

Sewerage / Subdivision Best Practice Guideline

JANUARY 2017

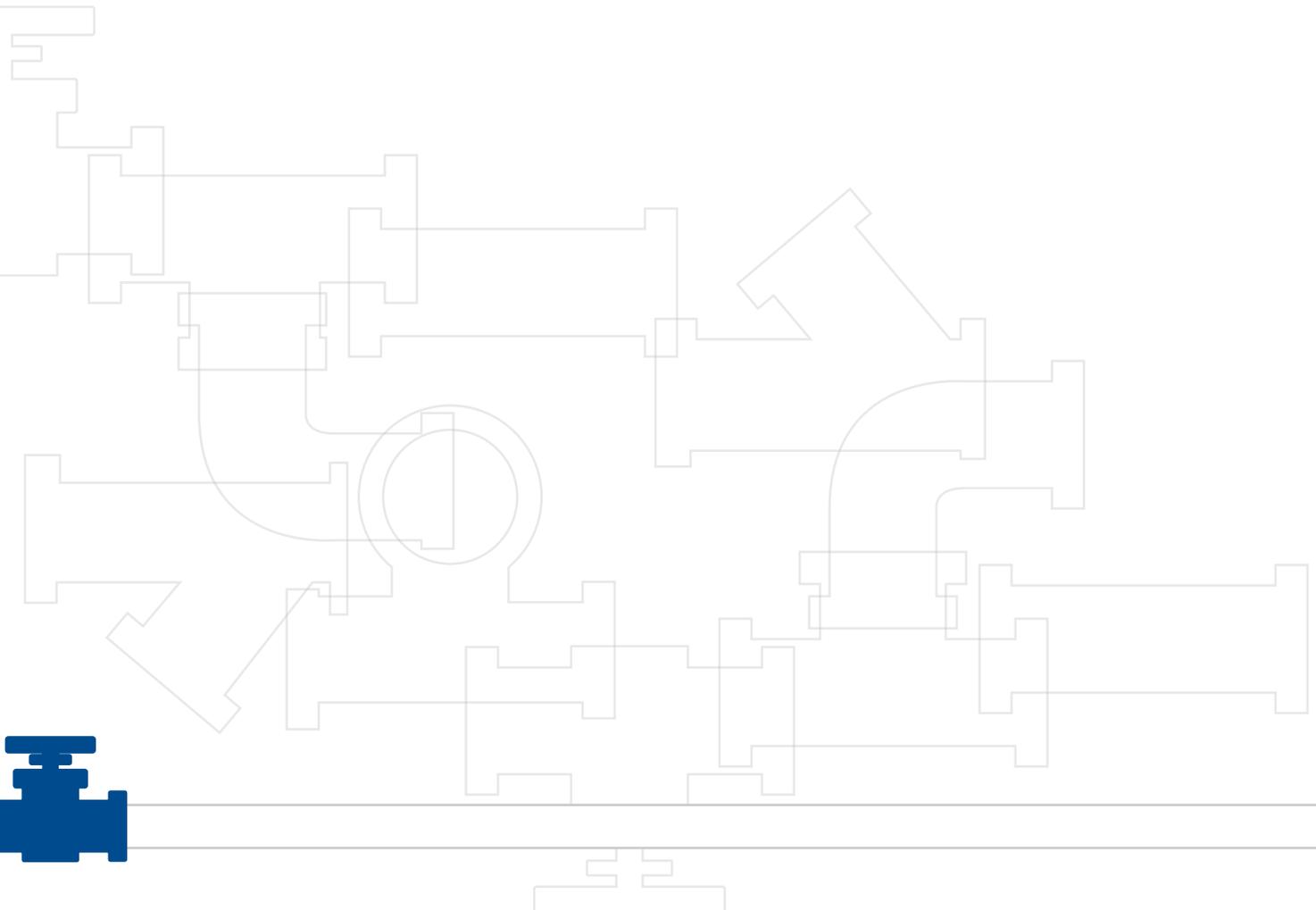


Ministry of
Municipal Affairs
and Housing

THIRD PARTY DISCLAIMER AND COPYRIGHT

This document has been prepared by the Subdivision Sewerage Committee, led by the Ministry of Community, Sport and Cultural Development (MCSCD). The initial research in the earlier stages of the project was completed by OpusDaytonKnight.

The information in this document is to be considered the intellectual property of MCSCD in accordance with Canadian Copyright Law.



Contents

1.0 INTRODUCTION	1
1.1 Background	2
1.1.1 <i>Basis for a Best Practice Guideline</i>	2
1.1.2 <i>What is a Best Practice?</i>	3
1.1.3 <i>Who Should Use this Guideline?</i>	3
1.1.4 <i>Application of this Guideline</i>	3
1.1.5 <i>What this Guideline will not do</i>	3
1.2 Role of Approving Authorities in the Subdivision Process	4
1.2.1 <i>Role of Regional Districts</i>	4
1.2.2 <i>Role of Health Authorities</i>	4
1.2.3 <i>Role of Provincial Approving Officers</i>	5
1.2.4 <i>Role of Ministry of Environment</i>	5
1.3 Legislative Framework	6
1.3.1 <i>Restrictive Covenants</i>	7
2.0 CURRENT PRACTICES FOR APPROVING AUTHORITIES IN SUBDIVISION PROCESS	8
2.1 Local Government	8
2.1.1 <i>Local Government Bylaws</i>	9
2.2 Health Authorities	9
2.2.1 <i>Site Assessment</i>	10
2.2.2 <i>Level of Treatment:</i>	10
2.2.3 <i>Triggers for Health Authorities to investigate onsite sewerage systems</i>	11
2.2.4 <i>Lot and Discharge Area Size</i>	11
2.3 Provincial Approving Officers	12
2.4 Other Jurisdictions	12
2.4.1 <i>Alberta</i>	13
2.4.2 <i>Saskatchewan</i>	13
2.4.3 <i>Ontario</i>	14
2.4.4 <i>Washington</i>	14
2.4.5 <i>British Columbia</i>	15

Contents

3.0 BEST PRACTICES	16
BEST PRACTICE 1: Subdivision Reviews Based On Type 1 Systems.....	16
BEST PRACTICE 2: Maintenance Bylaws required for Subdivision reviews based on Type 2 and 3 systems.....	18
BEST PRACTICE 3: Covenants.....	20
BEST PRACTICE 4: Limit developments that use onsite systems to sites that follow the Site Capability, Sewerage System Standard Practice Manual Version 3	22
BEST PRACTICE 5: Connect to an existing community sewage system whenever practical and economically feasible	24
BEST PRACTICE 6: Hydrogeological assessment for parcel sizes smaller than one hectare and with identified sensitive features.....	26
BEST PRACTICE 7: Decentralized community sewerage systems serving residential developments should not be approved unless owned and operated by local government or strata	28
BEST PRACTICE 8: Commercial and industrial developments should use community water and sewer systems where possible and have applications prepared by a Professional Engineer	30
BEST PRACTICE 9: All subdivision applications proposing use of onsite sewerage systems for servicing of new parcel(s) be accompanied by a thorough site assessment (based on scale of development).....	32
BEST PRACTICE 10: Where onsite sewerage systems that are located within a flood area are proposed, approval should not be granted.....	34
BEST PRACTICE 11: Subdivision and Development Control Bylaws for requiring various levels of servicing and types of onsite systems	36

Contents

REFERENCES	38
APPENDIX 1: DEFINITIONS	40
APPENDIX 2: SUITABILITY ASSESSMENT FLOWCHART	48
APPENDIX 3: COMPARISON OF CRITERIA FROM SUBDIVISION REGULATIONS OF THE REGIONAL HEALTH AUTHORITIES.....	49
APPENDIX 4: SITE SUITABILITY/SOIL PERMEABILITY, SEWERAGE SYSTEM STANDARD PRACTICE MANUAL VERSION 3	50
APPENDIX 5: LEGISLATIVE FRAMEWORK.....	52
APPENDIX 6: DETERMINING APPLICABLE SEWAGE LEGISLATION BASED ON JURISDICTION FLOW DIVIDE (22.7 m ³ /d)	53
APPENDIX 7: CHECKLIST FOR SUBDIVISION APPLICATION SUBMISSIONS.....	55
APPENDIX 8: SUBDIVISION APPLICATION PROCESS.....	56
APPENDIX 9: LEVEL OF TREATMENT PER JURISDICTION.....	57
APPENDIX 10: EXAMPLES OF RESTRICTIVE COVENANT APPLICATION.....	58
APPENDIX 11: EXAMPLES OF REGIONAL DISTRICTS USING DEVELOPMENT PERMIT AREA'S (DPA'S).....	59

Figures and Tables

FIGURE 1: Suitability Assessment Flowchart	50
TABLE 1: Comparison of Criteria from Subdivision Regulations of the Regional Health Authorities.....	51
TABLE 2: Site Capability/Soil Permeability, Sewerage System Standard Practice Manual Version 2	52
TABLE 3: Minimum Lot sizes and soil depth requirement for new parcels<2 hectares.....	54
TABLE 4: Minimum Discharge areas for new parcels < 2 hectares.....	54
TABLE 5: Community Sewerage System Requirements Using Type 1 Effluent.....	55
TABLE 6: Legislative Framework	56
TABLE 7: Level of Treatment Per Jurisdiction	61
TABLE 8: Examples of Restrictive Covenant Application	62
TABLE 9: Examples of Regional Districts using Development Permit Area's (DPA's)	63

1.0 Introduction

The primary goal of this Sewerage/Subdivision Best Practice Guideline (Guideline) is to provide guidance and standardization for approving authorities (provincial approving officers, health authorities and regional districts – see Appendix 1) and to provide direction and increased participation of local governments in the rural subdivision process in regards to onsite sewerage systems.¹

A secondary goal is to encourage and provide direction for local governments to proactively participate in the subdivision process using information provided herein, with support from approving authorities. The five health authorities (HA's) are comprised of Northern Health, Interior Health, Vancouver Island Health Authority, Vancouver Coastal Health and Fraser Health.

While the Subdivision Sewerage Regulation (SSR) and the Standard Practice Manual (SPM) provide requirements for the design, construction, and maintenance of individual systems on individual parcels, they do not consider important aspects of land development such as cumulative impacts and long term use of land. Therefore, this Guideline is designed to address these aspects.

This Guideline is laid out in three sections. Appendices and reference guidelines (RG's) are attached.

- ▶ **SECTION ONE** provides an introduction including an overview of the subdivision application process as it pertains to onsite sewerage systems and the roles of the various agencies involved.
- ▶ **SECTION TWO** lays out current practices related to subdividing using onsite sewerage systems.
- ▶ **SECTION THREE** identifies best practices (BP's) for subdividing using onsite systems, noting that for each BP, there are a wide range of circumstances and accepted practices that could be considered.

.....
1 This Guideline recognizes that where onsite sewage systems are proposed, they should be considered the permanent infrastructure solution and a sustainable means of providing sewer service throughout the life cycle of the developed land

1.1 BACKGROUND

Across British Columbia (B.C.), there are many rural areas that rely on onsite sewerage² systems, which, if sited, designed, and maintained properly, can be an effective method of treating domestic sewage. This Guideline recognizes that where onsite sewage systems are proposed, they would be considered to be permanent infrastructure and a sustainable means of providing a suitable alternative to a centralized municipal sewer system to developed land.

As local governments adopt these BP's, developed through coordination/consultation with the regional HA's, an opportunity exists to significantly reduce HA involvement and help to further streamline the subdivision process. This will improve the efficiency of subdivision approvals, and support effective and efficient land use decisions (see Section 3 – Best Practices, page 22) while still maintaining the protection of public health.

1.11 Basis for a Best Practice Guideline

This Guideline addresses the need for improved standards for subdivisions by considering a number of challenges including:

1. **PUBLIC AND ENVIRONMENT HEALTH PROTECTION:** Installation of an onsite sewerage system (for discharge of sewage effluent) on land with unsuitable conditions can cause public and environmental health issues. Further, ineffective decision-making at the subdivision/development stage can result in improperly located and/or designed systems that might result in unsustainable³ onsite sewerage systems.

In order to protect human health, the environment, and groundwater quality, numerous factors must be closely considered, especially for higher density subdivisions in hydrogeologically sensitive areas (see RG #1).

2. **COST:** Large expenditures can be incurred where inappropriate onsite systems are developed and must be replaced with a municipal sewage collection system.
3. **LACK OF LOCAL GOVERNMENT AUTHORITY AND AUTONOMY:** Regional districts require the tools, which respect their legislative authority for subdivision, to develop a level of autonomy from the HA's approval process.
4. **CUMULATIVE IMPACTS FRAMEWORK:** The overall impact of onsite sewerage systems within a given area on drinking water supply, water table mounding, surface water quality, and groundwater contamination is often not considered.
5. **LACK OF STANDARDIZED BEST PRACTICES:** There are no standardized BP's which can be utilized by Provincial Approving Officers (PAO's) and HA's that provide the flexibility to address the varied biogeoclimatic zones (see Appendix 1) present across B.C.

.....

- 2 Sewerage and Sewage systems are used interchangeably and where appropriate throughout Guideline.
- 3 For the purposes of this Guideline, the term 'unsustainable' refers to those onsite sewerage systems that are not sited, designed and constructed based on BP's and increase risk of not meeting regulatory standards

1.1.2 What is a Best Practice?

A BP is a method or technique that has consistently shown results superior to those achieved with other means, and is used as a benchmark. Best practices are also sometimes used to describe standard processes that multiple organizations can use. This Guideline is designed to provide guidance for subdivision development which uses onsite systems and is intended to be applicable Province-wide.

1.1.3 Who Should Use this Guideline?

Provincial Approving Authorities, HA's and regional districts can benefit from the information contained herein; however it is applicable to municipalities as well. The desired outcome is to have increased participation by local governments while providing consistent direction for PAOs and HA's who will support improved efficiency in rural subdivisions.

1.1.4 Application of this Guideline

The guidance offered in this document is intended to address the majority of the significant issues pertaining to onsite sewerage-based subdivisions and more generally applying to the creation of new parcels which are being serviced using individual onsite sewage systems with a daily flow less than 22.7 m³/d (SSR, 2004). Onsite sewerage systems with daily design flows equal to or greater than 22.7 m³/d may fall under the Municipal Wastewater Regulation (MWR) (see Appendix 6).

Accordingly, this Guideline consolidates information from existing subdivision guidelines of the five HA's and the information herein and regulations for subdivision assessment and approval are distinctly separate from the *Public Health Act – Sewerage System Regulation (SSR)* [see BP #1] and the Standard Practice Manual (SPM).

The Ministry of Health uses the *Health Act* and the SSR to regulate smaller, generally private, domestic sewerage systems (onsite septic systems). In conjunction with this Guideline, the Guide to Rural Subdivision Approvals is also a useful support document (see BP #1 under local government section, page 23).

BP's are used as a guideline only and are not intended to fetter the discretion of statutory decision-makers.

Specific sections of this Guideline will be referred to by page numbers and appendices.

1.1.5 What this Guideline will not do

The information contained herein does not apply to discharges under the MWR, although guidance information and BP's that fit with MWR requirements may certainly be adopted. The intent of this document is not to promote higher density development in areas with high infiltration rates and minimal soil depth (e.g. sandy overburden deposits).

This Guideline does not apply to the following situations, which are addressed by the SSR and the accompanying SPM:

- ▶ Existing property;
- ▶ Replacement of existing onsite systems due to failure; and
- ▶ Properties that rely on holding tanks.

1.2 ROLE OF APPROVING AUTHORITIES IN THE SUBDIVISION PROCESS

1.2.1 *Role of Regional Districts*⁴

Regional districts can provide planning services for the community as a whole, specific neighborhoods, or individual parcels; this can include regional growth strategies, official community plans (OCP's), and/or local bylaws. Regional districts are empowered to create bylaws for their jurisdictions under the *Local Government Act*.

Many regional districts have subdivision servicing bylaws which lay out the acceptable means of servicing various areas.

Zoning bylaws can also be used by regional districts to establish operation and maintenance bylaws and therefore control development. For example, zoning bylaws could specify appropriate wastewater management requirements or restrict development density using onsite systems for designated areas depending on local soil conditions (see RG #3).

1.2.2 *Role of Health Authorities*

Environmental Health Officers (EHOs) inspect and monitor activities and premises that have the potential to affect the public's health, including the area in which a subdivision may be located (healthful development of land), with particular interest in drinking water supply and onsite sewage discharge. Health authority staff play an important role in rural and urban land development, including a wide range of public health concerns, and provide input on watershed protection, community sewer, water supply systems, and soil evaluations for onsite sewerage systems.

The HA's advises Approving Officers from the perspective of the *Public Health Act*, the SSR, the *Drinking Water Protection Act (DWPA)*, and the Drinking Water Protection Regulation. The local HA's do not provide any form of approval regarding the subdivision of land and local HA's and EHOs review the subdivision application in reference to community health concerns, specifically water supply and sewage treatment and discharge. Appendix 8 provides an overview of the current subdivision application process in relation to onsite sewerage systems. Upon request health authority staff provides recommendations to PAO's pursuant to subdivision applications, as specified by the Local Services Act Subdivision Regulations (LSA-SR) engineering reports on soil analysis (see Appendix 5). Onsite evaluation and documentation may be requested and reviewed to ensure that the proposed use of the land is suitable.

.....
⁴ While this document has been specifically developed for regional districts in the subdivision of rural areas, it does have application within the municipal framework.

1.2.3 Role of Provincial Approving Officers

Provincial Approving Officers (PAO's) through the Ministry of Transportation and Infrastructure (MoTI) or municipality are designated under the *Land Title Act* to approve subdivisions and ensure they are implemented in accordance with provincial statutes, regulations, local government bylaws regulating subdivision and zoning (see Appendix 5). Provincial Approving Officers have separate jurisdictions of authority for approving subdivision plans and are quasi-judicial officials who act independently to ensure that the subdivision complies with Provincial acts, regulations and bylaws, as well as protecting the best interests of the public. The Ministry of Transportation and Infrastructure has a regulatory role in determining the highway component for all rural subdivisions (see section 2.3 for current practices of PAO's and Appendix 8 for their role in the subdivision application process).

In the Guide to Rural Subdivision Approvals, Approving Officers (AO's) are defined as being appointed under the *Land Title Act* and there are four separate jurisdictions for AO's, including municipal approving officers, regional districts and islands trust approving officers, MoTI provincial approving officers and Nisga'a approving officers.

Generally, these AO's have separate jurisdictions of authority for approving subdivision plans.

1.2.4 Role of Ministry of Environment

The Ministry of Environment (MoE) has authority over sewer systems that discharge to ground and have a daily design flow equal to or greater than 22.7 m³/d, and that discharge to surface water; these systems typically fall under the MWR under the *Environmental Management Act*. Sewerage systems with a daily design flow of less than 22.7 m³/d which discharge to ground are regulated under the SSR under the *Public Health Act* (refer to section 2.2- role of HA's). Examples of various development 'scenarios' (combinations of systems, structures serviced, and associated sewage flows) and criteria determining whether the SSR or MWR applies can be found in Appendix 6.

1.3 LEGISLATIVE FRAMEWORK

When land proposed for subdivision falls within the boundaries of a municipality, the regulations and zoning of that municipality regulates the lot sizes and uses of the land (see Appendix 5 for further clarity on application of legislation). If the land falls outside the boundaries of a municipality, then it is governed by the regulations and bylaws of the appropriate regional district or the Islands Trust if the subdivision is within the Trust area, and final approval of the subdivision is given by the PAO.

In regional districts, the LSA-SR is often important in shaping subdivisions, especially in the absence of regional district bylaws. Regional districts vary considerably and some have a full suite of bylaws to support development, while others (often more remote areas) have very few bylaws. With the exception of unregistered Crown lands, generally the courts only recognize those interests listed with the provincial Torrens system, (a government register of parcels of land), ownership (private), interests and transactions in land. Therefore, land cannot be conveyed or subdivided without registering the changes in the Land Title Office. In almost all cases, the Land Title Office will not register new parcels that are created through subdivision without the signature of the Approving Officer.

Local government land use policies and development requirements are set out in OCP's and subdivision control bylaws. A PAO may refuse to approve a subdivision if it does not comply with provisions of the *Local Government Act*, or local government subdivision and zoning bylaws (*Land Title Act* Section 87). The SSR and SPM stipulate requirements for the design, construction and maintenance of onsite sewerage systems for individual parcels, whereas, this Guideline addresses use of multiple onsite systems on a subdivision scale, and the potential cumulative impacts thereof.

The SSR addresses individual systems and the SPM provides design criteria for design flows, sizes of sewerage systems (discharge area) and separation distances within individual parcels.

1.3.1 Restrictive Covenants

A restrictive covenant is most commonly applied when a developer subdivides land for sale and wishes to apply some restrictions on the use and development of the lots to benefit or protect other land. Covenants have been used extensively to protect discharge areas for onsite sewerage systems by local governments, HA's and PAO's.

There are three main types of restrictive covenants:

1. **BUILDING COVENANTS** imposed by developers to ensure that the owners of lots complete building works within a certain timeframe and in accordance with specific building requirements (e.g. In relation to building height, colors and setbacks).
2. **COVENANTS DESIGNED** to protect the neighborhood character or guide the long term development of an area.
3. **COVENANTS THAT IMPOSE** rules of communal living on lot owners.

Restrictive covenants may be employed when an owner agrees that the owner's land or a specified part thereof is not to be built upon, or is not to be used in a particular manner. Restrictive Covenants (created pursuant to Section 219 of the *Land Title Act*) are registered limitations on a property.

Covenants are registered with the Land Title Office, and they help inform future landowners of restrictions on the property prior to purchase (e.g. where they can and cannot build) and to prevent them from inadvertently damaging or destroying the discharge area (RG #4). The land owners who benefit from a restrictive covenant are responsible for abiding by the covenant.

If there is a breach of a restrictive covenant, the person who owns land benefiting from the covenant can take action through the courts against the owner of land subject to the covenant. If one desires to apply for a planning permit to remove or vary a restrictive covenant, an application will need to be made to the responsible authority for the relevant planning scheme. For many covenants, the municipality is the responsible authority, however in some cases; the responsible authority is specified in the planning scheme.

See Appendix 10 for examples⁵ of how various responsible authorities might use restrictive covenants.

.....
⁵ Note that these examples are not only subdivision based, but rather provide an array of examples to show the scope of use.

2.0 Current Practices for Approving Authorities in Subdivision Process

Gaps in practice and understanding between the requirements of the SSR and provincial policies and guidelines for subdivision development using onsite sewerage systems has, in some instances, resulted in confusions and / or inconsistent practice for land developers, registered onsite wastewater practitioners (ROWP's), professionals, PAO's, HA's, and local government planning departments. The lack of clarity regarding policies and practices can hinder the Province's ability to respond in a clear, timely manner to the development industry.

Development proposals should result in new parcels that provide simple, sustainable methods of onsite sewage treatment and disposal that protects human health and the environment. Land owners and the community could benefit from an improved understanding of the subdivision and development requirements prior to investing significant time and resources on development proposals.

In order to establish BP's, the results of a comparison of similarities and differences in policies and practices of the various HA's and of other Canadian and American jurisdictions is included in this section as well as a legislative overview to help set the framework for current and best practices.

2.1 LOCAL GOVERNMENT

Currently, there is no legislative requirement for regional districts to be involved with rural subdivision. However, Section 506 of the *Local Government Act*, as well as the implementation of zoning have both been deemed to be current practices, which can enable regional districts to provide a role in subdivision if they choose to. Many regional districts use this authority to obtain some of the higher level outcomes they may wish to obtain around environmentally sensitive development and how and where development might occur. Section 506 can be used to set a standard and create zones within a regional district.

Local governments also regularly use Development Permit's (DPs) (see Appendix 1) as an important tool to address potential impacts of development and ensure they are identified and addressed (see Appendix 11 for examples of regional districts using Development Permit Areas (DPAs)).

Local governments wishing to use DPs must designate DPAs (see Appendix 1) for certain purposes in their OCP's. The *Local Government Act* allows DPAs to be established for a range of purposes including protection of the natural environment, protection of development from hazardous conditions (e.g. steep slopes), establish objectives around intensive residential development and to promote energy and water conservation.

2.1.1 Local Government Bylaws

In order to ensure that the development and choice of locations for onsite sewerage systems are sustainable, local governments may use subdivision and development control bylaws, maintenance bylaws (for onsite systems) and zoning bylaws to ensure that BP's are utilized. Subdivision and development control bylaws can require various levels of servicing such as set back requirements, construction standards and types of onsite systems to be used. This is especially important in areas that are located over vulnerable aquifers, near surface water, or areas with other sensitive environmental features.

Maintenance bylaws should be created and implemented to require regular maintenance of onsite systems so that these systems will be reliable sources of wastewater treatment over the long term (RG #6). Zoning bylaws can be used to control density if areas zoned for residential development will be serviced using onsite systems. This involves implementing minimum sizes for parcels serviced by onsite systems. Section 9 of the Community Charter see: http://www.bclaws.ca/Recon/document/ID/freeside/03026_00 establishes the concept of concurrent regulatory authority.

The Community Charter concurrent authority provisions apply to bylaws that deal with:

- ▶ Public health;
- ▶ Protection of the natural environment;
- ▶ Wildlife;
- ▶ Building standards; and,
- ▶ Prohibition of soil deposit or removal.

Municipalities are provided with powers to adopt bylaws in the spheres of concurrent authority. However, this municipal authority is subject to provincial involvement. The Community Charter's concurrent authority provisions also apply to regional districts for three of the five spheres: building standards, public health, and prohibition of soil deposit or removal (see Appendix 5).

Local governments also use restrictive covenants where necessary (refer to section 1.3.1, page 9).

2.2 HEALTH AUTHORITIES

Health Authorities use regionally developed subdivision guidelines to provide direction with respect to referrals received by PAO's. A review of identified, existing HA subdivision guidelines, revealed reasonable consistency across the Province, including site assessments for minimum depths of permeable soils, minimum parcel sizes and minimum field areas for primary and research effluent discharges.

Also consistent is the policy that subdivision development proposals need to be based upon the use of Type 1 sewerage systems as defined in the Sewerage System Regulation (Appendix 1) Type 2 and 3 systems may only be utilized if specific measures are in place (e.g. maintenance bylaws) to ensure the long-term sustainability of developments (see Appendix 1).

Appendix 3, provides a comparison of the criteria set out in the subdivision regulations⁶ for the various health authorities across the Province (in B.C., LSA-SR is linked to regulations for onsite sewage).

2.2.1 Site Assessment

The initial site assessment process is intended to evaluate the suitability of the development proposal, taking into account a number of considerations including, but not limited to:

- ▶ level of treatment and type of system proposed; soil suitability;
- ▶ parcel size, density, topography; and,
- ▶ hydrogeological and / or environmental sensitivity.

Depending on the results of the initial site assessment, the nature of the development proposal (e.g. proposed parcel size, density, number of parcel proposed), and the hydrogeological sensitivity, the site assessment will also set the stage to identify the requirements, if any, for more detailed hydrogeological investigations.

2.2.2 Level of Treatment:

TYPE 1 SYSTEM

In B.C., current HA's policy considers Type 1 systems (treatment by septic tank only) to be a BP for subdivisions using onsite sewerage systems in the absence of maintenance bylaws (see BP #1). Type 1 systems still require ongoing maintenance; including pump out of the septic tank occurs every three to five years, as well as additional maintenance activities, as specified in the Maintenance Plan filed with the health authority by the wastewater practitioner. Property owners are responsible to ensure that the required maintenance is conducted on the onsite system as stipulated in the maintenance plan.

TYPE 2 AND 3 SYSTEMS

Type 2 and 3 systems (see Appendix 1 – Definitions), typically require greater maintenance (higher costs) and can be more prone to failure. Failure of an onsite treatment system is a serious health risk, as the sewage can pass through the treatment system with possibly very little treatment. This results in the potential for human exposure to untreated effluent with high pathogen levels.

Type 2 and 3 systems (see BP #2) provide increased levels of treatment versus Type 1 systems, however, unlike Type 1 systems, should only be used where appropriate maintenance bylaws are put in place and monitored by an Authorized Person (see Appendix 1 and BP #2 under local government, page 27).

To assist homeowners and developers to understand the maintenance required for onsite systems, a maintenance guideline for homeowners has been included in AG #4 (developed by New Zealand Water & Wastes Association).

.....
⁶ The regulations for new subdivision and for existing parcels are not clearly separated from one another in B.C. The HA's make a distinction in policy but that is not the same as regulation.

2.2.3 Triggers for Health Authorities to investigate onsite sewerage systems

The regional HA's are responsible for accepting filings and fees for onsite sewerage systems submitted, on behalf of homeowners, by industry professionals. Onsite sewerage systems are installed, repaired and maintained by Authorized Persons (see Appendix 1).

Site investigations of sewerage systems need to be initiated in cases where systems are suspected to be negatively affecting a drinking water supply (e.g. as a result of system failure) or causing health hazard, as per the *Public Health Act*.

Often, these investigations are complaint driven and done locally by EHO's, who are responsible for service delivery by B.C.'s HA's, including:

- ▶ onsite sewage disposal;
- ▶ health implications of solid and liquid waste disposal;
- ▶ land use activities and communicable disease; and,
- ▶ Public health.

2.2.4 Lot and Discharge Area Size

Onsite systems are the appropriate sewage treatment infrastructure only where soil and groundwater conditions are suitable. Policies across jurisdictions such as Alberta and Ontario are similar to B.C. in accepting a minimum parcel size of one hectare (2.5 acres) where a hydrogeological impact assessment is not completed prior to subdivision application. One hectare is a widely accepted minimum parcel size that is considered to result in minimal risk to public and environmental health provided that it has been demonstrated via the initial site assessment that the site is not hydrogeologically sensitive (RG #1). It has been accepted by approving authorities that attenuation processes within a one hectare lot will be sufficient to reduce nitrate-nitrogen to acceptable concentration in groundwater below adjacent parcels.

Sufficient attenuation processes may not be present in hydrogeologically sensitive environments (RG #1). Minimum parcel sizes and discharge area sizes can vary based on soil type, depth and topography.

Recommended parcel sizes are also based on whether the parcel is serviced by a private water system (well) or a community water system (as stipulated in section 6.01-6.03 of the Subdivision Regulations). Parcels which are serviced by individual onsite wells must be large enough to provide adequate distance between the onsite sewage system and the water supply so that the risk of contamination of the drinking water supply is limited. Where parcels are serviced by a community water system, smaller parcel sizes may be justified (SPM version 3). Adjacent land uses should also be considered to avoid potential negative cumulative impacts.

Health authorities will also use restrictive covenants where necessary (refer to section 1.3.1, page 9).

2.3 PROVINCIAL APPROVING OFFICERS

Final approval of a subdivision is given by the PAO (see Appendix 8). Subdivision applications that are referred to HA's are assessed on the basis of current provincial health legislation and local HA's policies and guidelines. Once an assessment has been completed, recommendations are provided to the PAO. The PAO's evaluation is based upon information submitted by the applicant at the time of subdivision application, provincial legislation, local bylaws, and consideration of recommendations that may be made by a variety of internal departments and external agencies. Under the LSA- SR, PAO's may refer subdivision applications to the local HA's for comment.

Referrals are made where there is no relevant bylaw and lot sizes are less than 2 hectares (e.g. recommended one hectare), see: BP #1. Where subdivisions utilizing onsite sewage disposal are regulated by bylaw under Section 506 of the *Local Government Act*, PAO's are required to follow local bylaws.

PAO's will also use restrictive covenants where necessary (refer to section 1.3.1, page 9).

2.4 OTHER JURISDICTIONS

Generally, the guidelines and regulations of other jurisdictions (Alberta, Saskatchewan, Ontario and Washington) are broad in scope and not prescriptive, and place emphasis on the importance of having site assessments completed by Authorized Persons (either a registered onsite wastewater practitioner or a professional engineer – see Appendix 1). Those jurisdictions listed above, provide separate guidelines for the assessment of subdivision development particularly with respect to the potential requirements for additional hydrogeological assessments (where potential impacts to groundwater and surface water exist). Looking at current practices in other jurisdictions, comparisons focused on two main areas: cumulative impacts and level of treatment (see Appendix 9).

Alberta and Saskatchewan both appear to have implemented Ontario's methodology for the completion of hydrogeological impact assessments for the determination of potential cumulative impacts from onsite sewage systems on nitrate-nitrogen content in the groundwater, which has been viewed as the most limiting or critical impact of an increased density of onsite sewerage systems.

Given the importance of the assessment of cumulative impacts (especially where higher development densities are proposed and sensitive hydrogeological conditions exist), a recommendation is included herein, that a similar methodology be implemented in B.C. for determining the potential cumulative impacts of onsite systems less than the recommended minimums or where initial site assessment revealed further hydrogeologically sensitive conditions. The proposed methodology for groundwater impact assessments are included in RG #1.

2.4.1 Alberta

In Alberta the Private Sewage Disposal Systems Regulation, which falls under the *Safety Codes Act*, regulates the construction of onsite systems for individual lots which are designed to receive less than 25 m³ per day of sewage. This Regulation requires that onsite systems be certified and tested by the Standards Council of Canada. In Alberta, the *Municipal Government Act* (MGA) outlines the process for subdivision of land and the municipality has discretion to determine if an applicant's proposal is an appropriate use of land. The Subdivision and Development Regulation (Regulation) under the MGA requires the applicant to provide information related to the suitability and viability of land for onsite systems. Several provisions of the Regulation support the municipal subdivision authority to request information on the sustainability of the proposed site for onsite systems.

The Model Process for Subdivision Approval and Private Sewage (Model Process – see RG #6) is a document which gives criteria to determine if the subdivision is an appropriate use of land. The Model Process requires a submission including a site drawing, type of system, ground/soil conditions, and parcel suitability assessment for all applications. For applications where more than one new parcel is created further information is required such as density, topography drainage, soil survey reports, evaluation of soils, soil moisture near surface groundwater conditions, surface water impacts, and cumulative impacts.

The criteria for deciding what level of assessment is required include: parcel size, density, sensitive areas or difficult hydrogeological conditions, and sewage volume. Reference guideline #6 allows use of more sophisticated technologies, however, it requires a thorough hydrogeological assessment for parcels smaller than two hectares. Therefore, the major difference between Alberta and B.C. in regards to development using onsite systems is the definition of high density (e.g. two hectares versus one hectare).

2.4.2 Saskatchewan

Saskatchewan also has a similar legislative framework to B.C. where individual systems are regulated under the Private Sewage Works Regulation (PSWR). The PSWR requires permits to construct, or repair onsite systems, and requires inspection of the system by the health region. This regulation also specifies that where areas of environmental sensitivity or high density exist, that the health region be involved in the decision making process for types of systems.

In addition, in 2012, Saskatchewan released the Guidance Document for Developments and Subdivisions where Onsite Wastewater Treatment Systems are Proposed for use by municipalities and developers (see BP #4 under local government section, page 32). This document defines high density as developments where the average parcel size is less than one hectare. An assessment is required for all parcels less than four hectares. The document specifies two levels of assessment, based on the density, number of parcels, and sensitivity of the site.

2.4.3 Ontario

In Ontario onsite systems are generally regulated under the *Building Code Act*. The Ontario Ministry of Municipal Affairs and Housing are in the process of revising the building code. The new code will likely require more advanced systems which provide tertiary treatment to reduce nutrients in at-risk areas. The building code was also recently amended to require onsite sewage system maintenance inspection programs to be administered in certain areas by Provincial authorities (e.g. municipalities, health units and/or conservation authorities). Therefore, the main difference between B.C. and Ontario regulations are that while Ontario allows the use of more sophisticated technologies (e.g. Type 2 and 3 systems) they have mandated maintenance programs to ensure these systems function properly.

2.4.4 Washington

Kitsap County, Washington is an example of how BP's can be implemented in management of onsite systems. The Kitsap County Health District manages a program of mandatory maintenance and inspections of onsite systems which is required under the Kitsap County Board of Health Ordinance 2008-1. This program requires that onsite system owners have a maintenance contract with a local, licensed contractor (similar to an ROWP). Under this system, maintenance and therefore compliance is managed through an online system called e-Onsite.

Maintenance contractors submit their maintenance reports to this online system, as well as the termination of a contract and the system then notifies the program staff, who issue letters, if a contract is cancelled, or repairs are needed on a system.

This program is relatively easy to manage as all records are submitted and maintained electronically. The online system reduces the staff time required, allows non-compliance to be easily tracked, and allows the program to be self-funded. Under this program the primary responsibility for maintenance rests with the system / home owner. However, this program does not include monitoring of groundwater or surface water quality to track the impacts of the program, or monitoring of system effluent.

2.4.5 *British Columbia*

TOWNSHIP OF LANGLEY

Within B.C. the Township of Langley implemented a subdivision bylaw in 2011, which requires use of nitrogen removal systems in certain sensitive areas when subdivision is planned using onsite systems. Local governments can also address local zoning where parcels can have more than one single family dwelling. Many regional districts allow one house plus an ancillary dwelling or even two single family dwellings on a single parcel.

To ensure all proposed buildings are designed and constructed in accordance with accepted standards and codes, the appropriate permits must be issued and inspections must occur (e.g. all existing and new secondary suites must conform to municipal bylaws and provincial standards for public health and safety). As of May 2013, all secondary suites, existing or newly constructed, are required to have a secondary suite licence. A building permit is required to ensure the secondary suite has been inspected and can be licensed accordingly.

CAPITAL REGIONAL DISTRICT

The Capital Regional District (CRD) implemented bylaw no. 3479 in 2007, requiring regular maintenance of onsite systems. The CRD has had a positive experience with their maintenance bylaw, which requires maintenance of all onsite systems in the region and is accompanied by an extensive education program. The bylaw requires pump outs every five years for Type 1 systems, and annual inspections for Type 2 and 3 systems.

3.0 BEST PRACTICES

BEST PRACTICE 1:

Subdivision Reviews Based On Type 1 Systems.

RATIONALE:

All subdivision reviews should be based on Type 1 treatment (septic tank system), as defined in the SSR, BC Reg. 326/2004. Type 1 treatment systems typically operate with lower effluent application rate (hydraulic loading rates), (see Appendix 1) and are less prone to problems resulting from lack of maintenance, seasonal occupancy and power outages. Onsite sewerage systems are required to have a maintenance plan (owner must ensure it is followed) under the SSR. Examples include the Regional District of Nanaimo (RDN) and the Columbia Shuswap Regional District (CSRSD). The RDN states in their Subdivision Regulations Section 6 that lots created by subdivision will be a minimum of 1 ha in lot size: http://www.rdn.bc.ca/dms/documents/rdn-bylaws/electoral-area-f-zoning-and-subdivision-bylaw-no.-1285,-2002/section_6_-_subdivision_regulations.pdf

The CSRSD has a minimum parcel size of 1 ha for each proposed parcel created by subdivision for their Magna Bay Zoning Bylaw No.800: <http://www.csrds.bc.ca/inside-csrds/bylaws/magna-bay-zoning-bylaw-no-800-0>.

Without a maintenance plan, systems can fail in a very short time, and, on a subdivision scale, have detrimental 'cumulative' impacts on human health and the environment. As well, a 1 ha lot generally provides adequate land for the installment of a replacement field.

The application of the Type 1 treatment standard to proposed lots has always been to ensure that new lots are able to sustain onsite sewage treatment for the long term and to build in capacity for higher levels of treatment should owners alter or disturb the site conditions on the property. Type 1 systems are also less expensive to operate and generally more robust in terms of required maintenance or misuse by property owners.

Local governments can develop a Liquid Waste Management Plan (LWMP) to help plan for wastewater infrastructure that will meet community needs in the future. If increased density is desired, it is important to look at the long term cost/benefit from public health, environmental and economic perspectives. Further, options between onsite and community systems need to be assessed. If onsite is proposed then a plan for ongoing operation and maintenance is needed to ensure the system's long term performance.

APPLICATION:

Local Government

- ▶ Use Type 1 system as standard, in the absence of enforcement and operation and maintenance bylaw.
- ▶ Use of maintenance bylaw (RG #6) – refers to a bylaw that mandates and enforces maintenance of onsite sewerage systems within the municipality or regional district.
- ▶ Type 2 and Type 3 systems should be considered for community sewerage systems (refer to Section 2.2.2, page 14), or for individual parcels if the following conditions apply:
 - a. The local government has enacted a bylaw for operation and maintenance of Type 2 and Type 3 systems that regularly audits proof of qualified maintenance, and that provides for penalty, intervention, and correction by the municipality to correct non-compliant situations; and,
 - b. Zoning is in place that limits the development on each parcel to one single family dwelling. Link parcel size to density of development (e.g. one hectare per single family dwelling).

NOTE: this may not align with larger developments that produce flows near the jurisdictional division between the SSR/MWR. (View SSR here: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/22_326_2004 and MWR (see RG #3).

- ▶ Subdivision and development control bylaws should also be used by regional districts and municipalities to require enhanced treatment in sensitive areas and for higher densities. However, this could be done in conjunction with a maintenance bylaw to ensure that advanced systems are maintained properly, in order to provide the desired treatment.
- ▶ As an additional resource to this Guideline, see: <http://www.th.gov.bc.ca/da/manual1/SubdivisionManual.pdf>

Health Authority

- ▶ HA staff have been using Type 1 systems as the standard for approval of subdivisions in the referral process with PAO's.
- ▶ Develop subdivision review guidelines that are consistent with this section.
- ▶ If a local government is developing a bylaw for BP #1, HA's should work with the local government on its development.
- ▶ Encourage the local government to adopt this BP and related bylaw.
- ▶ In the absence of local government bylaw, when referred to by a PAO, HA's should consider BP #1 as best practice.

Provincial Approving Officer

- ▶ Ensure BP #1 is met through referral to HA's and/or local government bylaw, Section 506. Referrals are made where there is no relevant bylaw and lot sizes are less than 2 hectares (e.g. recommended one hectare), see: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/262_70
- ▶ When referral to HA's is not required, PAO's should follow BP #1 and ensure subdivision approvals are based on Type 1 systems.

BEST PRACTICE 2: *Maintenance Bylaws required for Subdivision reviews based on Type 2 and 3 systems.*

RATIONALE:

Ensuring septic systems are properly maintained will help protect local water quality, as failing septic systems result in significant public health risks and environmental degradation. Specifically, they cause contamination of groundwater and local streams, rivers and lakes as well as shellfish beds and eutrophication (see Appendix 1) of sensitive water bodies. For example, maintenance bylaws currently apply to owners of Type 2 and 3 onsite sewage systems within the District of Saanich, City of Colwood, City of Langford and Town of View Royal. Type 2 and Type 3 systems have much smaller drainfields than Type 1 systems. Instead, they rely on bacteria contained within a package treatment⁷ plant to further treat wastewater coming from a septic tank before it enters the drain field. All septic tanks need to be inspected regularly by a certified inspector⁸.

Type 2 and 3 systems (see Appendix 1) produce a higher quality effluent that can be discharged into a smaller drain field. As a result of further treatment these system can allow for higher density rural development. Type 2 and 3 systems (see Appendix 1) are both used where there are site or soil constraints that prevent a Type 1 system from being used. These systems have mechanical and electrical parts that require more frequent maintenance than Type 1 systems.

Ultimately, homeowners are responsible for the proper functioning of their system and must contact a local service agent (Authorized Person) to set up an annual (or more frequent) service contract for regular maintenance. The Authorized Person will prepare a detailed maintenance program for the homeowner and will provide a schedule of preventative maintenance activities. The SSR prohibits an owner of a sewerage system from causing or contributing to a health hazard (the discharge of sewage into a source of drinking water, surface waters, and tidal water or onto land).

The Capital Regional District (CRD) has a bylaw which requires pumping out of Type 1, systems every five years, and maintenance of Type 2 and 3 systems every year or more frequently, according to their maintenance plan. CRD has found that public acceptance and buy-in to the plan is necessary for its success. The CRD has also incorporated many educational initiatives that have raised awareness in the community around the importance of maintaining onsite systems.

.....
⁷ Package treatment systems are typically mechanical processes that have pumps, air blowers, and electrical components that can break down if they are not properly maintained.

⁸ The Applied Science Technologists & Technicians Association provides a list of people qualified to carry out an inspection for a Type 1 or Type 2 system. For a Type 2 or Type 3 system, follow the maintenance plan that was prepared by a Qualified Professional, and have the treatment plant manufacturer or their authorized agent maintain the equipment.

Type 1 is treatment by septic tank only whereby the sewage is held in the tank before heading into a drain field. The CRD onsite maintenance bylaw references a compliance rate of over 80% for type 1 systems making them easier to maintain and operate than other systems. Therefore, in the absence of mandatory maintenance programs, the best practice in regards to type of system to be used for subdivision is Type 1.

Most manufacturers' of Type 2 systems recommend maintenance between 2 and 3 times per year with additional maintenance for Type 3 systems. Under the CRD bylaw for example, Type 2 and 3 systems are required to be maintained by an Authorized Person at least once per calendar year⁹.

APPLICATION:

Local Government

- ▶ Consider the effectiveness of existing bylaws when making recommendations.
- ▶ See Ministry of Health website for Authorized Persons under the Sewerage System Regulation (e.g. Registered Practitioners and Professional Engineers) here: http://www.health.gov.bc.ca/protect/lup_authorized.html
- ▶ Hire qualified professionals from the Association of Professional Engineers and Geoscientists of B.C.: <https://www.apeg.bc.ca/Member-Directories/Professionals-for-Sewerage-System-Regulation>
- ▶ Reference the RDN SepticSmart Program that provides basic information to property owners about the proper use, maintenance, and servicing of their septic systems. Local governments may want to consider similar programs to help educate the public with onsite sewage systems in their area. The program also makes the link between a failing system and its potential impact on human health and the environment: <http://www.rdn.bc.ca/cms.asp?wpID=1159>.

Health Authority

- ▶ Through PAO referral, HA's should not support subdivisions based on Type 2 and 3 systems without a maintenance bylaw.
- ▶ If a local government is developing a bylaw for BP #2, HA's should work with the local government on its development.
- ▶ In the absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #2 as best practice.

Provincial Approving Officer

- ▶ Ensure BP #2 is met through referral to HA's and/or local government bylaw, Section 506.
- ▶ When referral to HA's not required, PAO's should follow BP #2 and consider maintenance requirements of proposed systems.

.....
⁹ As stated on the CRD regional district website, as of 2005, only an Authorized Person (see Appendix 1 – Definitions) can carry out repair, installation and site assessments on septic systems.

BEST PRACTICE 3: *Covenants.*

RATIONALE:

A restrictive covenant is a private written agreement between landowners to restrict the use or development of land for the benefit of other land. They are most commonly applied when a developer subdivides land for sale and wishes to apply some restrictions on the use and development of the lots to benefit or protect other land. A covenant that limits the use and development of a lot to a single house is a common type of restrictive covenant. A registered restrictive covenant is a covenant that is recorded on the certificate of title for the burdened land.

There are no legislative rules regarding the types of restrictions that can be included in a restrictive covenant. Councils are not responsible for preparing and writing restrictive covenants (they are a private treaty). Most restrictive covenants do not have a lapse date, which means that the covenant will bind successive owners of the burdened land for as long as it remains on title, and the covenant will remain on title until it is removed.

The covenant is an effective measure to ensure that any buildings or structures built with a building permit are not placed in the covenanted area. An approximate parcel area which might warrant the use of a covenant might be a parcel of 0.2 ha or smaller that would normally require covenanted disposal areas. Larger parcels with topographic or other constraints to the location of disposal fields may also require them.

Some regional districts, including FVRD; have policies regarding the use of covenants for this purpose. Section 182 of the *Land Titles Act* details restrictive covenants and their registration. Typical challenges include the failure of the restrictive covenant to comply with the mandatory requirements of the *Land Titles Act* or the common law, and would include restrictive covenants against public policy. Use of Section 1.3.1 Restrictive Covenants (page 9) can help ensure long term sustainability of the parcel and will limit the number of connections and the daily design flow of each connection.

APPLICATION:

Local Government

- ▶ The Guide to Rural Subdivision Approvals see: <http://www.th.gov.bc.ca/da/manual1/SubdivisionManual.pdf> states that various agencies and line ministries can recommend covenants as conditions of approval under different Acts such as the *Local Government Act*.
- ▶ While drafting a restrictive covenant, carefully review section 182 of the *Land Titles Act* to ensure requirements are followed.
- ▶ Covenants should be referenced in the building permit process. If there are no building permit requirements, the covenant effectiveness is greatly diminished. Covenants should be considered¹⁰ where only one suitable location exists for primary disposal and reserve areas.

Health Authority

- ▶ Consider need and effectiveness of covenant based on given situation. Covenants are generally only required in specific instances where the location of sewage treatment might pose a risk to public health (e.g. drinking water sources). Covenants are prudent when there is a particular public health concern (e.g. the parcel is located near a beach, shellfish harvesting area, or community water supply). It is advisable that covenants be registered with a reference plan (e.g. a drawing that provides pertinent information on the parcel including where it is located and the location of the primary and reserve discharge areas).

Two sample restrictive covenants are provided in RG #4.

- ▶ Covenants would also be prudent on community systems, strata systems and commercial developments to ensure sewage flows do not exceed original design specifications (e.g. strata systems are designed for each lot to have an equal share)¹¹.

Use the SPM section 2 tabular methodology for calculating sewage flow and covenant each strata lot.

NOTE: The designer would supervise the installation of the sewerage system and provide certification of the completed work, as well as provide working drawings.

- ▶ Community sewerage systems that use Type 2 or Type 3 treatment are acceptable, with associated discharge area sizes, providing they are operated by a municipality, regional district or strata corporation.
- ▶ If a local government is developing a bylaw for BP #3, HA's should work with the local government on its development.
- ▶ In the absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #3 as best practice.

Provincial Approving Officer

- ▶ Ensure BP #3 is met through referral to HA's and/or local government bylaw, Section 506.
- ▶ When referral to HA's is not required, PAO's should follow BP #3 where appropriate.
- ▶ Bylaw required for systems not owned by a strata or local government (ensure consistent with BP #2).

.....
¹⁰ This helps hinder the over-use of covenants for some areas, as they are costly to prepare and register; difficult to enforce and discharging or modifying is time consuming.

¹¹ Zoning for house size, secondary suits and carriage houses can alter the division of the sewage flow between each lot such that there is no capacity in the system to accommodate sewage from the last developed lot.

BEST PRACTICE 4: *Limit developments that use onsite systems to sites that follow the Site Capability, Sewerage System Standard Practice Manual Version 3.*

RATIONALE:

The rate of soil permeability (e.g. 'Constraining Factor' in Appendix 4) will have an impact on site capability in terms of development. The higher the permeability (larger particles such as gravel and large sand granules) of the soil/matter, the more readily a potential pollutant can make its way through this matter into a groundwater source. Unsuitable sites for development that use onsite systems have far reaching impacts both environmentally and in terms of public health.

The following requirements are based on Type 1 effluent quality. The intent is to provide sufficient area and soil depth to allow long-term and sustainable onsite sewage treatment. Therefore, it is recommended to limit developments that use onsite systems to sites that follow the SPM Version 3 (see Appendix 4), which is used to determine the suitability of the site for onsite systems considering factors such as soil conditions, flooding, depth to groundwater, and others. Table 2 provides information on soil type, constraining factors, and solutions depending on site specific features that can help provide important geological information to determine site suitability.

It is recommended that all discharge areas be at least 7.5 metres from a potential breakout point. This is to ensure there is sufficient horizontal and vertical distance for dispersal and treatment of the effluent, and to protect against human health concerns related to surfacing of sewage effluent. For example a site with 1.8m depth of soil or less would be considered to have limited suitability for use of onsite systems, as this is a key criterion and is significantly less for SPM for certain systems (e.g. 0.61m soil depth for type 1 pressure distribution).

APPLICATION:

Local Government

- ▶ Adopt Appendix 4, Table 2 through bylaw development.
NOTE: Unsuitable sites for developments would fall under the 'Constraining Factor' category of high to very high soil permeability.
- ▶ For all cases there are two further alternatives recommended under the SPM: custom design by an Authorized Person (which should include design to meet the SPM performance standards), or off-site treatment (use of another property). For all low permeability soil constraints, the use of alternating drainfields could improve system performance. For a directory of Professional Engineers and Geoscientists of B.C., please see: <https://www.apeg.bc.ca/Member-Directories/APEGBC-Membership-Directory>
- ▶ Consider adding Appendix 4, Table 2 ('Site Suitability') into the Subdivision Application, to ensure these factors are being considered upon application for development.
- ▶ Can view the Saskatchewan 2012 Guidance Document for Developments and Subdivisions where Onsite Wastewater Treatment Systems are Proposed for use by municipalities and developers as referenced here: <http://docplayer.net/217070-Guidance-document-for-developments-and-subdivisions-where-onsite-wastewater-treatment-systems-are-proposed.html>.

Health Authority

- ▶ Through referral from PAO, ensure that site suitability has been assessed (see RG #2) and Appendix 4.
- ▶ Adopt BP #4 as standard and ensure it occurs.
- ▶ Work with local government on developing bylaws.
- ▶ The HA's should align its subdivision review guidelines with this document, generally recommending against subdivision proposals that do not meet this criteria.
- ▶ If a local government is developing a bylaw for BP #4, HA's should work with the local government on its development.
- ▶ In the absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #4 as best practice.

Provincial Approving Officer

- ▶ Ensure BP #4 is met through referral to HA and/or local government bylaw, Section 506.
- ▶ When referral to HA is not required, PAO's should follow BP #4 and ensure site suitability assessments are completed and refer to HA's or local governments as required through bylaw, or directly through developer.

BEST PRACTICE 5: *Connect to an existing community sewage system whenever practical and economically feasible.*

RATIONALE:

Providing adequate sewage disposal is an important component in the protection of health and the protection of groundwater and surface water. Due to their limited size and population density, many rural communities do not provide a traditional engineered sewer system. Where this is the case, onsite sewage disposal systems have been employed as a practical solution to servicing individual developments. For un-serviced areas (e.g. where community sewage services are not available), onsite sewage treatment is often the only solution for domestic sewage.

Poorly planned, constructed or maintained onsite systems can threaten water quality in the Province, through untreated wastewater reaching local water bodies, affecting groundwater, resulting in human health and environmental impacts. If an onsite system is not pumped out regularly, the solids and scum can flow into the drain field and clog it, resulting in improperly treated wastewater rising to the surface threatening human health, reducing the property's value and creating odors. In addition, if there is too much residential water use, wastewater can be flushed out too quickly and solids can flow into the drain field, causing it to become over saturated.

It is Best Practice to discourage onsite systems where connection to an existing community system proves practical through a life cycle cost analysis and/or if there are existing barriers to effective use of onsite systems.

APPLICATION:

Local Government

- ▶ Could be a requirement in a municipality or regional districts' subdivision and development control bylaw or subdivision servicing bylaw. Could also be based on life cycle costs or referenced to broader planning documents, such as OCP's or regional growth strategies (where they want development to occur). Some jurisdictions may require a connection and/or may not want subdivision development based on density.
- ▶ Apply an understanding of life cycle cost analysis (capital, construction costs, operational and maintenance costs, taxes, financing, replacement and renovation) – specifically, understanding the real costs of providing onsite systems over time (new fields and/or replacement of septic systems).

Health Authority

- ▶ Work with the local government to develop a bylaw.
- ▶ If a local government is developing a bylaw for BP #5, HA's should work with the local government on its development.
- ▶ In the absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #5 as best practice.

Provincial Approving Officer

- ▶ Ensure BP #5 is met through referral to HA's and/or local government bylaw, Section 506.
- ▶ Work with local governments to develop appropriate bylaws when referred to PAO's.
- ▶ When referral to HA's is not required and in absence of a local bylaw, PAO's should consider following BP #5 and may require the developer to provide rationale for why or why not the connection to a nearby community sewer system is occurring. Rationale may include life cycle analysis.

BEST PRACTICE 6: *Hydrogeological assessment for parcel sizes smaller than one hectare and with identified sensitive features.*

RATIONALE:

The need for a hydrogeological assessment will depend on conditions and features present at specific sites and be affected by surrounding land use. As a result, there could be a range of accepted practices—see Section 2.4 (page 12) for several examples of jurisdictions such as the Township of Langley B.C. and Alberta. These examples illustrate the variation that exists across different jurisdictions both from B.C. and abroad for different sites with sensitive features.

In areas where population density is high and human use of land is intensive, groundwater is especially vulnerable. One of the main causes of groundwater contamination in the United States (U.S.) for example is the effluent from septic tanks. The US Environmental Protection Agency (USEPA) highlights that even though an individual system might release a small amount of waste into the ground; it is the larger number (higher density) of these systems that make them a serious contamination source.

Attenuation processes within a one hectare parcel and housing density (e.g. one home per hectare) should be sufficient to reduce the nitrate-nitrogen to an acceptable concentration in groundwater below adjacent properties. It should be noted that sufficient attenuation processes may not be present in hydrogeologically sensitive environments, where there are pre-existing nitrate concerns, or where there is little water surplus available. Many hydrogeological assessments are driven by local governments' concern over groundwater and aquifer health from cumulative impacts.

APPLICATION:

- ▶ For parcels requiring a hydrogeological assessment, information will be required in two stages:
 1. An initial scan or screen by a qualified professional: http://www.health.gov.bc.ca/protect/lup_authorized.html to determine if sensitive features are present.
 2. If step 1 indicates that the sensitive features exist, or if the PAO, HA's or local government deem it necessary, then a cumulative hydrologic assessment would be required.

NOTE: If insufficient information is available from the site assessment to assess whether these conditions exist at the site being considered, further work should be done to obtain the necessary information, in order to determine the potential for cumulative impacts, prior to approving a subdivision.

- ▶ Hydrogeological assessments can also be applied through simplified, desktop applications (e.g. wells database).

Local Government

- ▶ If a hydrogeological assessment is recommended based on sensitive features on a parcel, it could be stipulated as a requirement in a subdivision servicing bylaw (RG #1).

Health Authority

- ▶ Could participate in OCP process to ensure that sensitive areas are identified and that the local government requires development permit with hydrogeological assessment as required.
- ▶ If a local government is developing a bylaw for BP #6, HA's should work with the local government on its development.
- ▶ In the absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #6 as best practice. Refer to RG #1 or land use control (e.g. designating sensitive areas as requiring a development permit for this purpose).

Provincial Approving Officer

- ▶ Ensure BP #6 is met through referral to HA's and/or local government bylaw, Section 506.
- ▶ When referral to HA's is not required, PAO's should follow BP #6 where there is concern and/or identified sensitive features.
- ▶ Consider requiring that subdivision applications include tools for extracting necessary information from applicants to determine whether sensitive features are present.¹²

NOTE: Where a facility falls under the MWR, the Soils Evaluation Guide (RG #3) does not take the place of the required assessment by a qualified professional.

.....
¹² As Approving Officers do not routinely conduct site inspections of each application received, this would create a mechanism for acquiring the necessary information.

BEST PRACTICE 7: *Decentralized community sewerage systems serving residential developments should not be approved unless owned and operated by local government or strata.*

RATIONALE:

While centralized wastewater treatment plants are appropriate for larger communities, decentralized sewage systems provide an option for small communities where large sewage treatment plants are not desired or economically feasible. However, unless harnessed within strong land use planning rules, misuse of this option could lead to unsustainable development on rural lands.

In a smaller, decentralized system (see Appendix 1)¹³, individual septic tanks or aerobic units may pre-treat wastewater from several homes onsite before it is transported to a local (shared) treatment unit.

Advantages of the decentralized treatment approach include reducing the size of the downstream plants, creating local opportunities for water reuse and heat recovery from wastewater (through strategic placement of upstream plants) and by reducing the existing wastewater flows in the lower portions of the sewerage system – (capacity is freed up to handle a greater portion of wastewater flow). Decentralized sewerage systems typically require more extensive maintenance than onsite systems which service individual dwellings and therefore more monitoring and enforcement is required.

Decentralized community sewerage systems with ground dispersal are not recommended as a method for sewage treatment and discharge unless owned and operated by a municipality, regional district, or strata corporation.

Municipalities and regional districts have the authority to and are encouraged to create and enforce maintenance bylaws that require maintenance of all onsite and community ground dispersal systems. Decentralized community systems can be an appropriate solution where the local government has identified the need (e.g. in an OCP) and has the framework to ensure the sustainability of the infrastructure and service.

.....
13 Decentralized wastewater treatment systems use a combination of onsite or cluster systems to treat and dispose of wastewater from houses and businesses that are located relatively close together.

APPLICATION:

Local Government

- ▶ Subdivision servicing standard bylaws can be created that require systems to be built to a standard and then ownership given to the regional district, or it could require an existing system if applicable.
- ▶ Standards should follow requirements set out in applicable legislation, or be above standards.
- ▶ Daily design flows for community systems could be developed from Table 2-8 and 2-9 of the SPM, depending on the type of development.

NOTE: The size of the discharge area can then be determined based on the flow rate and the hydraulic loading rate that can be accommodated by the soil type. These discharge areas correspond to the appropriate soil type and percolation rate. Area requirements include a 150% reserve area.

Health Authority

- ▶ Community systems less than 22.7 m³/d should not be supported unless owned and operated by a local government or strata.
- ▶ If a local government is developing a bylaw for BP #7, HA's should work with the local government on its development.
- ▶ In absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #7 as best practice.

Provincial Approving Officer

- ▶ Ensure BP #7 is met through referral to HA's and/or local government bylaw, Section 506.
- ▶ When referral to HA's is not required, PAO's should follow BP #7 and only approve those developments (decentralized community sewerage systems) that are owned and operated by local government or strata.

BEST PRACTICE 8: *Commercial and industrial developments should use community water and sewer systems where possible and have applications prepared by a Professional Engineer.*

RATIONALE:

Commercial and industrial categories can span a wide range of functions from institutional to food preparation and may produce wastes with a higher strength concentration of hazardous and toxic chemicals than residential sewage, which can lead to source water protection and environmental concerns.

The Ministry of Environment produced Guidelines for Preparing Liquid Waste Management Plans (LWMP) which states that major industrial, commercial, and institutional discharges to the sewer system should be characterized in order to determine if existing source control measures are adequate. Source control programs (an important LWMP component) can be implemented through a regulatory or educational approach. As appropriate, improved or added source control measures such as bylaws, codes or practices and education programs should be identified and evaluated (measures considered should include pre-treatment of non-domestic high-strength or hazardous wastewater prior to discharge into the sewage collection system). The regulatory approach is typically focused on commercial, industrial and institutional dischargers, often through sewer use bylaws.

APPLICATION:

Local Government

- ▶ Through bylaws, local governments can set standards and could require commercial/ industrial developments to connect to community sewer, where onsite sewerage systems are used for commercial and industrial developments.
- ▶ A Section 219 Covenant (see Section 1.3.1) is recommended to limit the daily sewage flow, and to protect the primary and reserve discharge area.

Health Authority

- ▶ Encourage local government to implement bylaw to require commercial/industrial developments to connect to community sewer system.
- ▶ Provide PAO's with additional information/recommendations as per subdivision applications, regarding source controls.
- ▶ If a local government is developing a bylaw for BP #8, HA's should work with the local government on its development.
- ▶ In absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #8 as best practice.

Provincial Approving Officer

- ▶ Ensure BP #8 is met through referral to HA's and/or local government bylaw, Section 506.
- ▶ When referral to HA's is not required, PAO's should follow BP #8 and ensure developments use community sewer systems where possible and have applications prepared by a Professional Engineer. A list of qualified Engineers can be found here:
<https://www.apeg.bc.ca/Member-Directories/Professionals-for-Sewerage-System-Regulation>

BEST PRACTICE 9: *All subdivision applications proposing use of onsite sewerage systems for servicing of new parcel(s) be accompanied by a thorough site assessment (based on scale of development).*

RATIONALE:

There are a broad range of circumstances and factors such as hydrogeological sensitivity (high infiltration rates) and depth to groundwater that will help determine the environmental and public health implications of developing a site and how to mitigate these impacts where possible. Site suitability also recognizes that factors such as potential impacts to groundwater and surface water, healthy soil conditions and overall site suitability allow onsite systems to be effective wastewater management systems.

The site assessment would determine the suitability of the parcel for an onsite sewerage system. The site suitability category (which rates sites on a one to four scale) can be determined based on the information gathered in the site assessment. The suitability assessment flowchart describing the characteristics of each suitability category is provided in Appendix 2.

For a complete checklist for the subdivision application, applicants should refer to the MoTI and local government Management Association of B.C. Guide for Approving Officers for Local Government. Please refer to Appendix 7 for a Site Assessment Checklist. Also refer to the Interior Health website, for Subdivision Data Information Record available at: <https://www.interiorhealth.ca/YourEnvironment/HBE/Pages/Onsite-Sewerage-Systems.aspx>

APPLICATION:

Local Government

- ▶ Should require this BP through bylaw requirements (refer to RG #2).
- ▶ The parcel created could be in areas where community sewer is not planned or viable, and they should meet SPM criteria for site and soil evaluation for Type 1 systems.

Health Authority

- ▶ Encourage local government to follow this BP, and consider recommending against subdivisions where this BP was not followed.
- ▶ In absence of a local government bylaw, RG #2 should be followed.
- ▶ If a local government is developing a bylaw for BP #9, HA's should work with the local government on its development.
- ▶ In the absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #9 as best practice.

Provincial Approving Officer

- ▶ Ensure BP #9 is met through referral to HA's and/or local government bylaw, Section 506.
- ▶ When referral to HA's is not required, PAO's should follow BP #9 and in situations where site conditions warrant, the PAO should require the developer to implement a site assessment based on RG #2.

BEST PRACTICE 10: *Where onsite sewerage systems that are located within a flood area are proposed, approval should not be granted.*

RATIONALE:

Flooding is common in B.C., resulting from various weather events such as heavy rainfall, rain on snow, snowmelt (freshets), ice jams and debris flows. Floodplains are areas that experience periodic flooding from nearby rivers, lakes, streams, and the sea. Development in floodplains should be significantly limited; however, there are legitimate instances where it is supportable. For example, the Land Reserve Commission allows the severance of a 'home site' within the Agricultural Land Reserve (ALR) under very limited circumstances. Typically (and for the Fraser Valley Regional District), an onsite system is the only way to serve such a parcel. An intended consequence may be to encourage the development of community sewer systems in a floodplain.

Because onsite sewerage systems require permeable soil for treatment, it is not Best Practice to develop in a floodplain. Flooding would prohibit the area from providing treatment and would also allow untreated effluent to directly contaminate surface water, resulting in a significant health risk in the event of a flood. If soil is saturated for a short period, then soil oxygen levels remain high, aerobic soil bacteria survive and the soil continues to provide treatment for water. However, if the soil is saturated for a long period, then biodegradation of organic carbon and nitrogen will slowly deplete soil oxygen, aerobic soil bacteria will die off or become inactive, only a relatively few anaerobic bacteria will remain, and the soil's ability to treat sewage will be reduced, leading to potential breakout of pathogenic microorganisms. There is no set or fixed definition of what is a short period or long period, although the approximate timeframe is days to weeks, rather than hours or months.

The Floodplain Mapping Program was a joint initiative by Canadian and B.C. governments to provide information to help minimize flood damage in the Province. The program, which ran from 1987 to 1998, identified and mapped areas that were highly susceptible to flooding. These areas were designated as floodplains by the federal and provincial Environment ministers. B.C. uses the 200-year flood to define the flood risk area, but divides it into two zones, namely the floodplain, where development is discouraged, and the flood fringe, where flood-proofed development is possible. These maps provide an opportunity to ensure that development is done in a sustainable manner by restricting type of development, or types of services in zones susceptible to flooding.

APPLICATION:

Local Government

- ▶ Use maps created by The Floodplain Mapping Program to determine areas susceptible to flooding. Information regarding these maps can be located here: http://www.env.gov.bc.ca/wsd/data_searches/fpm/reports/index.html
- ▶ Develop flood hazard area bylaws without ministry approval; however, must consider ministry policies and guidelines.
- ▶ Use Sea Level Rise Adaptation Primer: <http://www2.gov.bc.ca/assets/gov/environment/climate-change/policy-legislation-and-responses/adaptation/sea-level-rise/slr-primer.pdf> (will have implications for flood plain mapping and construction levels).
- ▶ Establish the requirements for subdivision in flood prone areas. These requirements can include engineering reports assessing flood hazards and restrictive covenants.
- ▶ Develop standards through bylaw, identify zones (zoning bylaws) – where use of onsite systems for development is appropriate.

Health Authority

- ▶ With referral from PAO's – may request information (site specific) with respect to flood risk and mitigation.
- ▶ In the absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #10 as best practice.
- ▶ If a local government is developing a bylaw for BP #10, HA's should work with local government on its development.

Provincial Approving Officer

- ▶ Ensure BP #10 is met through referral to HA's and/or bylaw, Section 506.
- ▶ When referral to HA's is not required, PAO's should follow BP #10 and where applicable, should not approve subdivision in a floodplain.
- ▶ Consider sea level rise in coastal developments.
- ▶ May require information from the developer.
- ▶ Regulate subdivision development within regional district areas, outside of municipal boundaries. Under Section 86 of the *Land Title Act*, flood hazards must be considered as part of the subdivision approval process.

BEST PRACTICE 11: *Subdivision and Development Control Bylaws for requiring various levels of servicing and types of onsite systems*

RATIONALE:

Subdivision and Development Control Bylaws (SDCBs) can be used, where appropriate, to set standards and place requirements for subdivision to support environmental outcomes, protect sensitive areas, improve the viability of service delivery, address land-use limitations, as well as support broader community goals.

As an example, SDCBs can be developed, where and when appropriate, to require new developments within a reasonable distance of existing community sewage collection systems to connect to the sewage collection system. Subdivision and Development Control Bylaws can require enhanced treatment in designated areas that are environmentally sensitive as part of the servicing requirements for various areas. These SDCBs can also provide opportunity with respect to land use and subdivision development and can address many, if not all of the other BP's within the context of the bylaw.

Ultimately, SDCBs may regulate the shape, dimensions and area of subdivided parcels, as well as the works and services that must be provided.

Further, SDCBs can be used to set standards (e.g. construction standards for onsite and/or assessment standards) and apply them to the region, where appropriate, to identify applicable setbacks and different construction standards to meet regional needs.

Municipalities and regional districts could also consider limiting parcel coverage (e.g. driveways, parking areas, and buildings) for developments using onsite sewerage systems. Subdivision and Development Control Bylaws can protect areas on the site that are suitable for discharge areas and reduce the development's negative impacts on rainwater infiltration, as storm events can hinder sewerage system performance.

APPLICATION:

Local Government

- ▶ Use statutory authority (Part 13 of *Local Government Act*)/ http://www.bclaws.ca/civix/document/id/complete/statreg/r15001_13 to adopt subdivision servicing bylaws, zoning bylaws, issue development permits and development variance permits dealing with subdivision matters.
- ▶ Use zoning bylaws to limit parcel coverage for developments using onsite sewerage systems. An example from Sooke B.C. can be found here: http://sooke.ca/wp-content/uploads/2015/09/Zoning-Bylaw-600_Consolidated-July-12-16.pdf

Health Authority

- ▶ To work with local governments to help identify sensitive or critical areas (drinking water sources or public protection issues) in development of these bylaws. See Appendix 5 for further information on the OCP process as a vehicle for the development of these bylaws.
- ▶ If a local government is developing a bylaw for BP #11, HA's should work with the local government on its development.
- ▶ In the absence of a local government bylaw, when referred to by a PAO, HA's should consider BP #11 as best practice.

Provincial Approving Officer

- ▶ Ensure BP #11 is met through referral to HA's and/or local government bylaw Section 506.
- ▶ When referral to HA's is not required, PAO's should follow BP #11 and enforce bylaws in the subdivision approving process.

References

Alberta Association of Municipal Districts & Counties, *Example Level Three Assessment of Site Suitability*. Alberta: AAMDC, 2010.

Alberta Association of Municipal Districts & Counties, *Model Process Technical Resources: Updated Model Process Technical Resources to the Suitability and Viability of Subdivisions Relying on Private Sewage Systems*. Alberta: AAMDC, 2011.

Alberta Association of Municipal Districts & Counties, *The Model Process for Subdivision Approval and Private Sewage: The Suitability and Viability of Subdivisions Relying on Private Sewage Systems*. Alberta: AAMDC, 2011.

British Columbia Law Community Charter. Victoria, British Columbia:
SBC 2003: http://www.bclaws.ca/Recon/document/ID/freeside/03026_00

British Columbia Ministry of Environment, Environmental Protection Division. *Interim Guidelines for Preparing Liquid Waste Management Plans*. 2011.

British Columbia Ministry of Health. *Guidance document for determining ground water at risk of containing pathogens (GARP) including ground water under direct influence of surface water (GWUDI)*. Victoria, BC: Ministry of Health, Health Protection Branch; 2012.

British Columbia Onsite Sewage Association, *Introduction to Onsite Systems in British Columbia for Provincial Approving Officers*. British Columbia: BCOSSA, 2007.

British Columbia Ministry of Health and Applied Science Technologists of Technicians of British Columbia, *Sewerage System Standard Practice Manual (Version 3)*: British Columbia: Ministry of Health, Health Protection Branch and the Applied Science Technologists and Technicians of British Columbia, 2014.

Capital Regional District. *A Bylaw to establish a comprehensive community development plan for Willis Point, Bylaw No. 3027*: <https://www.crd.bc.ca/docs/default-source/crd-document-library/bylaws/juandefucaelectoralarea/3027---comprehensive-community-plan-for-willis-point-bylaw-no-1-2002B.pdf?sfvrsn=0>

Coast Garibaldi Health Unit, *Recommendations for Subdivision Standards for Onsite Sewage Disposal*. Vancouver, BC: University of British Columbia, Department of Soil Science and Resource Management & Environmental Studies, 1994.

The Columbia Shuswap Regional District. *Magna Bay Zoning Bylaw No.800*, 2013:
<http://www.csr.d.bc.ca/inside-csr.d/bylaws/magna-bay-zoning-bylaw-no-800-0>

Fraser Health, *Guideline for Providing Recommendations on the Subdivisions of Land*. Surrey, BC: Fraser Health, 2008.

Froese et al., "Onsite Wastewater Treatment Systems in Subdivisions," Saskatchewan Watershed Authority, Final Rep. Project No. SH/SWA H01, 2009.

Government of Saskatchewan, "Guidance Document for Developments and Subdivisions Where Onsite Wastewater Treatment Systems are Proposed", 2012.

Interior Health Authority, *Interior Health Authority Subdivision Guideline*. British Columbia: IHA, 2007.

Local Government Management Association of British Columbia, *Guide for Approving Officers for Local Governments*. British Columbia: Local government MABC, 2012.

Ontario Ministry of the Environment, *Technical Guideline for Individual Onsite Sewage Systems: Water Quality Impact Risk Assessment*. Ontario: OME, 1996.

Peace River Regional District, "Peace River Regional District Guide to Subdivision Development Procedures". *Peace River Regional District*, [Online]. Available: <http://www.prrd.bc.ca>. [Accessed: June 4, 2012].

Prince Albert Health Division, Saskatchewan, *Interim Review Process for Onsite Wastewater Disposal Systems for Developments and Subdivisions*. Saskatchewan: PAHD, 2008.

Regional District of Nanaimo (RDN). *Electoral Area "F" Zoning and Subdivision Bylaw No. 1285, 2002*: http://www.rdn.bc.ca/dms/documents/rdn-bylaws/electoral-area-f-zoning-and-subdivision-bylaw-no.-1285,-2002/full_bylaw_1285_consolidated_version.pdf

Sea Level Rise Adaptation Primer. Ministry of Environment: 2013: <http://www2.gov.bc.ca/assets/gov/environment/climate-change/policy-legislation-and-responses/adaptation/sea-level-rise/slr-primer.pdf>

Stantec, *Alberta's Model Process for Subdivision Approval: Training Sessions*. Edmonton, Alberta: Stantec, 2011.

United States Environmental Protection Agency, *Onsite Wastewater Treatment Systems Manual*. United States of America: USEPA, 2002.

United States Environmental Protection Agency, *Handbook for Managing Onsite and Clustered (Decentralized) Wastewater Treatment Systems: An Introduction to Management Tools and Information for Impending EPA's Management Guidelines*. United States of America: USEPA, 2005.

United States Environmental Protection Agency, *Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems*. United States of America: USEPA, 2003.

Vancouver Coastal Health, *Vancouver Coastal Health Subdivision Guideline*. Vancouver, BC: Vancouver Coastal Health, 2007.

Vancouver Island Health Authority, *Subdivision Standards*. Vancouver, BC: Vancouver Island Health Authority, 2009.

APPENDIX 1: *Definitions*

APPROVING AUTHORITIES: Agencies with approval roles for new subdivisions/developments (provincial approving officers, regional districts and health authorities).

APPROVING OFFICER: Appointed under the *Land Title Act*. There are four separate jurisdictions: municipal approving officers, regional district and Islands Trust approving officers, MoTI provincial approving officers and Nisga'a approving officers.

AQUIFER: A geologic formation (or group), or part of a formation that is saturated and sufficiently permeable to transmit economic quantities of water to wells and springs.

AUTHORIZED PERSON: An "Authorized Person" under the Sewerage System Regulation is either a registered onsite wastewater practitioner or a professional engineer.

BIOGEOCLIMATIC ZONES: Classification system used by the British Columbia (B.C.) Ministry of Forests for the Canadian province's many different ecosystems, defined as a geographic area having similar patterns of energy flow, vegetation and soils as a result of a broadly homogenous macroclimate.

BREAKOUT OR EFFLUENT BREAKOUT: Visible movement of effluent to the surface of the ground with a potential for breakout that may exist at present or future road cuts, excavations, and exposed impervious layers in ditches or drains. The SPM provides horizontal setback standards for potential breakouts.

BREAKOUT POINT: A point down grade of a discharge area or lagoon where effluent could surface onto the land, enter a drain, cross a property boundary, or enter surface water.

CENTRALIZED WASTEWATER TREATMENT SYSTEM: Consists of a collection of sewers and centralized treatment facility. Used to collect and treat wastewater from entire communities.

CLASS A: High quality municipal effluent resulting from advanced treatment with the addition of disinfection and nitrogen reduction.

CLASS B: Municipal effluent resulting from advanced treatment.

CLASS C: Municipal effluent resulting from secondary treatment.

CLASS D: Municipal effluent resulting from treatment in a septic tank.

CLAY: A textural class of soils consisting of particles less than 0.002 millimeters in diameter.

CLUSTER SYSTEM: A wastewater collection and treatment system under some form of common ownership and management that provides treatment and dispersal/discharge of wastewater from two or more homes or buildings but less than an entire community.

COMBINED IMPACT: Blended impact of all individual onsite systems on the development site. Impact of system's effluent discharge on groundwater is not assessed on a plume by plume basis.

COMMUNITY SEWAGE TREATMENT SYSTEM: Serves more than one parcel or more than one building in a strata plan under the *Strata Property Act*.

COMPLIANCE BOUNDARY: A performance boundary with defined performance limits (e.g. drinking water well).

CONFINED AQUIFER: Ground water is confined under pressure which is significantly greater than atmospheric pressure. Is under a low-permeability geological layer.

CONSTRUCT: To plan or conduct a site assessment in respect of a sewerage system, to install, repair or alter a sewerage system and to supervise any of the activities (authorized persons).

DECENTRALIZED WASTEWATER

TREATMENT SYSTEM: For collection, treatment, and dispersal/reuse of wastewater from individual homes, clusters of homes, isolated communities, industries, or institutional facilities, at or near the point of waste generation.

DEVELOPMENT PERMIT AREA (DPA): Set of development regulations pertaining to a specific area as specified by the OCP, with authority for local governments to establish DPA's set out in the Local Government Act, Sections 488 and 489. Any proposed building/subdivision within a DPA requires the issuance of a development permit.

DEVELOPMENT PERMIT (DP): When an area is designated as a Development Permit Area (DPA), then a Development Permit must be obtained prior to any subdivision, construction (including addition to or alteration to a building or structure) or alteration of land.

DRAIN FIELD: Shallow, covered, excavation in unsaturated soil into which pretreated wastewater is discharged through distribution piping for application onto soil infiltration surfaces through porous media or manufactured (gravel) components placed in the excavations. The soil accepts, treats, and disperses wastewater, discharging to groundwater.

DRY INDUSTRIAL/COMMERCIAL USES:

Only the discharge of the domestic waste of employees is permitted and treated (e.g. no industrial liquids, wash or cooling wastes are permitted).

EASEMENT: A non-possessory right of use and/or entry onto the real property of another without possessing it (e.g. for telephone and power lines).

EFFLUENT: Domestic sewage that has been treated by a treatment method and discharged into a discharge area.

EFFLUENT PRE-TREATMENT: Aerobic or other processes that reduce sewage effluent strength.

ENVIRONMENTAL HEALTH OFFICER

(EHO): EHO or Public Health Inspector certified to work in Canada and delegated authority by the Medical Health Officer (MHO). EHO's review and respond to land development applications with respect to drinking water supply and onsite sewage discharge.

ENVIRONMENTAL SENSITIVITY:

The relative susceptibility to adverse impacts of a water resource or other environments that may receive wastewater discharges.

EUTROPHICATION: Refers to natural or artificial addition of nutrients to bodies of water and to the effects of the added nutrients. When the effects are undesirable, eutrophication may be considered a form of pollution.

EVAPOTRANSPIRATION/ABSORPTION

BED: The use of an evapotranspiration bed (ET) is a large constructed sponge of sand/ gravel sealed from surrounding soil with an inbuilt water storage capacity and vegetated surface from which evapotranspiration is maximized.

GRAYWATER: Wastewater drained from tubs, showers, clothes washers, and other non-toilet sources.

GROUND WATER: Subsurface water occupying the zone of saturated soil, permanently, seasonally, or as the result of the tides.

GROUNDWATER MOUNDING: Localized increase in elevation of a water table that builds up as a result of the downward percolation of liquid into groundwater.

GROUND WATER TABLE

ASSESSMENT: All subdivision proposals should address the seasonal or permanent ground water table and assessments should provide data concerning the impact of a proposed development on water quality.

HEALTH AUTHORITY: The Ministry of Health works together with five regional health authorities and one provincial health authority to provide high quality, appropriate and timely health services to British Columbians, within their geographic areas.

HEALTH OFFICER: An EHO, Drinking Water Officer, or the MHO.

HIGH WATER MARK: A point on the shoreline, which corresponds with a the highest water level within the normal operating range for a controlled lake and for any other body of tidal or non-tidal water, to the average highest water level calculated from measurements taken over a sufficient number of years to enable a reasonable estimate.

HOLDING TANK: A watertight container for holding domestic sewage until the domestic sewage is removed for treatment.

HYDRAULIC LOADING RATE: Used in specifying the area of the bottom of the drain field trenches required for onsite wastewater systems. Volume of effluent

applied to the infiltrative surface of a sewerage system dispersal area (L/m²).

HYDROGEOLOGICALLY ISOLATED: Areas characterized by strong upward hydraulic gradients; massive un-fractured clay deposits at or near ground surface; or other thick impervious layers of materials over water-bearing formations.

HYDROGEOLOGICAL SENSITIVE AREAS: Areas susceptible to contamination based on existing geology and groundwater conditions (e.g. areas with permeable soils, shallow groundwater tables). This is difficult to determine prior to study initiation.

INFILTRATIVE SURFACE: Designated interface where effluent moves from distribution media or a distribution device into soil.

INFLUENT: Wastewater, partially or completely treated, or in its natural state (raw wastewater, sewage), flowing into a reservoir, tank, treatment unit, or discharge unit.

LATERAL: Perforated pipe or tubing used to carry and distribute effluent.

LEGAL SURVEY PLAN: An official registered survey plan prepared by a British Columbia Land Surveyor (BCLS) showing the legal dimensions of the parcels (e.g. position, type of posting of lot corners and boundaries).

LIMITING LAYER: A restrictive layer (see Restrictive Layer) or water/seasonal high table.

LINEAR LOADING RATE: A critical element for onsite sewage system whenever there is a restriction to the vertical movement of water in the soil.

LIVING SPACE: Total net floor area of a building less the floor area of a garage, breezeway, carport, crawl space or decks exterior to the building's foundation walls.

LOAM: Specific class of soil texture that contains a balanced mixture of sand, silt and clay. Loams contain enough sand to feel grit and enough clay to give soil body, but the properties and behavior of the soil are dominated by neither sand nor clay.

MAIN SEWAGE DISCHARGE AREA:

An area sized for a primary effluent field, based on percolation rate in the main area, and located in accordance with the SSR and this guideline to accommodate daily design sewage flow of a single-family four-bedroom home.

MAINTENANCE: Includes supervising maintenance of a sewerage system (by authorized person).

MAINTENANCE PLAN: Instructions for maintaining a sewerage system that, if followed, will ensure that the sewerage system does not cause, or contribute to, a health hazard.

NATIVE SOIL: Soil placed by natural geological processes above the seasonal high water table, has a percolation rate of less than 30 minutes an inch and has not been artificially disturbed.

NITROGEN (N): Gaseous element (molecular formula N₂) that constitutes 78 percent of the atmosphere by volume and occurs as a constituent of all living tissues in combined form; nitrogen is present in wastewater, surface water and groundwater as ammonia (NH₃) or ammonium ion (NH₄⁺), nitrite (NO₂), nitrate (NO₃⁻) and organic nitrogen.

OBSERVATION PORT: Larger diameter (over 3") pipe, open bottom or slotted, used to observe the soil infiltration surface.

ONSITE WASTEWATER TREATMENT

SYSTEM (OWTS): System relying on natural processes and/or mechanical components used to collect, treat, and disperse/

discharge wastewater from single dwellings or buildings.

ORGANIC NITROGEN: Nitrogen combined in organic molecules such as proteins and amino acids.

OVERALL LOT SLOPE: Natural slope of a proposed lot measured from highest to lowest elevation and recorded in percentage.

PARCEL: Any lot, block or other area in which land is held or into which it is subdivided, but does not include land covered by water.

PERCHED WATER TABLE: The permanent or temporary water table of a discontinuous saturated zone in a soil. The water table is "perched" upon the restrictive layer, while the normal water table is deeper in the soil profile.

PERCOLATION: The flow or trickling of a liquid downward through a contact or filtering medium.

PERFORMANCE BOUNDARIES: Applies to the point at which a wastewater treatment performance standard corresponding to the desired level of treatment at the point in the treatment sequence is applied (e.g. at point of pretreatment, physical boundaries in receiving environment, at point of use, or at property boundary).

PERFORMANCE STANDARD: A standard established as part of the SPM or by a regulatory authority to ensure future compliance with the public health and environmental goals. Performance standards can be expressed as numeric limits (e.g. pollutant concentrations, mass loads, wet weather flows, and structural strength) or narrative descriptions of desired performance, such as no visible leaks or no odors.

PERMANENT WATER TABLE:

See "Water Table."

PERMEABILITY: The ability of a porous medium such as soil to transmit fluids or gases.

PH: A term used to indicate the acidity or alkalinity of the water. The logarithm of the reciprocal of hydrogen-ion concentration in gram atoms per liter; provides a measure on a scale from 0 to 14 of the acidity or alkalinity of a solution (where 7 is neutral and greater than 7 is more alkaline and less than 7 is more acidic).

PHOSPHORUS (P): Chemical element and essential nutrient for all life forms and is expressed in terms of milligrams per liter elemental phosphorus; occurs in natural waters and wastewater almost solely as phosphates.

PHYSICAL BOUNDARIES: Points in the flow of wastewater through the treatment system where treatment processes change. Can be at the intersection of unit processes or between saturated and unsaturated soil zones and can be a performance boundary if included in design or standard practice.

PONDING: Accumulation of liquid on an infiltrative surface.

POTABLE WATER: Water that meets standards prescribed by the Drinking Water Protection Regulation is safe to drink and fit for domestic purposes without further treatment.

PRE-TREATMENT SYSTEM: Any technology or combination of technologies that precedes discharge to a subsurface wastewater infiltration system or other final treatment unit or process before final dissemination into receiving environment.

PRIMARY EFFLUENT: Domestic sewage effluent discharge from a septic tank.

PRIMARY TREATMENT: Level of treatment involving removal of particles (produces Type 1 effluent), typically by settling and flotation with or without the use of coagulants; some solids are an aerobically broken down but dissolved contaminants are not significantly removed in this treatment step (for example a grease interceptor or a septic tank provides primary treatment).

PROVINCIAL APPROVING OFFICER

(PAO'S): Designated under the *Land Title Act* and work with MoTI, municipalities and regional districts. PAO's receive subdivision applications for division of land within their designated boundaries and approve or refuse applications based on provincial legislation, local bylaw, and recommendations from a variety of internal departments and external agencies (e.g. Interior Health Authority).

PUBLIC HEALTH ENGINEER: An Issuing Official delegated authority under the *Drinking Water Protection Act* to issue construction permits for construction, alteration or extension of water Protection Act to issue construction permits for construction, alteration or extension of a water supply system.

QUALIFIED PROFESSIONAL: A person registered and in good standing with the Association of Professional Engineers and Geoscientists of B.C., or a member of the Applied Science Technologists and Technicians of B.C.

RECEIVING AREA: Area down-slope of a discharge area or directly in the path of sewage effluent travel which provides additional treatment, soil retention time and dilution for treatment of the sewage effluent to prevent premature break out.

REGISTERED ONSITE WASTEWATER

PRACTITIONER: A person qualified to act as a registered onsite wastewater practitioner under section 7 (1) or (2) of the SSR (BC Reg. 326/2004).

RESERVE SEWAGE DISCHARGE AREA:

A secondary discharge area that is equivalent in treatment capacity to the main sewage discharge area based on the percolation rate in the reserve area for the purpose of repair, replacement or extension of the onsite sewerage system.

RESTRICTIVE LAYER: A stratum impeding the vertical movement of water, air and growth of plant roots, such as hardpan, clay pan, fragipan, caliche, some compacted soils, bedrock and unstructured clay soils.

SEASONAL HIGH WATER TABLE (SHWT) – MAY ALSO BE A PERCHED WATER

TABLE: Upper limit of soil water table (at least 150 mm deep and within 2m of the ground surface) which persists for more than 21 consecutive or 30 total days during a year which has precipitation of at least 30% of average annual precipitation (to a maximum of 1 in 20 year return period precipitation).

SEPTAGE: The liquid, solid, and semisolid material that results from wastewater pretreatment in a septic tank, which should be pumped, hauled, treated, and disposed of properly.

SEPTIC TANK: A buried, preferably watertight tank designed and constructed to receive and partially treat raw wastewater. The tank separates and retains settle-able and floatable solids suspended in the raw wastewater which settle to the bottom to form a sludge layer.

SETTLE ABLE SOLIDS: Matter in wastewater that will not stay in suspension during a designated settling period.

SEWAGE: Urine, feces, and water carrying human wastes including kitchen, bath, and laundry wastes from residences, building, industrial establishments or other places. For the purposes of the SPM, “sewage” is generally synonymous with domestic wastewater or sewage.

SEWERAGE SYSTEM: A system for treating domestic sewage that uses one or more treatment methods and a discharge area, but does not include a holding tank or a privy.

SEWAGE DISCHARGE AREA: Total area comprised of the main and reserve sewage absorption field area and receiving area.

SOIL TEXTURE: The relative proportions of the various soils separates (e.g. silt, clay, sand) in soil.

STANDARD PRACTICE: Method of constructing and maintaining a sewerage system to ensure the sewerage system does not cause, or contribute to, a health hazard.

STRATA LOT: A strata lot as defined in the *Strata Property Act*.

STRATA PROPERTY: Ownership (e.g. condominiums, apartments and warehouses) includes exclusive rights to one or more interior living units while sharing the use and ownership of common property with other owners.

SUPPLY AQUIFER: Any groundwater aquifer that is potable, and therefore is being, or could be, used to supply drinking water.

SURFACE WATER: A natural watercourse or source of fresh water, whether usually containing water or not, and includes lakes, rivers, streams and ditches into which a natural watercourse or source of fresh water has been diverted, but does not include ground water.

TOPSOIL: The layer of soil moved in agricultural cultivation.

TYPE 1 SEPTIC SYSTEM: treatment by septic tank only.

TYPE 2 SEPTIC SYSTEM: treatment that produces effluent consistently containing less than 45 mg/L of total suspended solids and having a 5 day biochemical oxygen demand of less than 45 mg/L.

TYPE 3 SEPTIC SYSTEM: treatment that produces an effluent consistently containing less than 10 mg/L of total suspended solids and having a 5 day biochemical oxygen demand of less than 10mg/L, and a median fecal coliform density of less than 400 Colony Forming Units per 100 ml (see SSR).

UNCONFINED AQUIFER: Aquifer containing water that is not under pressure; the water level in a well is the same as the water table outside the well.

VERTICAL SEPARATION (NATIVE SOIL): The depth of unsaturated, original, undisturbed permeable soil below the infiltrative surface and above any limiting layer.

VERTICAL SEPARATION (AS CONSTRUCTED): The depth of unsaturated, original, undisturbed permeable soil below the infiltrative surface and above any limiting layer plus the depth

of sand media between the infiltrative surface and the native soil.

VIRUS: A small infectious agent that can replicate only inside the living cells of an organism.

WATER TABLE: (Seasonal Low or Permanent). The permanent water table refers to the lowest elevation of the water table during a year which has precipitation of at least 30% of average annual precipitation (to a maximum of 1 in 20 year return period precipitation).

WATER SUPPLY SYSTEM: A water system includes its source, treatment, storage, transmission and distribution facilities, but does not include a water supply servicing only one single family residence. The system must be owned, operated and maintained by a regional district, a strata corporation or an improvement district under the *Water Act* or the *Local Government Act*.

WELL: A hole constructed into the ground for the purpose of extracting groundwater.

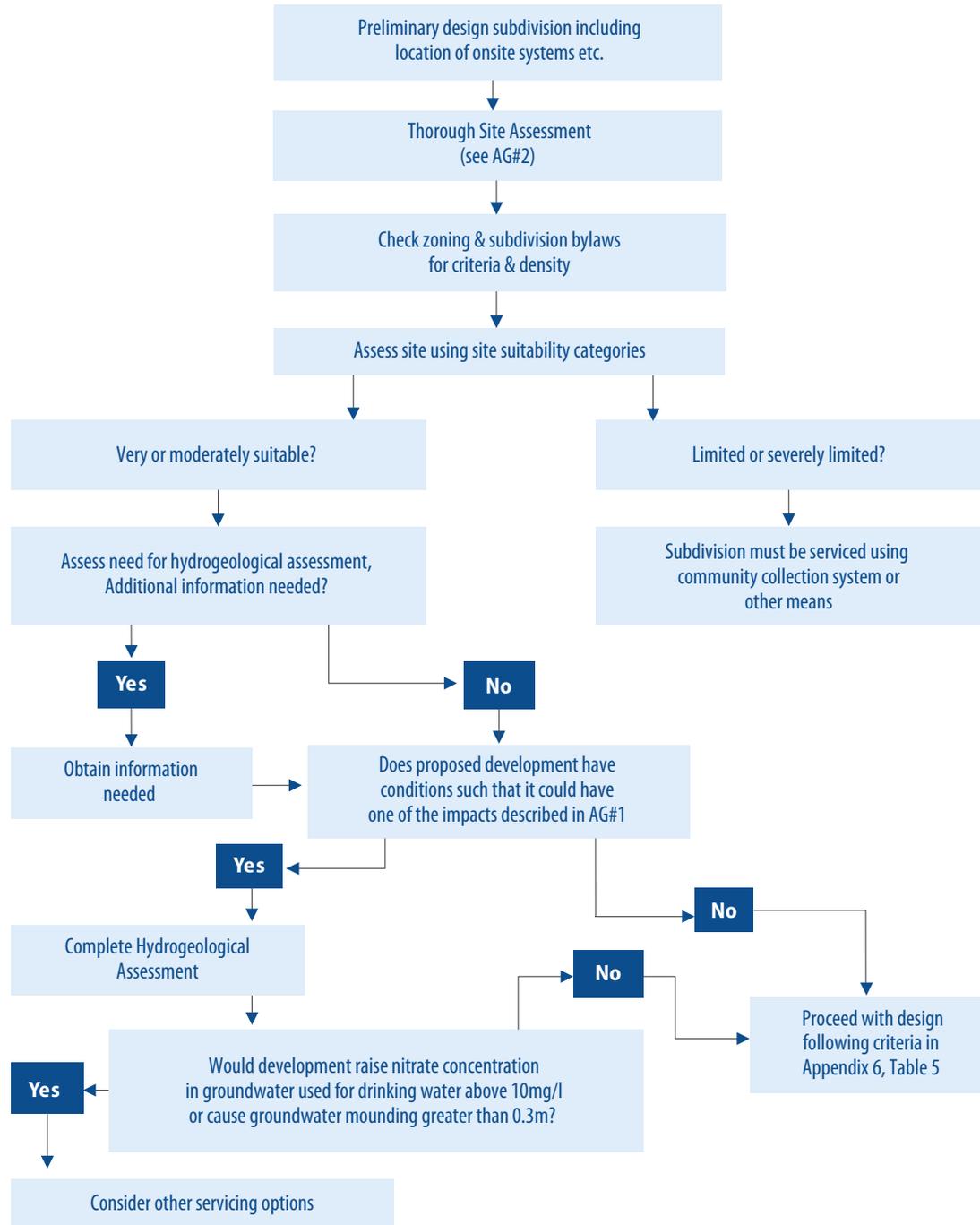
WET SEASON ASSESSMENT: Some subdivision proposals may be held in abeyance pending wet season assessment (some areas may require assessments in different months based on varying annual rainfall). This will enable a thorough evaluation of drainage, water table and porosity of soils. The coastal wet season is generally from November 1st to March 31st.

List of Abbreviations and Acronyms:

ALR	.....	Agricultural Land Reserve
BP	.....	Best Practice
BPG	.....	Best Practice Guideline
CRD	.....	Capital Regional District
CSRD	.....	Columbia Shuswap Regional District
DPA	.....	Development Permit Area
DWPA	.....	Drinking Water Protection Act
ETA	.....	Evapotranspiration/absorption bed
FVRD	.....	Fraser Valley Regional District
GWUDI	.....	Groundwater Under Direct Influence of surface water
HA	.....	Health Authority
HLR	.....	Hydraulic Loading Rates
ID	.....	Improvement District
LSA-SR	.....	Local Services Act Subdivision Regulations
LWMP	.....	Liquid Waste Management Plan
LGA	.....	Local Government Act
LLR	.....	Linear Hydraulic Loading Rates
MAL	.....	British Columbia Ministry of Agriculture and Land
MFLNRO	.....	British Columbia Ministry of Forests, Lands and Natural Resource Operations.
MOE	.....	British Columbia Ministry of Environment
MOTI	.....	British Columbia Ministry of Transportation and Infrastructure
MWR	.....	Municipal Wastewater Regulation
MGA	.....	Municipal Government Act
OSS	.....	Onsite Sewerage System
OCP	.....	Official Community Plans
PSWR	.....	Private Sewage Works Regulation
PAO	.....	Provincial Health Authority
PLNA	.....	Preliminary Layout Non-Approval or Rejection
PLA	.....	Preliminary Approval
ROWP	.....	Registered Onsite Wastewater Practitioner
RDN	.....	Regional District of Nanaimo
RG	.....	Reference Guideline
SSR	.....	Sewerage System Regulation
SPM	.....	Standard Practice Manual
USEPA	.....	US Environmental Protection Agency

APPENDIX 2: Suitability Assessment Flowchart

Figure 1: Suitability Assessment Flowchart



APPENDIX 3: Comparison of Criteria from Subdivision Regulations of the Regional Health Authorities

Table 1: Comparison of Criteria from Subdivision Regulations of the Regional Health Authorities

MUNICIPALITIES	MINIMUM PARCEL SIZES (Individual Water Systems)	MINIMUM COVENANT AREA	HYDROGEOLOGICAL ASSESSMENT TRIGGERS	TREATMENT LEVEL FOR SIZING DISCHARGE AREA	SEPTIC SYSTEM	MINIMUM # OF BEDROOMS FOR DETERMINING SEWAGE FLOW	MINIMUM DEPTH OF PERMEABLE SOIL (m) (Individual Water Systems)
Vancouver Coastal	0.46 m	1 ha. (0.9m soil and slope <5% or 1.2m soil and slope <30%)	535 m ² (sands and gravels)	<ul style="list-style-type: none"> ▶ Density (parcels<1ha.) ▶ Potential for gw or sw contamination ▶ Historical or existing circumstances ▶ Community sewerage systems 	Type 1	1-30	n/a
Interior Health	1.2 m (parcels <2 ha.)	1 ha.	256 m ² (gravelly sand and slope <5%)	<ul style="list-style-type: none"> ▶ If considered necessary by Environmental Health Officer 	Type 1	1-60 (unless soil >2.5m or parcel >2 ha.)	4
Vancouver Island Health Authority	0.46 m (slope <15% and parcels ≥2 ha.)	1 ha. (0.9 m soil and slope <15% or 1.2m soil and slope <30%)	535 m ² (sands and gravels)	<ul style="list-style-type: none"> ▶ Density (parcels<1 ha.) ▶ Potential for gw or sw contamination ▶ Historical or existing circumstances ▶ Community sewerage systems 	n/a	<30	n/a
Fraser Health	0.6 m (slope <15%)	0.8 ha.	n/a	<ul style="list-style-type: none"> ▶ Areas of special health concern 	Type 1	<30	4
Northern Health	1.2 m (parcels <2 ha.)	1 ha.	256 m ² (gravelly sand and slope <5%)	<ul style="list-style-type: none"> ▶ Percolation rate <1 min./2.5 cm 	Type 1	2-30 min. /2.5 cm	4

APPENDIX 4: Site Suitability/Soil Permeability, Sewerage System Standard Practice Manual Version 3

Table 2: Site Suitability/Soil Permeability, Sewerage System Standard Practice Manual Version 3

SOIL TYPE	CONSTRAINING FACTOR	SOLUTION	ALTERNATIVE SOLUTION	NOTES
Gravel and very gravelly sand (Kfs > 5,000 mm/d, Perc. < 1)	Very high permeability	Pressure distribution Timed dosing Type 2 10/10 or Type 3. <i>Professional design or design review by professional strongly recommended</i>	Sand mound or sand-lined trench with Timed dosing and a minimum of 24" (61 cm) mound sand	
Gravelly sand (Kfs 2,500-3,500 mm/d, Perc. < 2 min/inch)	High permeability	Pressure distribution Timed dosing	Sand mound or sand-lined trench with Timed dosing	Except where native soil vertical separation is greater than 72" (1.83 m)
Coarse to medium sand/loamy sand (Kfs 1,500-3,500 mm/d, Perc. 2-5 min/inch)	High permeability	Pressure distribution		Except where native soil vertical separation is greater than 72" (1.83 m)
Over 50% of soil is rock fragments larger than gravel, or over 60% coarse gravel (or in combination over 60% total coarse gravel and rock fragments)	Risk of effluent short circuiting due to large fractures, and severely reduced soil area for dispersal and treatment.	Pressure distribution Timed dosing Type 3	Only where vertical separation to water table is over 72" (1.83 m): 1. Sand mound or sand-lined trench with timed dosing (and reduced basal loading rate). 2. Subsurface Drip Distribution, with Type 2 10/10	Base HLR ¹⁵ and LLR ¹⁶ on the nongravel/rock portion of the soil and reduce loading rate by percentage of rock fragments/gravel. See footnote.
Loam, Silt Loam and Silt soils with platy structure of weak grade	Requires low hydraulic application rate AND unsuitable for infiltrative surface.	System or sand mound, with infiltrative surface a minimum of 18" (45 cm) above Platy layer AND Pressure distribution with low hydraulic application rate timed dosing.	For plough pan or thin layers with acceptable soils below: Remediation (where possible) OR sandlined trenches penetrating below the layer (where suitable).	If platy structure is noted on a site, site investigation should include a minimum of 4 observation test pits in the dispersal area and two in the receiving area. Site investigation should establish that remediation has succeeded where this is used.
Sandy clay, silty clay or clay soils (with moderate or strong BK, GR or P structure) (Kfs 20-60 mm/d, Perc > 60 min/inch)	Low permeability	Pressure distribution Type 2 10/10 or 3, timed dosing	Sand mound, OR Lagoon, where appropriate, OR ETA ¹⁷ bed, where appropriate	In the majority of cases these soils will have a clay content of over 40%, see requirements below

.....
15 Hydraulic Loading Rates (see Appendix 1 – Definitions)

16 Linear Loading Rate (see Appendix 1 – Definitions)

17 Evapotranspiration/absorption bed (see Appendix 1 – Definitions)

Table 2: Site Suitability/Soil Permeability, Sewerage System Standard Practice Manual Version 3 (continued)

SOIL TYPE	CONSTRAINING FACTOR	SOLUTION	ALTERNATIVE SOLUTION	NOTES
Sandy clay, silty clay or clay soils (with weak BK, GR or P structure)	Low permeability, requires low HAR and unsuitable for infiltrative surface	System (Type 2 or 3) or Sand mound, with infiltrative surface a minimum of 18" (45 cm) above these soils AND pressure distribution with timed dosing	Lagoon, where appropriate, OR ETA bed, where appropriate	
Soil contains greater than 40% clay OR Kfs less than 20 mm/day (120 min/inch Perc)	HLR table and LLR tables should be reduced	Pressure distribution Timed dosing Type 2 10/10 or Type 3 <i>Professional design or design review by Professional strongly recommended</i>	Sand mound with Timed dosing and a minimum of 24" mound sand. <i>Professional strongly recommended to establish basal HLR and LLR; OR Lagoon or ETA bed, where appropriate</i>	Also applies where soil contains significant amounts of expandable clay minerals (smectite, vermiculite) See Appendix 1
Organic soils, peat	Difficulty in establishing a suitable HLR	<i>Professional strongly recommended to establish HLR and LLR</i>		
Soils labelled as 'not recommended' in the HLR or LLR tables, or where the HLR or LLR tables show a zero	Low permeability	Pressure distribution Timed dosing Type 2 10/10 or Type 3 <i>Professional design or design review by Professional strongly recommended</i>	Sand mound with Timed dosing and a minimum of 24" mound sand. <i>Professional strongly recommended to establish basal HLR and LLR; OR Lagoon, where appropriate, OR ETA bed, where appropriate</i>	
Soils with a consistency stronger than moderately hard (dry), firm (moist), or of any cemented class	HLR table and LLRs should be reduced	Professional design or design review by <i>Professional strongly recommended to establish HLR and LLR</i>	Lagoon or ETA bed, where appropriate	See glossary
Depth of SHWT or low permeability layer less than 18" (45 cm) below surface	Low vertical separation	Pressure distribution Type 3, plus sand fill	Sand mound per SPM standards, where appropriate	See Section 2.3.3.2

A material could be defined as 'rock' when over 50% of the soil is made up of rock fragments that are larger than gravel. However, certain colluvial soils in the geological process of developing from parent rock material (inceptisols, upper saprolites) could be suitable for effluent treatment and dispersal. The system design should address suitable loading rates and dosing regimens to prevent saturated flow occurring in the inceptisol.

Coarse gravel is defined as the portion of the soil consisting of gravel particles larger than 20 mm and up to 75 mm. Rock fragments larger than gravel are those over 75 mm in size. With lesser amounts of rock fragments/coarse gravel, reduction of HLR should also be made in proportion to the percentage of this material. Where the percentage is less than 35% normal HLR could be used.

"Professional strongly recommended" in table recommends design or design review by a professional.

APPENDIX 5: Legislative Framework

Table 3: Legislative Framework

LEGISLATION, REGULATIONS AND BYLAWS	APPLICATION	REGULATORY AUTHORITY
<i>Local Services Act</i> Subdivision Regulation (LSA – SR)	Where no Regional District (RD) bylaws exist, the LSA – SR applies.	Provincial Approving Officer (PAO)
<i>Local Government Act</i> (LG Act)	<ul style="list-style-type: none"> ▶ Municipalities and regional districts have authority to create bylaws which pertain to onsite sewerage systems. ▶ Allows regional districts to expedite minor amendments to a Regional Growth Strategy (RGS) – a long range strategic plan that promotes environmentally healthy development. 	Municipalities and Regional districts
	<ul style="list-style-type: none"> ▶ Improvement Districts (ID) can enter into an agreement with local land use jurisdictions, so that a building permit can be refused if ID's servicing standard have not been met. 	Improvement Districts (ID)
<i>Land Title Act</i> and <i>Municipal Act</i>	<ul style="list-style-type: none"> ▶ Responds to basic Municipal Act reform principles establishing an opportunity for consultation and collaboration on inter local government issues. 	PAO
	<ul style="list-style-type: none"> ▶ Must not approve a subdivision if services do not meet the standards established in an ID bylaw. A PAO is appointed under the <i>Land Title Act</i>. 	Municipal, Regional District or PAO
Sewerage System Regulation (SSR)	Provides requirements for design and construction of onsite sewerage systems for individual parcels.	Province of B.C.
Community Charter	<ul style="list-style-type: none"> ▶ Gives municipalities a range of powers to self-regulate and offers spheres of concurrent authority (municipal services). ▶ Local councils have discretion to choose best options for their specific needs, subject to compliance with all provincial laws. 	Municipalities
	Areas where Province must be involved before municipality can adopt a bylaw include public health, protection of the natural environment and standards that are or could be dealt with by provincial building regulations.	Province of B.C.
Official Community Plans (OCP's)	Provides longer term vision for the community and can guide decisions on planning and land use management, within the area covered by the plan. Local governments are encouraged to consider how the OCP can be integrated with waste management plans.	Municipalities and Regional Districts
<i>Public Health Act</i>	Bylaws relating to the protection or preservation of human health or the maintenance of sanitary conditions within the municipality must be deposited with the Minister responsible.	Minister responsible
Subdivision Servicing Standards	<i>Local Government Act</i> was revised to more clearly set out powers of an ID to establish servicing standards and require that they be followed by an owner who subdivides/ develops their land. ID's have the ability to enter into an agreement with the local land use jurisdiction, so that a building permit can be refused if the ID's servicing standards have not been met. Standards can be varied for different areas, uses of land, zones, or circumstances.	Approving Officer (appointed under the <i>Land Title Act</i>)
Zoning Bylaws	Sets out subdivision requirements such as minimum lot dimensions, lot area and width and development servicing requirements, such as sidewalk, street lighting, and sewer and water connections.	Municipalities and Regional Districts

APPENDIX 6: *Determining Applicable Sewage Legislation Based on Jurisdiction Flow Divide (22.7 m³/d)*

REGULATORY FRAMEWORK

Regarding daily sewage system flow volumes, the applicable sources of governance include:

Sewerage System Regulation (SSR) section 2:

- 2 This regulation applies to the construction and maintenance of:
 - a) A holding tank
 - b) A sewerage system that serves a single family residence or a duplex,
 - c) A sewerage system or combination of sewerage systems with a combined design daily domestic sewage flow of less than 22.7 m³ that serves structures on a single parcel, and
 - d) A combination of sewerage system with a combined design daily domestic sewage flow of less than 22.7 m³ that serves structures on one or more parcels/strata lots or on a shared interest.

Municipal Wastewater Regulation (MWR) section 4:

- 4 (1) In this section, 'parcel', 'sewerage system' and 'strata lot' have the same meanings as in the Sewerage System Regulation, BC Reg. 326/2004.
- 4 (2) Subject to subsection (3), this regulation applies to all discharges
 - (a) To ground, if the discharge
 - i. Is equal to or exceeds daily design flow of 22.7 m³ /day, and
 - ii. Is from a sewerage system or combination of sewerage systems that serve structures on one or more parcels or strata lots, or on a shared interest, and
 - (b) To water
- 2 (3) This regulation does not apply to a discharge to ground or water if the discharge is from a sewerage system that serves only a single family residence or duplex.

COMBINED SYSTEMS

For clarification, please refer to the Onsite Sewerage Jurisdictional Flow Divide Interpretation Guideline located on the Minsitry of Health website at <https://www2.gov.bc.ca/gov/content/environment/waste-management/sewage/onsite-sewage-systems/sewerage-system-standard-practice-manual>.

- ▶ Combined systems are systems in which 2 or more residences (including single family residences) share a common disposal field.
- ▶ For combined Systems with a flow rate > 22.7 m³; the MWR applies; <22.7 m³, the SSR applies.
- ▶ For multiple single family residences (each with its own system) on a single parcel with a total flow of >22.7 m³ the SSR still applies.

EXAMPLE SCENARIOS

This section provides guidance on which regulation applies (the SSR or the MWR) for various scenarios.

- ▶ **SCENARIO 1:** A Strata comprised of 50 three bedroom single family residences each with their own septic tank and field (systems are not connected in any way) with a total design flow of 68 m³/day.

Answer: The MWR does not apply because it involves a discharge(s) from system(s) serving single family residences within the meaning of MWR section 4(3).

If all the flows were combined, the design flow would be 68 m³/d. Since the systems are not combined the total flow is not relevant.

- ▶ **SCENARIO 2:** A parcel consists of 25 separate sewage systems (for 25 single family residences) and a combined system for 25 units [all single family residences] The total design flow for the parcel is >22.7 m³/d.

Answer: The 25 separate sewage systems would fall under the SSR, and the 25 unit combined system would fall under the MWR.

- ▶ **SCENARIO 3:** A site with 48 (single family) homes, each with their own sewage system, and two (single family) homes connected to a combined system has a total design flow <22.7 m³/d.

Answer: Both scenarios would be captured under the SSR because the design flow does not reach the 22.7 m³/d threshold under MWR section 4(2).

- ▶ **SCENARIO 4:** A site with 49 (single family) homes [each with their own treatment system] and one community building (e.g. not a single family residence. Has its own treatment system).

Answer: The community building would be fall under the MWR if the daily flow for the site exceeds the 22.7 m³/d benchmark.

- ▶ **SCENARIO 5:** Multiple systems in a strata all on one parcel.

Answer: No one system exceeds the 22.7 m³/d benchmark but combined they do.

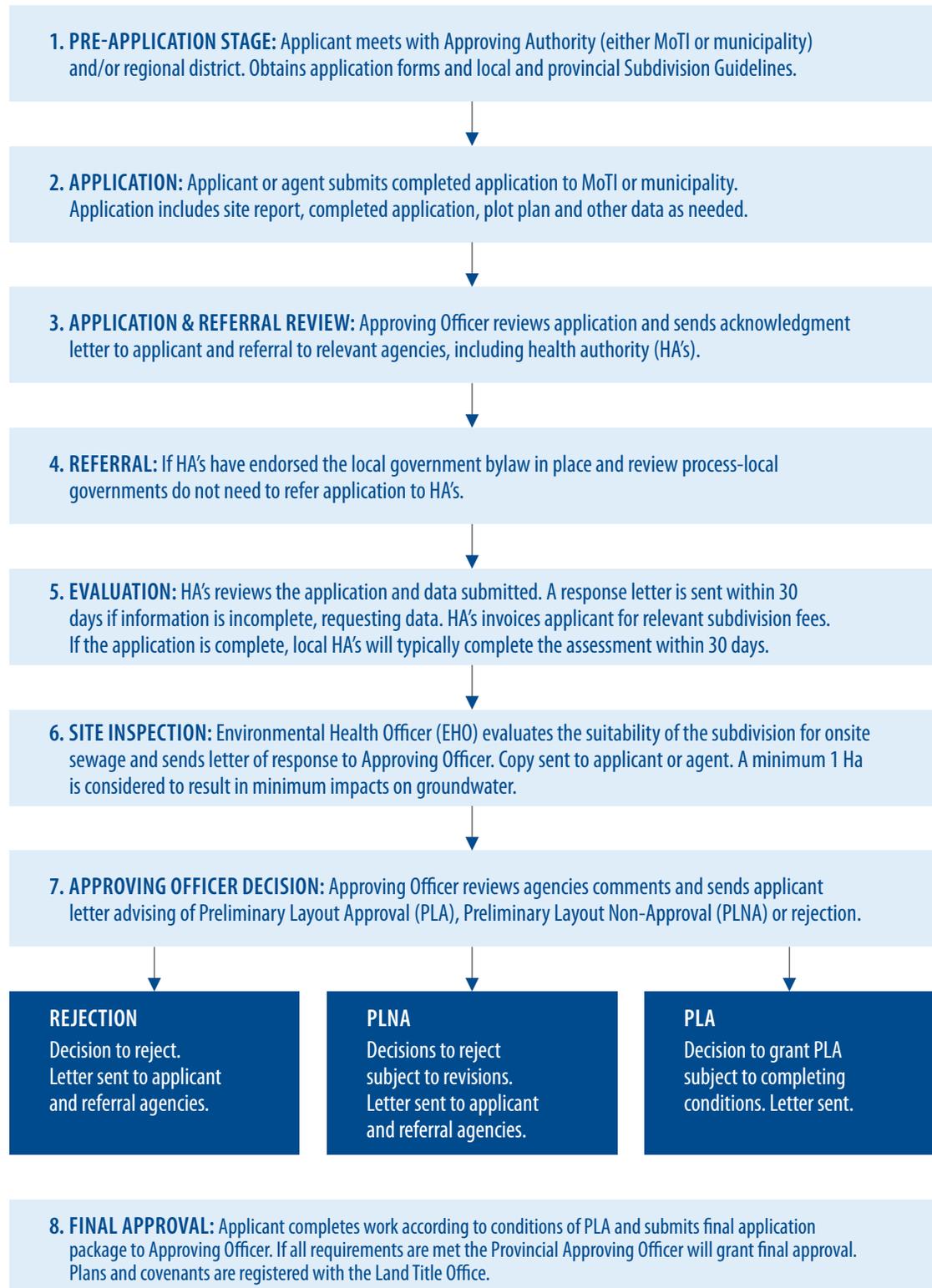
APPENDIX 7:

Checklist for Subdivision Application Submissions

Table 2: Site Suitability/Soil Permeability, Sewerage System Standard Practice Manual Version 3

SITE ASSESSMENT CHECKLIST (FOR SITE ASSESSMENT REPORT) for all applications under SSR (for applications under MWR, please contact MoE)					
PROJECT:					DATE:
ITEM	YES	NO	N/A	DATE	COMMENTS
Does the report include a site map indicating proposed location of onsite sewerage system (OSS) and does this map indicate location and size of reserve area (if any) and the location of the test pit/bore/core holes?					
Does report assess topography of the sites and identify any surface drainage characteristics that may limit onsite sewerage system selection, design or location?					
Does the report offer an opinion on the adequate parcel sizes for the proposed development using OSS and whether the site will support the OSS over the long-term?					
Does the report consider the proposed land use (type of development), anticipated or typical sewage volume as well as number of parcels and density of development within the area of assessment?					
Does the report determine site capability (soil permeability) for the lot for OSS installation (see Appendix 4) to each proposed parcel and comment on why a site capability/constraining factor has been assigned?					
Does the report provide an opinion on the level of groundwater mounding from the added wastewater loading (cumulative impact of entire subdivision)?					
Does report include information on all soil characteristics (see RG #3).					
Does the report comment on the effect of the cumulative nutrient load the subdivision proposal will place on unconfined aquifers or surface water bodies in the area?					
Was each lot investigated to determine the soil profile characteristics using appropriate methods of excavated test pits supplemented by solid soil cores if used and does the report consider available existing soils report information? Are soil samples taken from an area where an OSS is proposed to be located?					
Does the report document the location of any springs and the presence of any wells that utilize shallow groundwater (GWUDI) and/or dugouts used for domestic water purposes within 500 ft. (150 m.) of the proposed subdivision?					
Does the report comment on the presence/absence of signs of a high water table (mottling, gleying, saturated soils, and water in the hole, and presence of characteristic wetland vegetation) and the depth at which these signs were noticed?					
Does the site map indicate the location and size of the reserve area (if any) and the location of the test pit/bore/core holes?					
Does the report document the distance to wells, surface water, buildings, property lines and rights of way on the proposed parcel?					
Does the report indicate any limitations on treatment system types and offer an opinion on the merits of specific treatment types?					
Does the report include a recommendation for suitable systems, including their size, ideal locations, projected costs, and clearance requirements, any installation recommendations, and level of reliance on maintenance?					
If applicable, does the report consider possible connection to a public or communal wastewater treatment system at a later date?					

APPENDIX 8: *Subdivision Application Process*



APPENDIX 9: *Level of Treatment Per Jurisdiction*

Table 4: *Level of Treatment Per Jurisdiction*

ALBERTA
<ul style="list-style-type: none">▶ Allows various types of onsite sewerage systems to be used in subdivisions, based on the suitability of the site. As part of the approval process, the local authority comments on the suitability of the system type for the parcel.
SASKATCHEWAN
<ul style="list-style-type: none">▶ Allow various types of onsite systems for subdivisions (e.g. Type 1, Type 2 and Type 3), with an emphasis on the need for management and maintenance of onsite systems. Ontario has mandatory maintenance programs in areas of environmental sensitivity.
TOWNSHIP OF LANGLEY
<ul style="list-style-type: none">▶ Has implemented a bylaw that requires nitrogen removal systems for new development located over sensitive aquifers. The Township also plans to implement a maintenance bylaw for new development which will require that these systems be maintained according to the maintenance plan.
NEW ZEALAND
<ul style="list-style-type: none">▶ New Zealand and some jurisdictions in the United States have developed an alternative way to deal with Type 2 and 3 systems through the use of service contracts. In New Zealand and King County, Washington state, property owners are required to have a service contract with an onsite system maintenance provider. This ensures that inspections and maintenance are completed on a regular basis.▶ As stated in further detail in Section 2.0, current Best Practice in B.C. is the requirement for subdivisions to be based on the disposal area requirements for Type 1 systems, unless specific measures are implemented at an LG level to ensure the adequate operation and maintenance of Type 2 and 3 systems.

APPENDIX 10:

Examples of Restrictive Covenant Application

Table 5: *Examples of Restrictive Covenant Application*

ORGANIZATION/ REGIONAL DISTRICT	AREA	ROLE	APPLICATION
Ministry of Environment (MoE)	Sensitive areas and water quality protection (protection of property from flood or other natural hazards).	Signatory as the covenantee to a myriad of agreements on properties throughout the Lower Mainland Region.	These covenants are usually administered by the Water Stewardship Division. Many restrictive covenants contain a restriction that requires an additional setback ¹⁸ of buildings from the conservation area (no-touch leave strip or covenant area).
Ministry of Agriculture and Lands (MAL)	Edge Planning Areas ¹⁹	Managing urban growth in a manner that protects farm operations and growth in agricultural sector.	Agricultural Land Reserve (ALR) boundary provides a geographic point where local government policy makers can apply an edge planning strategy for each community that includes edge farm notification restrictive covenants on new land titles.
Ministry of Forests, Lands and Natural Resource Operations (MFLNRO)	Protection of Archaeological sites	Covenant registration process is led by the Ministry of Transportation and Infrastructure (MoTI), but the covenants are with the MFLNRO.	Restrictive covenants used in the property subdivision approval process as the mechanism to safeguard recorded archaeological sites protected under the <i>Heritage Conservation Act</i> .
Peace River Regional District (PRRD)	Removal of existing building for new buildings	Regional Board confirms requirement for restrictive covenant to issue permit for building replacement.	Facilitates consideration of building permit application for new building prior to removal of existing accessory building.
Fraser Valley Regional District (FVRD)	Construction without a permit (engineering and environmental services)	Conservation of land.	Fraser Valley Conservancy (Purchaser) enters into a restrictive covenant in favor of FVRV specifying the land must be retained in perpetuity, used only for conservation purposes.

.....
18 This setback is intended to ensure that property owners are left with enough useable space so they are not tempted to use the protected habitat as their active yard/garden area.

19 Urban and agricultural land situated near the ALR boundary that requires special management in the spirit of shared responsibility.

APPENDIX 11: *Examples of Regional Districts using Development Permit Area's (DPA's)*

Table 6: *Examples of Regional Districts using Development Permit Area's (DPA's)*

REGIONAL DISTRICT	DPA'S
Fraser Valley Regional District (FVRD)	Considering using a DPA to require that sewage effluent be treated to a Class "A" ²⁰ standard (see Appendix 1 for other Classes) in an environmentally sensitive area. ²¹
Regional District of Nanaimo (RDN)	DPA regarding fish habitat protection for a village center development.
Columbia Shuswap Regional District (CSRD)	Hazard Land DPA regarding areas slated for subdivision for lands subject to hazardous conditions (e.g. lands susceptible to flooding and erosion).
Peace River Regional District (PRRD)	DPA's related to steep slopes, hazardous conditions and stream protection.
Regional District of East Kootenay (RDEK)	DPA's for Commercial, Light Industrial, and Multi-Family Development, Protection of the Natural Environment and Shoreline Protection.
Cariboo Regional District (CRD)	DPA's for Interface Fire Hazards.

.....
20 A classification that can be used by FVRD or MoE. Generally, MoE will stipulate the required classification in there Permit. Class "A" is high quality municipal effluent resulting from advanced treatment with the addition of disinfection and nitrogen reduction.

21 Places that have special environmental attributes worth of retention or special care. These areas are critical to the maintenance of productive and diverse plant and wildlife populations.





Ministry of
Municipal Affairs
and Housing