EDGE OF ASPHALT	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-FACE OF CURB	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-FACE OF WALK	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-GRAVEL	survey points	8 - Grey	Continuous	

LAYER NAMES	LAYER DESCRIPTION	LAYER COLOR	LINE TYPE	PLOT STATE
DRIVEWAY				
PNTS-E-*ROAD*-GRAVEL LANE	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-LEFT EDGE OF ASPHALT	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-LEFT GUTTER	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-LIP OF EA	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-LIP OF GUTTER	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-PAINT LINES	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-RIGHT EDGE OF ASPHALT	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-RIGHT GUTTER	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-SIGNS	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-TOP OF CURB	survey points	8 - Grey	Continuous	
PNTS-E-*ROAD*-TOP OF WALK	survey points	8 - Grey	Continuous	
PNTS-E-SANI-IC	survey points	94 - Green	Continuous	
PNTS-E-SANI-MH	survey points	94 - Green	Continuous	
PNTS-E-SITE-BOTTOM OF BANK	survey points	8 - Grey	Continuous	
PNTS-E-SITE-BOW	existing bottom retaining wall	8 - Grey	Continuous	
PNTS-E-SITE-CONCRETE PAD	survey points	8 - Grey	Continuous	
PNTS-E-SITE-GROUND	survey points	8 - Grey	Continuous	
PNTS-E-SITE-SITEFEATURES-OFF	survey points	8 - Grey	Continuous	
PNTS-E-SITE-SITEFEATURES-ON	survey points	8 - Grey	Continuous	
PNTS-E-SITE-TOP OF BANK	survey points	8 - Grey	Continuous	
PNTS-E-SITE-TOW	existing top retaining wall	8 - Grey	Continuous	
PNTS-E-SITE-TREES	survey points	8 - Grey	Continuous	
PNTS-E-STRM-CB	survey points	190 - Purple	Continuous	
PNTS-E-STRM-DITCH	survey points	8 - Grey	Continuous	
PNTS-E-STRM-MH	survey points	190 - Purple	Continuous	
PNTS-E-STRM-SWALE	survey points	8 - Grey	Continuous	
PNTS-E-SURF-TIN POINTS	survey points	8 - Grey	Continuous	
PNTS-E-UTIL-INVERTS	survey points	8 - Grey	Continuous	
PNTS-E-WATR	survey points	150 - Blue	Continuous	
PNTS-E-WATR-STEM	survey points	8 - Grey	Continuous	
PNTS-E-WATR-VALVE	survey points	150 - Blue	Continuous	
PNTS-LABEL	all point labels layer - need for style creation	7 - White	Continuous	
PNTS-P-ALGN	alignment points	2 - Yellow	Continuous	
PNTS-P-LOT-CORNER	proposed *lot* corner	2 - Yellow	Continuous	
PNTS-P-MINUS	cut-fill points	20 - Red	Continuous	
PNTS-P-PLUS	cut-fill points	84 - Green	Continuous	
PNTS-P-*ROAD*-CL	*road* CL points	2 - Yellow	Continuous	

LAYER NAMES	LAYER DESCRIPTION	LAYER COLOR	LINE TYPE	PLOT STATE
PNTS-P-SITE-BOW	proposed bottom retaining wall	2 - Yellow	Continuous	
PNTS-P-SITE-TOW	proposed top of retaining wall	2 - Yellow	Continuous	
PNTS-TABLE	survey points	7 - White	Continuous	
ROAD				
ROAD-E-ASPH	existing asphalt	8 - Grey	Continuous	
ROAD-E-CURB	existing curb	8 - Grey	Continuous	
ROAD-E-DWY	existing driveway	8 - Grey	Continuous	
ROAD-E-GUT	existing gutter	8 - Grey	Continuous	
ROAD-E-LANE	existing lane	8 - Grey	Continuous	
ROAD-E-NAME	existing *road* name	11 - Pink	Continuous	
ROAD-E-SW	existing sidewalk	8 - Grey	Continuous	
ROAD-E-WLINE	crosswalk, stop and white lines, bike lanes, etc.	254- Grey	Continuous	
ROAD-E-YLINE	yellow lines	253- Grey	Continuous	
ROAD-P-ASPH	proposed asphalt	3 - Green	Continuous	
ROAD-P-GUT	proposed gutter line	7 - White	Continuous	
ROAD-P-NAME	proposed *road* name	11 - Pink	Continuous	
ROAD-P-SIGNS	proposed signs	170 - Blue	Continuous	
ROAD-P-SW	proposed sidewalk	4 - Cyan	Continuous	
ROAD-P-TEXT	proposed *road* text	11 - Pink	Continuous	
SANITARY				
SANI-A-MH	asbuilt sanitary manholes - plan\profile	11 - Pink	Continuous	
SANI-A-PIPE	asbuilt sanitary mains - plan\profile	10 - Red	Continuous	
SANI-A-SERV	asbuilt sanitary service - plan\profile	7 - White	Continuous	
SANI-A-TEXT	asbuilt sanitary text - plan\profile	11 - Pink	Continuous	
SANI-E-FM	sanitary forced main	94 - Green	Dashed	
SANI-E-MH	existing sanitary manholes - plan	94 - Green	Continuous	
SANI-E-MH-PROF	existing sanitary manholes - prof	94 - Green	Continuous	
SANI-E-PIPE	existing sanitary mains - plan	94 - Green	SAN	
SANI-E-PIPE-PROF	existing sanitary mains - prof	94 - Green	SAN	
SANI-E-SEC	existing sanitary section	94 - Green	Continuous	
SANI-E-SERV	existing sanitary service connection - plan	94 - Green	Continuous	
SANI-E-SERV-PROF	existing sanitary service connection - prof	94 - Green	Continuous	
SANI-E-TEXT	existing sanitary text - plan	94 - Green	Continuous	
SANI-E-TEXT-PROF	existing sanitary text - prof	94 - Green	Continuous	
SANI-F-MH	future sanitary manholes - plan	94 - Green	Continuous	
SANI-F-MH-PROF	future sanitary manholes - prof	94 - Green	Continuous	
SANI-F-PIPE	future sanitary pipe - plan	94 - Green	SAN	
SANI-F-PIPE-PROF	future sanitary pipe - prof	94 - Green	SAN	
SANI-F-SEC	future sanitary section	94 - Green	Continuous	
SANI-F-TEXT	future sanitary text - plan	94 - Green	Continuous	
SANI-F-TEXT-PROF	future sanitary text - prof	94 - Green	Continuous	
SANI-P-IC	proposed sanitary inspection chamber - plan	11 - Pink	Continuous	
SANI-P-IC-PROF	proposed sanitary inspection chamber - prof	11 - Pink	Continuous	
SANI-P-MH	proposed sanitary manhole - plan	11 - Pink	Continuous	
SANI-P-MH-PROF	proposed sanitary manhole - prof	10 - Red	Continuous	
SANI-P-PIPE	proposed sanitary mains - plan	10 - Red	SAN	
SANI-P-PIPE-PROF	proposed sanitary mains - prof	10 - Red	SAN	
SANI-P-SEC	proposed sanitary section	10 - Red	Continuous	
SANI-P-SERV	proposed sanitary service - plan	7 - White	Continuous	

LAYER NAMES	LAYER DESCRIPTION	LAYER COLOR	LINE TYPE	PLOT STATE
SANI-P-SERV-PROF	proposed sanitary service - prof	7 - White	Continuous	
SANI-P-SERV-TEXT	proposed sanitary service text	11 - Pink	Continuous	
SANI-P-TEXT	proposed sanitary text - plan	11 - Pink	Continuous	
SANI-P-TEXT-PROF	proposed sanitary text - prof	11 - Pink	Continuous	
SHALLOWS UTILITIES				
UTIL-E-ELEC	existing electrical conduit	8 - Grey	ELECTRICAL	
UTIL-E-GAS	existing gas conduit	8 - Grey	GAS	
UTIL-E-GAS-TEXT	existing gas conduit text	8 - Grey	Continuous	
UTIL-E-HTC	existing HTC conduit	8 - Grey	TEL	
UTIL-E-HTC-TEXT	existing HTC conduit text	8 - Grey	Continuous	
UTIL-E-LAMP	existing lamp	8 - Grey	Continuous	
UTIL-E-LAMP-TEXT	existing lamp-text	8 - Grey	Continuous	
UTIL-E-TRAF	existing traffic conduit	8 - Grey	ELEC	
UTIL-P-ELEC	proposed electrical conduit	7 - White	ELECTRICAL	
UTIL-P-GAS	proposed gas conduit	2 - Yellow	GAS	
UTIL-P-GAS-TEXT	proposed gas conduit text	11 - Pink	Continuous	
UTIL-P-HTC	proposed HTC conduit	6 - Magenta	TEL	
UTIL-P-HTC-TEXT	proposed HTC conduit text	11 - Pink	Continuous	
UTIL-P-LAMP	proposed lamp	7 - White	Continuous	
UTIL-P-LAMP-TEXT	proposed lamp-text	11 - Pink	Continuous	
STORM				
STRM-A-CB	asbuilt storm catch basins	11 - Pink	Continuous	
STRM-A-DW	asbuilt storm drywell	11 - Pink	Continuous	
STRM-A-LEAD	asbuilt storm leads	10 - Red	Continuous	
STRM-A-MH	asbuilt storm manholes - plan\profile	11 - Pink	Continuous	
STRM-A-PIPE	as built storm pipe	10 - Red	STORM	
STRM-A-TEXT	asbuilt storm text - plan\profile	11 - Pink	Continuous	
STRM-E-CB	existing catch basin - plan	190 - Purple	Continuous	
STRM-E-CB-PROF	existing catch basin - prof	190 - Purple	Continuous	
STRM-E-DW	existing storm drywell - plan	190 - Purple	Continuous	
STRM-E-DW-PROF	existing storm drywell - prof	190 - Purple	Continuous	
STRM-E-LEAD	existing storm lead	190 - Purple	Continuous	
STRM-E-MH	existing storm manholes - plan	190 - Purple	Continuous	
STRM-E-MH-PROF	existing storm manholes - prof	190 - Purple	Continuous	
STRM-E-PIPE	existing storm mains - plan	190 - Purple	STORM	
STRM-E-PIPE-PROF	existing storm mains - prof	190 - Purple	STORM	
STRM-E-TEXT	existing storm text - plan	190 - Purple	Continuous	
STRM-E-TEXT-PROF	existing storm text - prof	190 - Purple	Continuous	
STRM-F-CB	future storm catch basin - plan	190 - Purple	Continuous	
STRM-F-CB-PROF	future storm catch basin - prof	190 - Purple	Continuous	
STRM-F-DW	future storm drywell - plan	190 - Purple	Continuous	
STRM-F-DW-PROF	future storm drywell - prof	190 - Purple	Continuous	
STRM-F-LEAD	future storm lead	190 - Purple	Continuous	
STRM-F-MH	future storm manhole - plan	190 - Purple	Continuous	
STRM-F-MH-PROF	future storm manhole - prof	190 - Purple	Continuous	
STRM-F-PIPE	future storm main - plan	190 - Purple	STORM	
STRM-F-PIPE-PROF	future storm main - prof	190 - Purple	STORM	
STRM-F-SEC	future storm section	190 - Purple	Continuous	

LAYER NAMES	LAYER DESCRIPTION	LAYER COLOR	LINE TYPE	PLOT STATE
STRM-F-TEXT	future storm text - plan	190 - Purple	Continuous	
STRM-F-TEXT-PROF	future storm text - prof	190 - Purple	Continuous	
STRM-P-CB	proposed catch basin - plan	11 - Pink	Continuous	
STRM-P-CB-PROF	proposed catch basin - prof	10 - Red	Continuous	
STRM-P-DW	proposed drywell - plan	11 - Pink	Continuous	
STRM-P-DW-PROF	proposed drywell - prof	10 - Red	Continuous	
STRM-P-LEAD	proposed storm lead	10 - Red	Continuous	
STRM-P-MH	proposed storm manhole - plan	11 - Pink	Continuous	
STRM-P-MH-PROF	proposed storm manhole - prof	10 - Red	Continuous	
STRM-P-PIPE	proposed storm mains - plan	10 - Red	STORM	
STRM-P-PIPE-PROF	proposed storm mains - prof	10 - Red	STORM	
STRM-P-SERV	proposed storm service - plan	6 - Magenta	Continuous	
STRM-P-SERV-PROF	proposed storm service - prof	6 - Magenta	Continuous	
STRM-P-SERV-TEXT	proposed storm service text	11 - Pink	Continuous	
STRM-P-TEXT	proposed storm main text - plan	11 - Pink	Continuous	
STRM-P-TEXT-PROF	proposed storm main text - prof	11 - Pink	Continuous	
TITLE BLOCK				
TITL-BLOCK	title block	7 - White	Continuous	
TITL-BLOCKTEXT	title block text	7 - White	Continuous	
TITL-BORDER	title block border	5 - Blue	Continuous	
TITL-JOBDESC	text in titleblock	7 - White	Continuous	
TITL-JOBNUMBER	text in titleblock	5 - Blue	Continuous	
TITL-LEGEND	titleblock legend	7 - White	Continuous	
TITL-MAGRID	major grid on titleblock	7 - White	Continuous	
TITL-MIGRID	minor grid on titleblock	3 - Green	Continuous	
TITL-NARROW	north arrow	8 - Grey	Continuous	
TITL-PAVE-LEGEND	pave legend in title block	7 - White	Continuous	
TITL-RDLEGEND	*road* legend in titleblock	7 - White	Continuous	
WATER				
WATR-A-HYD	asbuilt hydrant	11 - Pink	Continuous	
WATR-A-PIPE	asbuilt water mains - plan\profile	10 - Red	Water	
WATR-A-SERVICE	asbuilt water service	7 - White	Continuous	
WATR-A-TEXT	asbuilt water main text - plan\profile	11 - Pink	Continuous	
WATR-A-VALVE	asbuilt water valve	11 - Pink	Continuous	
WATR-E-BO	existing water blow-off	150 - Blue	Continuous	
WATR-E-HYD	existing water hydrant	150 - Blue	Continuous	
WATR-E-PIPE	existing water mains - plan	150 - Blue	Water	
WATR-E-PIPE-PROF	existing water mains - prof	150 - Blue	Water	
WATR-E-SERV	existing water service	150 - Blue	Continuous	
WATR-E-TEXT	existing water main text - plan	150 - Blue	Continuous	
WATR-E-TEXT-PROF	existing water main text - prof	150 - Blue	Continuous	
WATR-E-VALVE	existing water valve	150 - Blue	Continuous	
WATR-F-BO	future water blow-off	150 - Blue	Continuous	
WATR-F-HYD	future water hydrant	150 - Blue	Continuous	
WATR-F-PIPE	future water main - plan	150 - Blue	Water	
WATR-F-PIPE-PROF	future water main - prof	150 - Blue	Water	
WATR-F-SERV	future water service	150 - Blue	Continuous	
WATR-F-TEXT	future water text - plan	150 - Blue	Continuous	
WATR-F-TEXT-PROF	future water text - prof	150 - Blue	Continuous	
WATR-F-VALVE	future water valve	150 - Blue	Continuous	

LAYER NAMES	LAYER DESCRIPTION	LAYER COLOR	LINE TYPE	PLOT STATE
WATR-P-BO	proposed water blow-off	10 - Red	Continuous	
WATR-P-HYD	proposed hydrant	11 - Pink	Continuous	
WATR-P-PIPE	proposed water mains - plan	10 - Red	Water	
WATR-P-PIPE-PROF	proposed water mains - prof	10 - Red	Water	
WATR-P-SERV	proposed water service - plan	7 - White	Continuous	
WATR-P-SERV-PROF	proposed water service - prof	7 - White	Continuous	
WATR-P-TEXT	proposed water main text - plan	11 - Pink	Continuous	
WATR-P-TEXT-PROF	proposed water main text - prof	11 - Pink	Continuous	
WATR-P-VALVE	proposed water valve	11 - Pink	Continuous	

11.4 Required Drawings

11.4.1 Cover Sheet (Title Page)

In addition to any other requirements presented in this policy, the cover sheet shall show the following information:

a) Name of *Development* or Project.
b) Name and address of *Owner* and *Consulting Engineer*.
c) Site location plan of *Development* or project.
d) Legal description of subject properties.
e) File numbers of approving authorities, (i.e. *District* and/or Ministry).
f) Complete drawing index of all sheets belonging to the set.

Note: The standards defined Sections 2.1(c), 2.1(d), and 2.3 do NOT apply to the cover sheet.

11.4.2 Key Plan(s)

In addition to any other requirements presented in this policy, Key Plans shall show the following information:

a) *Lot* numbers, plan numbers, and *road* names of the subject *Development* and adjoining properties.
b) Cross reference of the drawings by outlining the area contained in each drawing and referencing that drawing by drawing number.
c) General *Construction* notes.

11.4.3 Building Envelope Plan (if applicable)

In addition to any other requirements presented in this policy, Building Envelope Plan shall show the following information:

a) Overall plan of current phase
b) *Lot* numbers

c) *Roads*, curbs, gutters and *sidewalks*

d) Rights of way and easements

e) Offset lines from all *Lot* boundaries indicating required building setbacks

f) 10 meter by 10 meter square on each *Lot* indicating the required minimum building envelope

g) Notes that indicate the required setbacks from all *Lot* boundaries pursuant to the *Zoning Bylaw*

11.4.4 Composite Plan(s) (as required)

In addition to any other requirements presented in this policy, Composite Plans shall show the following information:

a) All existing and proposed utilities, *roads*, walkways, and sidewalks.

b) All rights of way and easements including widths.

c) Control monuments with identification number.

d) All legal information, including bearings, dimensions, *Lot* numbers, block numbers, legal plan numbers, and street names. All *lot*s must be numbered.

e) Show legal *Lot* line dimensions.

f) All roadway dimensions including width of right of way, BOC to BOC and BOC to edge of right of way.

g) Area of each *Lot*.

11.4.5 Plan / Profile Drawings

In addition to any other requirements of this policy, Plan/Profile drawings shall show the following information:

11.4.5.1 General

a) Both plan and profile stationing must be tied to a *Lot* line or *Road* boundary.

b) The profile shall be shown at true centerline length and projected below the plan in as close a horizontal relationship as possible.

c) The top half of a Plan/Profile sheet shall show the plan view and shall show the legal layout with legal descriptions of all properties, the location of all sidewalks, catch basins, underground utilities such as sewer, water, telephone, television power, manholes, valves, hydrants, and all survey monuments, etc.

d) Drawings shall also show existing dwellings, fences, trees, hedges, unusual ground features, existing *Roads* and driveways including the type such as asphalt, concrete or gravel.

e) Plan/Profile drawings for various services may be combined on one plan (must be clear and readable) in the following manner:

- *Roads* & Storm Drains
- Sanitary Sewers & Water

11.4.5.2 *Road* Plan/Profile Drawings (may be combined with Storm Drains)

Road ***plan*** views shall show the following information:

a) Drawings shall show width of *Road*, width of shoulders, and the offset of curb from *Lot* line.

b) Chainages of the B.C. and E.C. of horizontal curves shall be shown together with the delta angle, centerline radius, tangent length, and centerline arc length. Curb radii are not required if the centerline radius and *road* width are shown, except on curb returns at intersections and at the end of *Cul-de-sacs*.

c) Quarter point gutter elevations for *Cul-de-sac*.

d) Catchbasin rim elevations.

Road ***profiles*** views shall show the following information:

a) The design gutter and/or centerline grade (%).

b) Vertical curve chainage and elevations of B.C., E.C. and P.I.; the external value, e; the length of vertical curve; the chainage and elevation of the low spot of sag curves; and, K value of vertical curvature (crest on sag).

c) Existing ground elevation along the centerline of proposed roadway and/or the edge of existing asphalt.

11.4.5.3 Water Plan/Profile Drawings (may be combined with Sanitary Sewer and Storm Mains)

Water ***plan*** views shall show the following information:

a) Offset of pipelines from *Lot* lines.

b) Length and size of pipe.

c) Offset of connections from *Lot* lines.

d) The locations of manholes, hydrants, valves, services, end-of-main, or other appurtenances referenced to nearest *Lot* line.

e) Information on any curves or pipe deflections.

f) Easements (existing and/or required).

g) Location and connection details for all values and fittings.

Water ***profiles*** views shall show the following information:

a) Surface profiles (existing and design, if applicable) over proposed main.

b) Length, size, grade, type, and material of pipe.

c) Profiles of invert and crown of pipes.

d) Location, type and invert elevation of all crossing utilities.

e) Stationing of all valves, fittings and appurtenances.

f) Anchor block locations.

11.4.5.4 Storm Drains and Sanitary Sewer Plan/Profile Drawings

Storm & Sanitary ***plan*** views shall show the following information:

a) The drawings shall show the structural details of all manholes and chambers, etc. not covered by standard drawings. Where the sanitary sewers and storm drains or other utilities are to be installed in a common trench, a typical cross-section showing vertical and horizontal distances between pipes and classes of pipe and bedding shall be shown.

b) Offset of pipelines from *Lot* lines.

c) The size of pipe.

d) Offset of connections from *Lot* lines.

e) The locations of manholes, clean-outs and services relating to *Lot* lines.

f) Information on any curves or pipe deflections.

g) Easements (existing and/or required).

h) Future curb & gutter lines (if applicable).

i) Manhole identification numbers.

j) Inverts of service connections at *Lot* line (if applicable).

k) For storm drainage, features such as ditches, culverts, streams, channels, etc.

Storm & Sanitary ***profiles*** views shall show the following information:

a) Surface profiles (existing and design, if applicable) over proposed main.
b) Length, size, grade, type, and material of pipe.
c) Profiles of invert and crown of pipes.
d) Location, type and invert elevation of all crossing utilities.
e) Invert elevations of manholes.
f) Alignment station of manhole.
g) Manhole identification number.
h) Rim elevations of proposed or adjusted manholes.

11.4.6 Grading Plan(s)

In addition to any other requirements presented in this policy, grading plans shall show the following information:

11.4.6.1 General

a) Pre-*Development* contour lines. The topographic information shall extend a minimum 30.0m outside the *Development* site;
b) proposed contours, slopes, grades, and spot elevations;
c) the minor (10 year return) storm sewer system with the flows noted per section and the accumulated flows from all upstream sections. Provision must be made for upstream *Development* potential where applicable;
d) the major (100 year return) system. The *Consulting Engineer* shall note wherever the major system is not in the pipe or the roadway, showing the routing and flows for the 100 year return storm;
e) all swales proposed to affect the submitted Storm Water Management Plan;
f) how the *Development* proposal will affect adjacent lands, attempts should be made to "meet" existing elevations along the *Development* boundary;
g) a legend noting all items proposed in the Storm Water Management Plan. Applicable "General Notes" should also be included.

11.4.6.2 *Lot* Grading

a) all existing corner *Lot* elevations (uncircled);

b) all proposed corner *Lot* elevations (circled);

c) the proposed building envelope with the Minimum Basement Elevation (MBE) noted;

d) the slope of the *lot* (directional arrow), noting a minimum 2% grade on the *lot*s;

11.4.7 Landscape Plan(s)

In addition to any other requirements presented in this policy, Landscape plans shall show the following information:

a) extent of proposed landscape *Works and Services*;

b) existing and proposed *Lot* information, including *lot* lines, easements, legal descriptions, addresses and dimensions;

c) existing and proposed contours, slopes, grades and spot elevations for landscaped areas (if not already shown on grading plan);

d) existing and proposed buildings, structures, *Roads*, curbs, sidewalks, walls, fences, signs, site features and other appurtenances;

e) existing vegetation proposed to be removed, relocated or retained;

f) areas of proposed preservation, naturalization, restoration, lawn and landscaping, including soil types, depths and amendments;

g) proposed plant species name (botanical and common), size and planting condition;

h) existing and proposed irrigation systems; and

i) *Construction* details and specifications as required.

11.4.8 Storm Water Management Plan (SMP)

In addition to any other requirements presented in this policy, Storm Water Management plans shall show the following information:

a) Site and surrounding area (400m minimum outside *Development*) showing roads and major features. A small location plan of the watershed is also to be included.

b) Contours of existing ground (1.0 m intervals where slope <20%, 2.0m >20%) for the site and surrounding area mentioned above.

c) Major flood routing (1:100 year); show as arrows and indicate if in pipe or on surface show an "open" arrow for surface routes and the same arrow "shaded" for routes in pipes).

d) Detention pond details, if applicable.

e) Area, in hectares, of *Development* and the total area of drainage basin.

f) Directional arrows of flow within the site and on surrounding areas.

g) Sub-catchment boundaries, coefficients and areas.

h) Pipe system including size, grade, and minor and major flows (a table may be utilized).

i) The subject *Development* is to be highlighted.

11.4.9 Erosion and Sediment Control Plan(s)

This plan is to detail methods and procedures that will be used to prevent or minimize soil displacement and transport of sediment from the *Development* site. This is to include methods to prevent or minimize soil transport onto adjacent properties or onto existing roads adjacent to the site (i.e. tracking from vehicles). Preventative methods of soil displacement on the site are to be detailed. In addition to any other requirements presented in this policy, the drawing shall show the following:

a) Existing contours of the site at an interval sufficient to determine drainage patterns.

b) Final contours if the existing contours are significantly changed.

c) Final drainage patterns/boundaries.

d) Existing vegetation such as significant trees, shrubs, grass, and unique vegetation.

e) Limits of clearing and grading.

f) Erosion and sediment control measures (temporary and permanent) including locations, names and details, in accordance with "Land *Development* Guidelines for the Protection of Aquatic Habitat".

g) Storm Drainage systems including drain inlets, outlets, pipes, and other permanent drainage facilities (swales, waterways, etc.).

The plan must have a narrative section describing the land, the disturbing activity and details of the methods used for controlling erosion and sedimentation. Include a description of the procedures for *Construction* and maintenance of the control measures and note the persons involved in maintenance and provide a maintenance schedule that is to be followed. Where the land area to be subdivided is less than 10 hectares, this plan may be combined with the Stormwater Management Plan.

11.4.10 Street Lighting Plan(s)

A plan view of the street lighting shall be provided. There shall be General Notes included on the Plan noting reference(s) to the Municipal Standards and Specifications and the appropriate design criteria.

11.4.11 Street Sign, Paint Marking, and Traffic Control Device Plans

A drawing identifying signs, markings, and required control devices is required. Detailed drawings may be required for traffic control devices.

11.4.12 Traffic Management Plan(s)

Detail routes for *construction* traffic and traffic controls for traffic on existing roads affected by *construction* is required.

11.4.13 *Road* Cross Section Plan(s)

Shall be scaled at 1:100 horizontal and 1:50 vertical and shall note the existing ground elevation, the proposed elevations of the *road* centerline, the curb and gutter (or *road* edge) and *Lot* lines. Cross-sections are required at 20.0 m intervals.

11.4.14 *Construction* Details

Show all details for *Construction* including those which are not covered by, or specifically detailed in the provisions of this bylaw. Where there is a Standard Drawing, it is expected the drawings will refer to the Standard Drawing Number.

11.4.15 Electrical, Gas, and Communication Utilities

Per appropriate authority (Individual utilities may provide separate drawings).

11.5 Drawing Submissions

11.5.1 Design Submissions

Two (2) paper copies of all *Design Drawings* are required for design submissions. Colour copies may be requested to aid readability.

11.5.2 Record Drawings

Record Drawings must be submitted after the completion of the *Works and Services*. *Record Drawings* must be delivered in paper format for review and approval by the *District*. The *Record Drawings* shall include all drawing sheets submitted for the *"Certificate to Proceed with Construction"* unless specifically exempted by the *Approving Officer*.

The *Owner* shall submit to the *District* a complete set of electronic drawings of the *Subdivision* or *Development* in DWG format compatible with the current version of AutoCAD in addition to a Digital Hard copy in Adobe PDF format in accordance with Sections 5.3 and 5.4 of this policy. The complete electronic set shall only be submitted after acceptance of the draft paper *Record Drawings* by the *Approving Officer*.

11.5.3 Electronic Drawings

11.5.3.1 General Requirements

The *Owner* shall submit to the *District* a complete set of electronic drawings of the *Subdivision* or *Development* in AutoCAD DWG format.

The electronic drawing shall be prepared in accordance with Section 2.0 and the conventions prescribed in Section 3.0.

All external files associated with the electronic drawing (e.g. special fonts, line types, and/or images) shall also be supplied with the electronic drawing submission.

No drawing shall be submitted that contains any external references (xrefs). All externally referenced drawings shall be bound prior to submittal.

11.5.4 Digital Hard Copies

A digital hard copy is any digital file that is reproducible without the ability to modify the drawings contents or appearance.

11.5.4.1 General Requirements

Adobe's Portable Document Format (*.pdf) is the preferred file type. However alternatives will be considered. Alternative formats might be Autodesk's Drawing Web Format (*.dwf) or scanned tif or jpg images.

Drawing sets submitted as a digital hard copy shall be electronically sealed by the *Owner's Engineer*.

11.5.4.2 Device/Document Settings for Plotting Adobe Portable Document Format

Ensure all text is legible and the shading and hatching ordered so as not to block or hide other line work and/or text.

The following settings shall be used when plotting the drawings to Adobe PDF:

- paper size to be ANSI D 558.8mm x 863.6mm
- layout to be "landscape"
- graphic print quality to be no less than "600 dpi"

SERVICING AGREEMENT

DISTRICT OF PEACHLAND
Servicing Agreement

WSAXX-XX
<name, type & civic address of project>

THIS AGREEMENT is dated for reference this ____ day of <month>, <year>.

BETWEEN:

District of Peachland,
5806 Beach Avenue,
Peachland, British Columbia, V0H 1X7
(the "District")

OF THE FIRST PART

AND:

[name of land owner] (Inc. #_____)
[street address]
[location], British Columbia, [postal code]
(the "Owner")

OF THE SECOND PART

WHEREAS:

A. The Owner desires to develop certain lands and premises within the District of Peachland, more particularly known and described as:

Parcel Identifier:
Lot __, Block __, District Lot _____, Osoyoos Division Yale District Plan _____
(the "Lands")

B. Section 509 of the *Local Government Act*, as amended, including any regulations, as amended, authorizes the District to enter into an agreement which sets out the works and services required to be constructed and installed to the standards established by the District of Peachland Subdivision and Development Servicing Bylaw No. 2395, (the "SDS Bylaw"), as hereinafter defined, by a specified date or forfeit to the District the amount deposited as performance security.

C. The Owner agrees to construct and install at their expense all of the works and services as hereinafter defined, all of which shall be completed in accordance with this Agreement and to the satisfaction of the District including:

(a) Works and Services, pursuant to section 509 of the of the *Local Government Act*; and
(b) Certain amenities, pursuant to section 482 of the *Local Government Act*.

D. The Owner has agreed to grant and transfer to the District all its rights, title and interests in and to the works and services and certain amenities, including property pursuant to section 282 of the *Local Government Act*, to the District and the District has agreed to accept such transfer of the works and services and certain amenities, on the terms of this Agreement.

NOW THEREFORE in consideration of the mutual promises contained in this Agreement and other good and valuable consideration paid by each of the parties to each other (the receipt and sufficiency of which each party hereby acknowledges) the parties hereby covenant and agree with each other as follows:

1. Definitions

1.1 In this Agreement:

(a) "Complete" or "Completion" with respect to the Works means completion to the satisfaction of the District Engineer and Approving Officer evidenced by the Certificate of Acceptance under section 17;

(b) "District Engineer" means the Director of Engineering, or designate;

(c) "Works" means all those works and services required to be provided under the SDS Bylaw and without limitation, those works and services described in Schedules A [Schedule of Works] and B [List of Approved Issued for Construction Drawings] to this Agreement.

1.2 All other words and expressions used in this Agreement that have a defined meaning under the SDS Bylaw shall have the same meaning as under that Bylaw.

2. Term of Agreement

This Agreement shall take effect from the Reference Date and continue until the issuance of the Letter of Acceptance by the Approving Officer.

3. Covenants of Owner

The Owner covenants and agrees:

3.1 to install, construct and complete the Works;

3.2 to pay to the District in advance upon execution of this Agreement all fees, disbursements, expenses, charges, taxes, rates and assessments required to be paid to the District under the SDS Bylaw and the Building Bylaw including, but not limited to:

(a) relation to A non-refundable Inspection fee in the amount of $<amount>, representing 3% of the estimated cost of construction and installation of the Works before issuance of a Certificate of Acceptance by the District Engineer on behalf of the Approving Officer;

(b) all development cost charges imposed by bylaw, where applicable, on the Subdivision and Development of the lands. The Owner acknowledges and agrees that the work done and payments made pursuant to the Agreement are not payments or work to be applied as a credit toward development cost charges, save as may be expressly agreed to by the District in writing;

(c) latecomer Charges pursuant to Latecomer Agreement <name > (subject to Bank of Canada interest rate changes) are as follows; (Omit if not applicable

i. Excess Services Charge in the amount of $<amount> representing a $<amount> fee per new lot (#) totaling $<amount> and $<amount> in interest as calculated annually at a rate prescribed by Bylaw of the District, for a period commencing on <date of agreement>, up to <current date>. Interest from <current date> to the referenced date of Agreement, was calculated at a per diem rate of $<per diem amount>.

ii. Extended Services Charge in the amount of $<amount> representing a $<amount> parcel fee and $<amount> in interest as calculated annually at a rate prescribed by Bylaw of the District, for a period commencing on <date of agreement>, up to <current date>. Interest from <current date>, to the referenced date of the Agreement calculated at a per diem rate of $<per diem amount>.

(d) legal fees and disbursements incurred by the District in preparation of this Agreement and ancillary documents, and the costs of registration of such documents in the Land Title Office;

(e) all expenses and costs incurred by reason of liens for non-payment of labour or material, worker's compensation assessments, unemployment insurance, federal or provincial tax check off in the Works and for unlawful encroachment by the Works.

3.3 To deposit with the District, as security for the due and proper performance by the Owner of all of the covenants, agreements and obligations of the Owner in this Agreement either by cash or Irrevocable Letter of Credit (LOC) the sum of $<amount> (the "Deposit") as a Performance Bond in the amount of 125%, plus 10% for engineering, of the Consulting Engineers Estimated Cost of Works and Services for construction and installation of the Works and Services.

3.4 The Deposit, less the amount required by section 14 to be maintained, during the Maintenance Period, will only be returned to the Owner upon acceptance of a Certificate of Substantial Completion and Record Drawings of the Works in strict conformance with this Agreement.

3.5 No interest on the Deposit shall be paid to the Owner.

3.6 The District, its employees, contractors, agents and others, are granted free and uninterrupted access to any and all parts of Lands for the purpose of making inspections and taking samples of materials being used in connection with the construction of the Works.

3.7 For the duration of this Agreement upon the request of the District, the Owner will make, do and execute or cause or procure to be made, done and executed, all such further acts, deeds, rights-of-way, easements and assurances as reasonably required by the District for the more effective carrying out of this Agreement.

3.8 Not to sell or otherwise transfer any interest in the Lands without first obtaining from any perspective purchaser, lease holder, tenant or other transferee of the Lands an agreement to be bound by the terms of this Agreement.

4. Designs by Consulting Engineer

The Owner covenants and agrees:

4.1 The Owner has engaged a Consulting Engineer to prepare and certify designs including For Construction drawings and documents; to carry out construction survey, construction field reviews, inspections and field coordination; to perform as the Contract Administrator as defined in the Master Municipal Construction Documents (MMCD) for the project; and to make complete submissions, including Record Drawings, all in conformity with the standards and specifications required under Schedule 11 of SDS Bylaw ("the specifications") and any other requirements of the SDS Bylaw; and

4.2 That the Owner has caused the Consulting Engineer to deposit with the District a letter, signed by the Consulting Engineer, outlining the scope of the Consulting Engineer's engagement [Owner-Consulting Engineer or Contractor Agreement Confirmation Letter], including;

(a) the schedule of inspection of the Works to be undertaken by the Engineer [Summary of Design and Field Review Requirements for Land Development Projects and a sealed schedule of quantities and cost estimates];

(b) the Consulting Engineer's assurance that the Works have been designed in accordance with the Specifications and all requirements of all District bylaws that apply

to and govern the Works [Assurance of Design and Field Review for Land Development Projects; Design Quality Control and Assurance Plan];

(c) professional certification of all design and construction drawings for the Works [Sealed Design Drawings];

(d) the Consulting Engineer will certify and submit Record [As-built] Drawings for the Works [Construction Quality Control and Assurance Plan; Record-keeping Quality and Assurance Plan];

4.3 The Owner will cause the Consulting Engineer to supervise the construction and installation of the Works, including by way of sufficient on-site inspections in such a manner as to ensure that the Works are constructed and installed strictly in accordance with SDS Bylaw specifications. The Owner must not construct the Works or any part of them except under the supervision of the Consulting Engineer.

4.4 Without limiting the generality of section 4.3, "sufficient on-site inspections" means a minimum of one site visit per day, or such inspections as the District Engineer agrees are sufficient to ensure the Works are constructed in accordance with good engineering practice, during construction and installation of the Works as described in the Construction Quality Control and Assurance Plan. The Owner shall cause the Consulting Engineer to maintain daily inspection reports and to provide such daily inspection reports to the District upon request.

4.5 The Owner must immediately notify the District Engineer of any severance of the Owners engagement of the Consulting Engineer that occurs during the course of the design or construction of the Works and must provide the District Engineer with a letter signed by the Consulting Engineer retained in their place, outlining the scope of that Consulting Engineer's engagement [Owner-Consulting Engineer or Contractor Agreement Confirmation Letter and Assurance of Design and Field Review for Land Development Applications].

4.6 The Owner further covenants and agrees that the Owner has retained a landscape professional to carry out the design and field inspection of any landscaping work that is required as part of the Works, and that the requirements of sections 4.1 to 4.4 of this Agreement, so far as they refer to the role and function of the Consulting Engineer, shall with the necessary changes apply to the role and function of the landscape professional in respect of the design and construction of that landscaping work.

5. Performance Bond

5.1 If an Owner wishes to submit an Application for Subdivision Approval or an Application for Building Permit to the District before a Certificate of Acceptance has been issued in respect of the Works to be designed and constructed, the Owner shall provide the District with a Performance Bond in the amount of 125% plus 10% of the cost, as estimated by the Consulting Engineer and verified by the District Engineer, of the construction and installation of any Works that have not yet been constructed by the Owner prior to the Owner making such an application.

5.2 The Performance Bond shall be administered in accordance with section 6 herein and as follows:

6. Irrevocable Letter of Credit (LOC)

6.1 Any Performance Bond or LOC provided by the Owner to the District shall be a clean unconditional and irrevocable Letters of Credit in a form acceptable to the District expiring no earlier than one year from the date of the issuance and providing for the right of renewal, unless the bond or LOC is perpetual, issued to the District by a local branch of a chartered bank or such other financial institution satisfactory to the District. Such LOC shall be

maintained as good and valid security by the Owner at all times as required by this Agreement.

6.2 Renewal of Letters of Credit (LOC). Unless the LOC is perpetual, the Owner shall renew the LOC, at least thirty (30) days prior to its expiration in any year for a further twelve month period until a Certificate of Substantial Completion for the Works has been issued. The amount of the renewal LOC in respect of Works for which no Certificate of Substantial Completion has been issued, shall be increased by the amount of the increase in all items of the British Columbia Consumer Price Index as established by Statistics Canada, if any, or its replacement index, over the preceding twelve month period. If the Owner fails or omits to renew any LOC and deliver such renewal to the District within 14 days before the expiry of any LOC then held by the District, the District may draw down on the then current LOC without notice or restriction, and hold the monies in lieu thereof.

6.3 Draw on Deposit or Default. If the Owner fails to observe or perform any of the obligations under this Agreement the District may, with 30 days written notice to the Owner, cure the default and draw upon the Deposit in an amount equal to the Default Costs incurred by the District in curing such default.

6.4 Shortfall in Security. If the Performance Bond is insufficient to cover any deficiency costs, the Owner shall pay to the District, immediately on receipt of the District's invoice for same, the difference between the balance of the Performance Bond and the deficiency costs.

6.5 Reduction of Security. If the Owner wishes to apply to the District for a reduction of the Performance Bond before a Certificate of Substantial Completion has been issued with respect to all Works, the Consulting Engineer must schedule a field inspection with the District Engineer and provide a materials certificate as set out in the Specifications and a Statutory Declaration detailing the completed Works. The District may reduce the Performance Bond by an amount equal to the cost, as estimated by the Consulting Engineer and verified by the District Engineer, of designing and constructing such completed Works; provided that in no event will the Performance Bond be less than ten percent (10%) of the original Performance Bond value.

6.6 Return of Security. The District shall return the balance less 10% of the original Performance Bond value, unless a replacement Maintenance Bond has been provided, to the Owner following the receipt of a Certificate of Substantial Completion and a Statutory Declaration in accordance with this Agreement prepared by the Consulting Engineer and verified by the District Engineer with respect to completion of all Works.

7. Indemnity

7.1 The Owner shall release, and does hereby indemnify and save harmless the District and all of its agents, contractors, employees, officials, officers and authorized representatives, from and against:

(a) all costs, expenses, damages, claims, demands, actions, suits and liability by whomever brought or made and however arising whether directly or indirectly, from the construction or installation of the Works and any injury or damage thereby caused to person or property (including death) except that arising from the exclusive negligence or other fault of the District;

(b) all costs and expenses incurred by the District arising directly or indirectly from any engineering operation, construction, repair, replacement or maintenance by the District to or on any real or personal property which is affected by the Works and which the District either owns or is by duty or custom obliged, directly or indirectly to construct, repair, replace or maintain; and

(c) all expenses and costs incurred by reason of liens for nonpayment of labour or material, workers' compensation assessments, unemployment insurance, federal or provincial tax check off in relation to the Works and for unlawful encroachments by the Works.

7.2 Waiver and release by Owner. The Owner waives, relinquishes, and abandons any right or claim which the Owner now has or may at any time have save and except as expressly provided in this Agreement, for any contribution from the District or any other person toward the Owner's cost of designing constructing or installing the works and services, or of making the payments, contributions or transfers under section 3 of this Agreement.

7.3 Act or Omission of Owner. Despite any rule of law or equity to the contrary, the Owner releases, saves harmless, and forever discharges the District and its elected officials, officers, servants, employees, solicitors, agents, successors, and assigns from all manner of actions, causes of actions, suites, debts, losses, dues, accounts, bonds, covenants, contracts, expenses, damages, costs, claims, and demands whatsoever, and whomsoever, brought by reason of or related to:

(a) the Works to be performed or provided by the Owner or its servants, agents, officers, contractors, sub-contractors, licensees, or invitees, under this Agreement;

(b) liens for non-payment for labour or materials, workers compensation assessment, unemployment insurance, or federal or provincial taxes.

7.4 Act or Omission of the District. Despite any rule of law or equity to the contrary, the Owner releases, saves harmless, and forever discharges, and covenants not to sue the District, its elected officials, officers, servants, employees, consultants, solicitors, agents, successors, and assigns in respect of any and all actions, claims, demands and damages howsoever arising which the Owner now has or may hereafter have against the District, its elected officials, officers, servants, employees, consultants, solicitors, or agents of the District which is existing or arising on relation to prevent the Owner from enforcing any remedy for breach by the District of its obligations under this Agreement.

8. Insurance

8.1 The Owner will, without limiting its obligations or liabilities and at its own expense, provide and maintain at all times from issuance of the Certificate to Proceed with construction and/or commencement of construction and installation of the Works until the District Engineer issues a Certificate of Acceptance, insurance from insurers licensed to conduct business in Canada:

(a) comprehensive general liability insurance on an occurrence basis, in an amount not less than five million ($5,000,000) dollars inclusive per occurrence against death, bodily injury and property damage arising directly or indirectly out of the work or operations of the Owner, its employees and agents in or about the Lands, highways or other lands in carrying out the construction and installation of the Works and in performing its obligations under this Agreement. Such insurance shall name the District as a co-insured and shall contain a cross-liability and severability of interests clause so that the District and the Owner may be insured in the same manner and to the same extent as if individual policies had been issued to each. The insurance will include, but not be limited to: premises and operators liability, broad form products and completed operations, owners and consultants protective liability, blanket automobile, contingent employers liability, broad form loss of use, personal injury and incidental medical malpractice;

(b) automobile liability insurance on all vehicles owned, operated or licensed in the name of the Owner in an amount not less than two million ($2,000,000) dollars per occurrence for bodily injury, death and damage to property; and

(c) owners' equipment insurance in all risks forms covering construction machinery and equipment used for the installation of Works.

8.2 The Owner shall provide to the District with proof of insurance by certified copy of insurance policies before commencing the Works and again before the issuance of any Certificate of Substantial Completion. The policy of insurance shall contain a provision requiring the insurer to give to the District thirty (30) days prior written notice before any alteration or cancellation of the policy shall be effective. To the extent the District has an insurable interest, the building's risk policy will have the District as first loss payee. The Owner will be responsible for deductible amounts under the insurance policies. All of the Owner's insurance policies will be primary and not require the sharing of any loss by the District or any insurer of the District.

8.3 The Owner acknowledges that any requirements by the District as to the amount of coverage under any policy of insurance will not constitute a representation by the District that the amount required is adequate and the Owner acknowledges and agrees that the Owner is solely responsible for obtaining and maintaining policies of insurance in adequate amounts. The insurance policy coverage limits shall not be construed as relieving the Owner from responsibility for any amounts which may exceed these limits, for which the Owner may be held liable.

8.4 The Owner shall place and maintain, or cause any of its subcontractors to place and maintain such other insurance or amendments to the foregoing policies as the District may reasonably direct.

8.5 The Owner hereby waives all rights of recourse against the District for the loss or damage to the Owner's property.

8.6 Should the Owner fail to maintain the proper insurance coverage for the term of this Agreement, the District will have the authority, but is under no obligation, to draw on the Performance Bond or LOC posted by the Owner to purchase on behalf and at the expense of the Owner the required insurance coverage.

8.7 The Owner acknowledges and agrees that the Owner relies exclusively on its own Consulting Engineer, landscape professional and contractor and that the District does not, by its approvals, inspections or acceptance of the Works, warrant or represent that the Works are without fault or defect and that all approvals and inspections of the Works given or made by the District are for the sole benefit of the District and shall in no way relieve or excuse the Owner from construction and installing the Works in strict compliance with the provisions of this Agreement.

9. Workers Compensation

9.1 The Owner agrees that it shall, at its own expense, procure and carry, or cause to be procured, carried and paid for, full Workers Compensation Board coverage for itself and all workers, employees and others engaged in or upon any Works which are the subject of this Agreement and to comply with the provisions of the *Workers Compensation Act*.

9.2 The Owner covenants and agrees either:

(a) to enter into a written agreement with a qualified third party to act as the Prime Contractor, with respect to the construction of the Works, for the purpose of section 118 of the *Workers Compensation Act*; or

(b) as the Owner, as defined in the Workers Compensation Act, of the project for which the construction of the Works are being undertaken, to assume the responsibilities of the Prime Contractor for purposes of section 118 of the *Workers Compensation Act*.

9.3 The Owner covenants and agrees that it will provide, or will ensure that the third party Prime Contractor provides, the following completed documentation to the District prior to the commencement of the construction of the Works:

(a) the District's "Designation of Contractor as Prime Contractor for the Land Development Project" form, or "Designation of Developer as Prime Contractor for Land Development Project" form, as the case may be, as completed by the third party Prime Contractor and, where applicable, by the Owner;

(b) a copy of the completed "Notice of Project" which has been filed with WorkSafe BC, pursuant to section 20.2 of the *Occupational Health and Safety Regulation*, B.C. Reg. 296/97, as amended, by the third party Prime Contractor or the Developer, as the case may be; and

(c) written confirmation of the name of the qualified coordinator appointed pursuant to section 20.3(2) of the *Occupational Health and Safety Regulation*, B.C. Reg. 296/97, as amended, by the third party Prime Contractor or the Developer, as the case may be, for the purpose of ensuring the coordination of health and safety activities for the location where the construction of the Works will be performed.

10. Certificate to Proceed with Construction

Upon the issuance of the Certificate to Proceed with Construction the District covenants and agrees that it will permit the Owner to perform the Works on the terms and conditions contained in this Agreement and to occupy and use municipal highways and lands of the District as necessary for the Works subject to such terms and conditions in any case and from time to time as the District Engineer may impose.

11. Commencement of Works

In carrying out the Works the Owner covenants and agrees:

11.1 Not to commence the construction or installation of the Works without first advising the District Engineer in writing at least five days before commencement and obtaining a Certificate to Proceed with Construction from the District.

11.2 To construct, install and complete the Works as designed and to the specifications and as shown in Schedules A and B [Issued for Construction Drawings] and in conformance with the Certificate to Proceed with Construction.

11.3 To obtain the prior written approval of the District Engineer for any changes to the Issued for Construction Drawings.

11.4 To comply with any changes to the Issued for Construction Drawings required by the District Engineer as necessary to satisfy the District Engineer that the Works will function and operate in a manner satisfactory to the District Engineer.

11.5 To modify and reconstruct the Works where they are damaged, defective, or not operating to the satisfaction of the District Engineer prior to completion.

11.6 To pay the cost of all necessary connections by the District of the Works to municipal water distribution, storm drainage and sewerage systems as the case may be.

11.7 Not to damage any works, services or property of the District, or remove, alter or destroy any survey pins, posts or monuments, and if in default to replace, repair and restore any damage of whatever nature to the reasonable satisfaction of the District Engineer.

11.8 To comply with all statutes, laws, regulations and orders of any authority having jurisdiction with respect to any aspect of the Works and without limiting the generality of the foregoing all bylaws of the District.

11.9 To not deposit or permit the deposit of any material or debris upon any highways or lands of the District and in the event that any material or debris is deposited upon any highways or lands of the District as a result of construction of the Works, buildings, structures or improvements, the Owner agrees to remove such material or debris within 24 hours at the expense of the Owner. In the event that the Owner does not remove such material or debris within 24 hours, then the District may remove the material or debris at the expense of the Owner. If any invoice of the District for the removal of such material or debris remains unpaid after thirty (30) days from the date of the invoice, the District is authorized to deduct the amount of such invoice from the Deposit.

11.10 To retain at all times a site representative to provide competent survey, layout and onsite supervision to ensure that the Works strictly conform to the Issued for Construction Drawings, and to record the details of any field design or construction changes to the Issued for Construction Drawings and to record all of the geometric information for preparation as Record [As-Built] Drawings.

11.11 To advise the District Engineer of the name and address of the Consulting Engineer retained by the Owner and to ensure that such Consulting Engineer maintains Consulting liability and errors and omissions insurance of not less than $ 5,000,000.00 per occurrence during the term of his or her engagement. The owner's Engineer shall provide proof of such insurance before the Owner commences the construction and installation of the Works.

11.12 Not to employ any person or contractor in the construction of the Works who, in the reasonable opinion of the District Engineer is unfit, incapable or unskilled, and at all times, in connection with the execution of the Works, to employ and keep on site a competent general works superintendent capable of speaking, reading and writing the English language. Any explanations, directions and requests given by the District Engineer to the superintendent shall be conclusively deemed to have been given to the Owner.

11.13 Not to engage any contractor in respect of the Works unless that contractor holds a business license issued by the District.

12. Completion Date

The Owner shall proceed without delay and shall complete construction and installation of the Works by [month, day, year].

13. Certificate of Substantial Completion

The Owner covenants and agrees to submit a Certificate of Substantial Completion issued by the Consulting Engineer upon satisfactory completion of the Works and performance of all other requirements of this Agreement except the requirements of section 14.

14. Maintenance Period

14.1 Upon completion and issuance of a Certificate of Substantial Completion of the Works, the Owner covenants and agrees to:

(a) maintain the Works by repairing any deficiencies in design, materials or workmanship in the Works that may arise for a period of one year from acceptance of a Certificate of Substantial Completion of the Works (the "Maintenance Period") or if the Maintenance Period commences between the period of November 1st and March 31st, it may be

extended to terminate on April 1st following the one year anniversary of the commencement of the Maintenance Period;

(b) remedy any defects appearing within a period of one year from the date of the Certificate of Substantial Completion and pay for any damage to other works or property resulting therefrom, within thirty (30) days after the delivery of a notice in writing to the Owner, or within such other time as is agreed to or specified by the District Engineer, acting reasonably, save and except for defects caused by reasonable wear and tear, negligence of the District, its servants or agents, or acts of God;

(c) despite sub-paragraph (b) if in the sole opinion of the District Engineer any emergency arises;

(d) keep deposited with the District for a period of one year from Substantial Completion of the Works until Total Completion of the Works, a Maintenance Bond equal to the greater of:

i. 10% of the initial Deposit by Cash or LOC; or

ii. $2,000

all or part of which amount may be withheld by the District from the balance of the Performance Bond otherwise payable to the Owner;

(e) should it become evident that the existing Maintenance Bond is in the opinion of the District Engineer, insufficient to perform all of the terms and conditions of this Agreement then the District reserves the right to request additional security.

(f) if for any reason the LOC ceases to be effective security or becomes unenforceable so as to reduce or remove its purpose as full security for the performance of all the terms and conditions of this Agreement, the Owner agrees to replace it immediately with a further LOC acceptable to the District; or such other security acceptable, in its sole discretion, to the District.

14.2 The Owner agrees that the District Engineer may upon written notice to the Owner, given before the issuance of the Certificate of Acceptance under section 17 of this Agreement, increase the Maintenance period to a period the District Engineer considers reasonable, given the nature of the Works, but in any event not to exceed three years.

(a) Draw on Deposit for Default. If the Owner fails to observe or perform any of the obligations under this Agreement, the District may give notice of the District's election to cure the default and may draw upon the Maintenance Bond an amount equal to the deficiency costs incurred by the District in curing such deficiencies.

(b) Shortfall in Security. If the Maintenance Bond is insufficient to cover the deficiency costs, the Owner shall pay to the District immediately on receipt of the District's invoice, the difference between the balance of the Maintenance Bond and the deficiency costs.

(c) Return of Security. The District shall return the balance of the Maintenance Bond following the expiration of all maintenance periods, receipt by the District of a Certificate of Total Completion, all Statutory Declarations from the Owner, verification by the District Engineer that all information, documents, agreements, covenants and fees required from the Owner and Consulting Engineer pursuant to this Agreement have been provided to the District and issuance by the District of the Certificate of Acceptance by the Approving Officer.

15. District Amenities

15.1 Transfer of Lands for Public use: The Owner further covenants and agrees with the District, in anticipation of and compliance with the proposed Zone amending bylaw and under section 282 of the *Local Government Act*, that it will transfer, pay or contribute to or concurrent with the adoption of the Zone Amending Bylaw:

(a) [LIST AMENITIES AND DEADLINES FOR PERFORMANCE OF EACH]

(b) The Owner shall pay to the respective government such Property Transfer Tax, Goods and Services Tax, or other tax, fee, or charge that may be applicable in respect of any transfer of property to the District.

15.2 No Deemed Expropriation or Injurious Affection: The Owner acknowledges and agrees that the zoning of certain areas of the Lands for public use does not constitute an expropriation, deemed expropriation, condemnation, public taking or injurious affection for which the Owner would be compensated.

16. Certificate of Total Completion

The Owner covenants and agrees that upon the satisfactory completion by the Owner of all the covenants and conditions in this Agreement, and without limiting the generality of the foregoing, including the maintenance of the Works constructed under this Agreement in complete repair for a period of one year, it shall provide to the District:

(a) a Certificate of Total Completion of the Works sealed by the Consulting Engineer; and
(b) a Statutory Declaration in accordance with the SDS Bylaw;

prepared by the Consulting Engineer and verified by the District Engineer with respect to completion of all Works.

17. Certificate of Acceptance

17.1 The District covenants and agrees that upon the satisfactory completion by the Owner of all the covenants and conditions in this Agreement, and without limiting the generality of the foregoing, including the maintenance of the Works constructed under this Agreement in complete repair for a period of one year, it shall provide to the Owner a Certificate of Acceptance of the Works signed by the District Engineer, together with the remaining deposit.

17.2 The Owner agrees that the issuance of a Certificate of Acceptance constitutes a transfer and conveyance to the District of all rights, title and interests in the Works for the District's own and unfettered use absolutely, free and clear of all encumbrances, except those Works specified by the District within the Lands and on-site landscaping.

18. Owner Default

18.1 The Owner agrees that if the works or any part thereof is not completed in accordance with the provisions of this Agreement and, in particular, by the Completion Date set out in section 12, if the owner shall be in default of any of the covenants herein contained, and such default shall continue for a period of fourteen (14) days after notice thereof has been given by the District to the Owner, the District may draw down on the Performance Bond held by it under this Agreement and use the funds for the purpose of completing the Works in accordance with this Agreement.

18.2 If the Owner shall fail to observe, perform or keep any of the provisions of this Agreement to be observed, performed or kept by the Owner, the District may at its sole discretion and without prejudice to any other remedy rectify the default of the Owner, at the Owner's expense and without limiting the generality of the foregoing may:

(a) enter onto the Lands or any highway, right of way or other place where the Works are to be constructed, and do or cause to be done through its servants, contractors and others, all such things as may be required to fulfill the obligations of the Owner including without limitation, the completion of the Works;

(b) make any payments required to be made for and on behalf of the Owner;

(c) retain the services of a Consulting Engineer or landscape professional to inspect the Works in order to determine whether they have been constructed in accordance with the requirements of this Agreement and for such purposes may without notice or limitation deduct from the Deposit all costs, and expenses incurred, payment and expenditures made, and monies due and owing to the District;

(d) despite the above the District is under no obligation whatsoever to complete the terms and conditions of this Agreement, nor is the District under any obligation to complete the terms and conditions should it begin to complete the terms and conditions.

18.3 If the District incurs any costs and expenses or makes payments at all as either provided in section 14 of this Agreement or otherwise in this Agreement, or if the Owner is otherwise indebted to the District under this Agreement, and the Deposit is not sufficient to fully recompense the District, the Owner shall forthwith upon notice from the District pay to the District the amount of such deficiency together with interest thereon at five percent (5%) per annum calculated and compounded monthly from the date such cost or expense was incurred or payment or expenditure was made by the District. Such amounts required to be paid by the Owner shall constitute a debt due and owing to the District and may be collected in the same manner and with the same remedies as ordinary taxes on land and improvements under the Community Charter, as amended and it is due and payable by December 31 and unpaid on that date, the debt to be deemed to be taxes in arrears.

19. Insolvency of Owner

19.1 The Owner agrees that, 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 Performance Bond held by it under this Agreement and use the funds for the purpose of completing the Works in accordance with this Agreement.

19.2 The Owner agrees that, 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 Performance Bond 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.

19.3 The owner agrees that the Performance Bond and Maintenance Bond are not assets of the Owner and are not subject to any trust or other right or claim of the Owner other than a contract claim expressly contemplated by this Agreement.

19.4 General. Without limiting the application of the SDS Bylaw, the provisions of the SDS Bylaw shall be incorporated by reference into this Agreement.

19.5 The Owner represents and warrants to the District that:

(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 Lands; and

(d) the Owner has the corporate capacity and authority to enter into and perform this Agreement.

20. GENERAL PROVISIONS

20.1 Intention of Parties. The parties intend, by their execution and delivery of this Agreement, to create a covenant granted to the District under section 219 of the *Land Title Act*, a contract and a deed executed and delivered to the District under seal.

20.2 Covenants Run with the Lands. The covenants set forth in this Agreement shall charge the Lands pursuant to section 219 of the *Land Title Act* and are covenants the burden of which shall run with the Lands and bind the Lands and every part or parts thereof, and every part to which the lands may be divided or subdivided, whether by subdivision plan, strata plan or otherwise. The Agreements set forth in this Agreement do not terminate if and when a person other than the Owner becomes the Owner in fee simple of the Lands or any portion thereof, but charge the whole of the interest of such person and continue to run with the land and bind the Lands and all future owners for the time being of the Lands or any portion thereof.

20.3 Benefit of District. It is further expressly agreed that the benefit of all Agreements made by the Owner in this Agreement accrues solely to the District and that this Agreement may only be modified by agreement in writing of the District with the Owner, or discharged by the District pursuant to the provisions of section 219(9) of the *Land Title Act* and this Agreement.

20.4 Wherever in this Agreement the approval of the Approving Officer or the District Engineer is required or some act or thing is to be done to the satisfaction of the District:

(a) such provisions shall not be deemed to have been fulfilled or waived unless the approval or expression of satisfaction is in writing signed by the Approving Officer or the District Engineer and no prior approval or expression of satisfaction and no condoning, excusing or overlooking by the District or the District Engineer on previous occasions when such approval or satisfaction was required shall be taken to operate as a waiver of the necessity for such approval or satisfaction wherever required by this Agreement; and

(b) such approval or satisfaction shall be at the discretion of the District Engineer acting reasonably in conformance with sound and accepted public municipal Engineering practice.

20.5 Decisions of District. Unless otherwise expressly provided in this Agreement, whenever the District is permitted to make or give any decision, direction, determination, or consent, the District may act in its sole discretion.

20.6 The failure of the District at any time to require strict performance by the Owner of any obligation under this Agreement shall in no way affect its rights thereafter to enforce such obligation, nor shall the waiver by the District of the performance of any obligation hereunder at any later time.

20.7 Entire Agreement. It is mutually understood, agreed, and declared by and between the parties the District has made no representations, covenants, warranties, guarantees, promises, or agreements (oral or otherwise), express or implied, with the Owner other than those expressly contained in this Agreement. This Agreement constitutes the entire agreement between the Owner and the District with regard to the subject matter hereof and supersedes all prior agreements, understandings, negotiations, and discussions, whether oral or written of the District with the Owner.

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

20.9 Priority of Agreement. The Owner shall do or cause to be done, at the expense of the Owner, all acts necessary to grant priority to this Agreement and any covenants required under this

Agreement over all charges and encumbrances which may have been registered against the title to the Lands in the Kamloops Land Title office, save and except those specifically approved in writing by the District or in favour of the District.

20.10 Owner's Costs. Unless otherwise expressly provided in this Agreement, the expense of performing the obligations and covenants contained in this Agreement, and of all matters incidental to them, is solely that of the Owner. All of the costs of the preparation, execution, and registration of any amendments or discharges are to be done at the Owner's sole expense.

20.11 Time of the Essence. Time is of the essence of this Agreement. If a delay in performance of the Works is caused by reason of strike or lockout, fire, Act of God, or any other act which in the opinion of the District Engineer is effectively beyond the Owner's reasonable control, the District Engineer will extend the time for completion of the Works and Services by the Owner by whatever time the District Engineer deems to be reasonable in the circumstances.

20.12 Nothing in this Agreement shall exempt the Owner or the Lands from the ordinary jurisdiction of the Council of the District, its bylaws and regulations, and without limitation the construction of the Works shall not confer directly or indirectly any exemption or right of set-off from development cost charges, connection charges, application fees, user fees or other fee or charge, except as statutorily required.

20.13 Pursuant to section 219 of the *Land Title Act*, R.S.B.C. 1996, c 250 the Owner covenants that no buildings or structures, except the Works, shall be placed, built or constructed upon the Lands until the Approving Officer has issued to the Owner the Certificate of Acceptance provide for in section 17 of this Agreement. All amounts of money due and owing to the District from the Owner as provided for in this Agreement and without limiting the generality of the foregoing due and owing under section 3.2 of this Agreement shall constitute a rent charge charging the Lands.

20.14 Waiver. No amendment or waiver of any portion of this Agreement is to be valid unless in writing and executed by the parties to this Agreement. Waiver of any default by a party is not to be deemed to be a waiver of any subsequent default by that party.

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

20.16 Enurement. This Agreement enures to the benefit of and is binding upon the parties hereto and their respective heirs, executors, administrators, successors and assigns (as the context permits).

20.17 The obligations, agreements and promises of the Owner in this Agreement are joint and several.

20.18 If a delay in construction or maintenance of the Works is caused by reason of labour disputes, fire, acts of god, unusual delay by common carriers or any other act which is effectively beyond the Owner's control, the District will extend the time of completion or maintenance of the Works by the Owner for whatever time the District Engineer deems to be reasonable in the circumstances.

20.19 Choice of Law. This Agreement has been entered into and shall be governed by and construed according to the laws of and enforced in the Province of British Columbia. Any claim, cause of action or dispute (Claim) the Owner has with the District arising out of or in relation to this agreement or the District exclusively in the Provincial Court of British Columbia, and the Owner Agrees to submit to the Personal Jurisdiction of such courts for the purpose of litigating all such claims. The Laws of the Province of British Columbia will govern this agreement, as well as any claim that might arise between the Owner and the District.

20.20 Further Assurances. 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.

20.21 Discharge of Agreement. Within 30 days of the issuance of the Certificate of Acceptance, and upon receipt of a registerable form of discharge prepared by and at the expense of the Owner, the District shall execute and deliver to the Owner a registerable discharge of this Covenant.

20.22 The Owner agrees under section 511 of the *Local Government Act* that all bylaws of the District adopted under Part 14 of the *Local Government Act* shall have effect in respect of the Lands and the subdivision of the Lands, provided that they are adopted before commencement of the construction and installation of the Works. The Owner agrees that to the extent that such bylaws modify, alter or add to the requirements or standards for Works of the type constituting the Works, the Owner shall comply with such modifications, alterations or additions in constructing, installing and carrying out the Works.

20.23 Headings. The headings in this Agreement are inserted for convenience and reference only and in no way define, limit or enlarge the scope or meaning of this Agreement or any provision of it.

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

20.25 No remedy under this Agreement is to be deemed exclusive but will, where possible, be cumulative with all other remedies at law or in equity.

20.26 Severability:. If any section or lesser portion of this Agreement is held invalid by a court of competent jurisdiction, the invalid portion shall be severed and the invalidity of such section or portion shall not affect the validity of the remainder.

20.27 Notices. Any notice or other communication required or contemplated to be given or made by any provision of this Agreement shall be given or made in writing and either delivered personally (and if so shall be deemed to be received when delivered) or mailed by prepaid registered mail in any Canada Post Office (and if so shall be deemed to be delivered on the sixth 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:	[name of land owner] (Inc. #_____) [street address] [location], British Columbia [postal code]
and the District at:	District of Peachland 5806 Beach Avenue Peachland, BC V0H 1X7 Attention: CAO

or to such other address to which a party hereto from time to time notifies the other parties in writing.

As evidence of their agreement to be bound by the terms of this instrument, the parties hereto have executed the Land Title Office form C which is attached hereto and forms part of this Agreement. Further, the Approving Officer or Building Inspector, as the case may be, acknowledges that this is the instrument creating the conditions under section 219 of the *Land Title Act* by the registered Owner referred to in this instrument.

END OF DOCUMENT
<Insert page break>

Schedule “A”
Schedule of Works & Cost Estimate
<Insert page break>

Schedule “B”
List of Approved Issued for Construction Drawings

List of IFC drawings issued by <name of engineering consultant & job number> for <name of developer> – <civic address> <development type> Sealed by <name of engineer> , P.Eng. on <date on seal> Permit to Practice # <#>:

Drawing #	**Description**	**Revision #**

<Insert page break>
<insert copies of drawings>
<Insert page break>

IN WITNESS WHEREOF the parties have executed this Agreement on the dates written below.

DISTRICT OF PEACHLAND by its
authorized signatories:

)
) in the presence of:
_____)
Name:)
)
_____)
Name: _____
Witness:

_____
Date

_____
Name:

_____
Date

Name of Owner by its
authorized signatory(ies):

)
) in the presence of:
_____)
Name:)
)
_____)
Name: _____
Witness:

_____
Date