

INTERIM GUIDELINES FOR PREPARING LIQUID WASTE MANAGEMENT PLANS



Ministry of
Environment

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1.0 Introduction

The *Environmental Management Act* (EMA) allows local governments to develop a Liquid Waste Management Plan (LWMP) for approval by the Minister of Environment. The approved LWMP authorizes a local government, in accordance with operational certificates, to proceed with measures in the plan to accommodate existing or future development with a strategy to ensure the management, resource recovery and disposal of treated waste is sufficiently protective of public health and the environment. Public and stakeholder consultation must be included to ensure that multiple interests have been considered and that the LWMP is supported by the community. A projected implementation schedule is generally included; the schedule may be affected by technical issues, the pace of development, and the availability of financing. A LWMP is an economical and effective method of providing a comprehensive plan for managing a community's liquid waste. It is anticipated that local governments will develop plans voluntarily, although the EMA allows the minister to direct local governments to prepare or revise a waste management plan. The following guidelines are designed to help local governments determine what should be addressed in a LWMP.

2.0 Provincial Objectives for LWMPs

The two primary objectives for LWMPs are to protect public health and the environment and to properly consult the public. Opportunities for elector participation through public review and consultation are an essential part of developing a LWMP and must occur before a plan may be considered for approval.

Additional provincial objectives for LWMPs are water conservation, drinking water source protection, resources from waste, energy conservation, climate change adaptation, and mitigation and sustainable financing and asset management. Local governments are encouraged to use their LWMPs to illustrate innovation and leadership in these areas.

2.1 Public Health and Environmental Protection

The Municipal Sewage Regulation (MSR) sets out the requirements that should be met by wastewater discharges for the protection of public health and the environment. Where the MSR standards are currently not met, a LWMP will establish a schedule for upgrading substandard facilities. Schedules will vary for each municipality to reflect the diversity of social, environmental and economic conditions within the province.

In addition, the province has endorsed the Canadian Council of Ministers for the Environment (CCME) Canada-wide Strategy for the Management of Municipal Wastewater Effluent. The Strategy is designed to provide a harmonized framework to manage municipal wastewater discharges to surface waters with federal discharge criteria. LWMPs should be consistent with the CCME strategy (for more information visit <http://www.env.gov.bc.ca/epd/mun-waste/waste-liquid/>).

The MSR and the Organic Matter Recycling Regulation (OMRR) under the EMA allow for the beneficial use as well as disposal of appropriately treated effluent and biosolids. The MSR and OMRR provide appropriate standards to reference when drafting operational certificates for the LWMP.

2.2 Public Consultation

The EMA contains the requirements for local governments to carry out a process for comprehensive public review and consultation for all aspects of the development, amendment and final content of a waste management plan. The EMA also states that the minister must be satisfied that there has been adequate public review and consultation during the development of the LWMP before approving the plan. These requirements are important because there is no mechanism to appeal a plan once approved by the minister.

The Local Government Act and the Community Charter require approval of electors for the borrowing of funds necessary to finance any capital works, including wastewater infrastructure. The provisions of the EMA allow local governments to borrow money without the approval of electors for implementation of an approved LWMP; therefore, the public consultation process must provide opportunities for elector participation during the development and amendment of a plan.

Local governments serve as the lead on consultation with their constituents, special interest groups, and First Nations groups. Public participation processes depends on the unique blend of population characteristics and information channels in the local community. Public participation should foster acceptance and a feeling of ownership among the residents of the local community. While the guidelines found in this document serve as a baseline, local governments should not feel limited by them as further action may be required to meet the needs of community members.

3.0 Preliminary Planning Considerations

A LWMP provides opportunity for a community to develop a long-term plan for building, financing, and managing their liquid waste infrastructure. In addition, it allows local governments to obtain ministry authorization for reuse and disposal of treated liquid waste to the environment. The LWMP forms the implementation plan for the management of liquid waste from collection, through treatment and resource recovery, to residual disposal.

Prior to proceeding with the LWMP process, a local government should satisfy itself that a LWMP will substantially benefit the community and the environment. Typically, the LWMP process will be an effective vehicle in areas where there is considerable growth and development or where there are known problems associated with existing infrastructure. Further, a LWMP allows community-specific solutions to be developed and sets a schedule to finance and upgrade infrastructure to ultimately meet the MSR requirements.

Local governments need to consider the financial capacity of their communities when developing LWMPs. Both construction and operation costs of the infrastructure must be included, and the community should prepare long range financial plans to ensure resources will be available when they are needed.

3.1 Community Objectives and Land Use Plans

The goals and objectives of local governments should form the basis for the development of a LWMP. In addition to liquid waste, consideration should also be given to issues associated with growth and development, stormwater management, drinking water supply (capacity and contamination risks), and non-point source pollution. A LWMP can also identify and assess opportunities for water conservation, resource recovery (e.g. heat recovery), energy efficiency and generation, greenhouse gas emissions reduction, climate change adaptation and mitigation.

Regional growth strategies and official community plans state objectives and policies regarding future land use patterns in incorporated municipalities or in designated areas of regional districts. These land use plans provide a statement to the public and the province about a local government's growth management objectives, and provide the rationale for subsequent land-use regulations. Such plans should inform development of a LWMP.

Local government land use planning is essentially a process of anticipating change in land use, and determining how to manage or influence those changes for the benefit of the community or region. Local governments typically include the following elements in official land use plans:

- Identify rural/urban development areas;
- Assess settlement suitability;
- Identify the expected sequence of urban/rural land development, including the proposed timing, location and phasing of water and sewer service; and
- Choose between generic servicing alternatives (e.g., centralized, decentralized, on-site, communal and non-communal,).

Issues raised for discussion in the LWMP may illustrate the need to review and revise official land use plans.

Land use planning and zoning will help protect potential waste management treatment sites, create opportunities for use of reclaimed water and other resources, and maintain natural watershed hydrology. Detailed attention to these planning aspects can help avoid large expenditures in future treatment, storage and other related waste management facilities.

3.2 Provisions for Infrastructure

Careful planning and integration of water, sewage and stormwater infrastructure can minimize environmental impacts, reduce life cycle costs and provide flexibility for future expansion or upgrade of facilities. Asset management is essential for the long-term investment in infrastructure represented in a LWMP where components are often designed for 50 to 100 years of service. Sewage collection system and trunk sewers can be a major cost of sewage works and

their location and design should be selected with care to avoid excessive life-cycle costs. Appropriate land-use zoning of adjacent areas, or provision of adequately sized treatment plant sites can allow for future expansion with minimal impact on existing neighbourhoods. The use of satellite treatment plants and on-site systems within an integrated management program can in some cases provide for desirable land use options, reduced life-cycle costs, resource recovery, and provide flexibility for the scheduling and construction of works.

The way in which land is developed impacts watershed hydrology and the resulting requirements for stormwater infrastructure. The creation of impervious surface area associated with development (roofs, roads, etc.) can reduce the infiltration of precipitation into the ground and increases the amount of surface water runoff, which in turn requires drainage works to control flooding, erosion and other impacts. Consideration of watershed hydrology at the outset of the land use planning process can preserve key elements of the natural drainage network (e.g., groundwater recharge, natural detention areas) and can minimize both adverse environmental impacts and the need for drainage infrastructure.

Infrastructure such as storm and sanitary sewers, on-site sewage disposal systems, storm runoff detention and infiltration systems, water supply pipelines, reclaimed water transmission pipelines, pump stations, treatment plants, industrial pre-treatment facilities, sludge treatment works, and outfalls must be viewed as interrelated systems. A change in the design or location of one of these systems can affect the others. To avoid costly future changes, facilities should be located where long term land use conflicts will be minimized, and where there is ample room to upgrade and expand.

As the siting of major infrastructure considers land use concerns, local governments are encouraged to incorporate major sewer, water and stormwater infrastructure considerations in the official land use planning process. Further direction can be obtained from the technical guide for the preparation of official land use plans, the MSR with its guidance documents, the OMRR, and the stormwater guidance documents listed in Appendix 3.

3.3 Data Requirements

Adequate data must be available to properly develop and evaluate plan options. Most important are up-to-date regional growth strategies and official community plans. These documents are important because they normally form the foundation for the preparation of a LWMP.

Desirable data include population projections, daily monitoring records for sewage quantity and quality, water consumption data, stream flow and precipitation records, water quality data for surface and groundwater bodies, inventories of plant and animal species and their habitat, information regarding soils, local drainage, aquifers, and groundwater flow regimes.

In some cases, the advisory committee(s) (see Section 4.2) may decide that there is insufficient information available for an informed and responsible evaluation of alternatives to be

conducted. The advisory committee(s) may choose to delay the LWMP pending completion of the appropriate studies, and the studies may be incorporated as a component of the LWMP.

3.4 Authority

Prior to embarking on a LWMP, local governments should determine that they have the authority to undertake all of the functions they wish to control through a LWMP, such as stormwater management, regulation of agricultural runoff, and management of on-site sewage disposal systems (less than 22.7 m³/d). The use of bylaws should also be examined. Some local governments may not have authority for stormwater management (in such cases it may rest with the Ministry of Transportation and Infrastructure). Most municipalities do not have jurisdiction over agricultural runoff. Onsite sewage systems that generate less than 22.7 m³/d of sewage effluent and discharge effluent to ground are normally under the jurisdiction of the Ministry of Health. Initiatives that involve on-site systems should be undertaken in cooperation with local health officers. Under the *Health Act*, local governments can acquire authority for on-site system management.

4.0 Liquid Waste Management Planning Process

Local governments should recognize that the planning process will typically involve a minimum two to three year period for plan development. The cost to retain a consultant to help prepare a comprehensive LWMP that includes all of the components described in these guidelines is dependent upon the complexity of the plan. Costs for staff time, public consultation, and site specific studies (environmental, pre-design studies, geotechnical, etc.) are additional and will vary according to the circumstances.

The scope of work for the LWMP will be specific to each local government in reflecting the community goals and objectives and should be discussed at the outset of the process with the director (Ministry of Environment Regional Manager). Support of the scope of work should be received from the director and the advisory committee(s) (see Section 4.2) prior to starting work on each of the three stages of plan development. As work proceeds, the scope of work may be refined based on the findings of completed studies and the public consultation process. Documenting changes to the scope of work is critical to properly inform ministry staff and stakeholders of the process as it develops.

4.1 Initiation of Process

Normally a LWMP is formally initiated with a resolution being passed by a local government. This may be self directed on a voluntary basis or may be a requirement based on a request from the minister (see section 24(2) of the EMA). In the case of amendments to an existing plan research, evaluation and a public consultation process will occur (see Section 6.3) and the scope of work should be discussed and agreed upon with the director.

A copy of the local government resolution and their staff report providing justification for the process must be sent to the director, with copies and a covering letter going to the following agencies and groups:

- All municipalities, regional districts and First Nations within and adjacent to the LWMP area or who may be affected by the LWMP (e.g., downstream users);
- Environment Canada;
- Fisheries and Oceans Canada;
- Ministry of Agriculture;
- Ministry of Community, Sport and Cultural Development;
- Ministry of Health;
- Ministry of Transportation and Infrastructure; and
- Others as appropriate (e.g. as suggested by the director).

4.2 Liquid Waste Committees

Local governments should establish four committees comprising representatives of various interest groups, geographic areas, stakeholders, and senior government agencies. A guiding steering committee will be advised by two advisory committees, with a final plan monitoring committee which will serve after the plan has received approval from the Minister. One advisory committee should represent community/stakeholder interests (public advisory committee), and the other should emphasize technical aspects (technical advisory committee). Each advisory committee should report to the steering committee. The members of each committee should elect or agree upon a chairperson who will administer the committee. The committee structure should include mechanisms for referring matters to, receiving reports from, and forming linkages between other committees to maximize cooperation. In certain circumstances local governments may find it beneficial to establish a single advisory committee to fulfill the role of both the public and the technical advisory committee to improve communication and reduce the number of meetings required.

Local governments, in consultation with the director, should provide the steering and advisory committee(s) with reference scope of work and a mandate to advise local governments on matters pertaining to liquid waste management at all stages of the planning process. Each committee's role should include input into the development of environmental guiding principles and the scope of work for studies needed to support the LWMP, design and implementation of the public review and consultation process, and review of interim and final reports. The advisory committee(s), in consultation with local governments and the director, should set the scope of work for a plan monitoring committee which will be developed after the plan is approved and will aid in plan implementation, monitoring, and provide on-going advice to local government council and staff (see Section 6.2). It is desirable for a plan monitoring committee to have continuity of membership from the advisory committee(s). Local governments should establish a reporting structure for each committee that ensures that committee reports and recommendations are given open consideration by the local government.

4.2.1 Steering Committee

A steering committee should be established to guide the advisory committees and to make recommendations to the local government council or board of directors. The steering committee will normally include senior political and technical representatives of the local government. The ministry and the consulting team may also be represented on the steering committee.

4.2.2 Public Advisory Committee

A public advisory committee should be established as early in the planning process as possible. In order to ensure that the public advisory committee primarily reflects community interests, local governments should seek and invite representation from each of the following sectors or groups, which exist in the community:

- (a) One elected representative from each municipality;
- (b) First Nations within or adjacent to the plan area;
- (c) Local environmental groups;
- (d) Residents of electoral area and municipalities in the regional district;
- (e) Local business groups and rate-payer associations;
- (f) Operators or owners of private liquid waste facilities;
- (g) Generators of large liquid waste discharges;
- (h) Local school districts;
- (i) The technical advisory committee;
- (j) The consulting team; and
- (k) The Ministry of Environment.

4.2.3 Technical Advisory Committee

A technical advisory committee should be established concurrently with the public advisory committee. In order to ensure that the technical advisory committee primarily reflects government interests, the municipality should seek and invite representation from the following agencies and organizations:

- (a) The Ministry of Environment
- (b) Engineering and/or planning departments of the regional district and member municipalities;
- (c) First Nations;
- (d) Health Authorities;
- (e) Provincial and federal ministries or agencies who have indicated interest or whose mandate will be affected by or will affect the planning process; and
- (f) The public advisory committee, including at least one non-governmental and one governmental representative from that committee.

4.3 Consultation Process

The LWMP should include a program for public review and consultation as soon as practical after initiating the LWMP process. Input from the public advisory committee should be incorporated into the design of the public consultation process which will result in a consultation report. For guidance on First Nations consultation see Appendix 4.

The program should incorporate the following principles:

- (a) Public involvement should begin as early in the planning process as possible;
- (b) Information should be openly exchanged among the public, the local government, and the advisory committee(s);
- (c) Public responses should be given open consideration by the local government and, where appropriate, addressed in the planning process; and
- (d) The proceedings and results of activities, which are part of the public consultation process, should be documented and available for public scrutiny.

Examples of public consultation include mail-out brochures and newsletters, advertizing in the news media (print, radio, and TV), public opinion surveys, internet based communication, and public open houses.

The extent to which the various development options impact social issues should be addressed in the consultation process. The social impact on both existing and future development must be considered, including odour nuisance, noise, traffic, air quality and visual impact.

The level of accuracy of the cost estimates that form part of the public consultation process must be clearly explained in each stage of the plan development process. Apportionment of costs to existing users and to future development should be equitable. Local governments may wish to apply polluter and user pay principles when rate structures are formulated. In principle, those connected to the sewage system that contribute high volume and/or high contaminant loads may pay higher rates than those that contribute low volume and/or low contaminant loads.

The impact of costs on the taxpayer must be estimated for in the Stage 2 evaluation process and must form part of the Stage 3 LWMP. The possibility of senior government grants and the use of development cost charges to reduce capital costs should be presented for comparison with the no grant scenario. As a minimum, for a typical residential taxpayer, the added capital debt repayment and user fees associated with the Stage 2 options and the selected Stage 3 option should be presented. Under the Community Charter and Local Government Act, electoral approval must be sought for any borrowing associated with capital works. Because the EMA waives these requirements for elector approval for any borrowing necessary to implement the LWMP, it is important that the public has an opportunity to provide input with respect to proposed financing.

Adequate public consultation during the plan's development is essential as there is no mechanism to appeal a plan once approved by the minister (see section 24(7) of the EMA). This

assumes that a reasonable amount of consultation has occurred in the development of the LWMP and that liabilities or expenditures incurred by the public are detailed in the plan.

4.4 Three-Stage Process

The LWMP is developed in three stages (see Diagram 1 for a summary of the process). At the beginning of each stage a scope of work should be completed and submitted to ministry staff. The stage specific scope of work will guide the completion of a report for that stage. At the conclusion of each stage, local governments should seek endorsement of the report produced from the advisory committee(s). The final report should then be submitted to the director for review before proceeding to the next stage. At the conclusion of Stage 3, local governments should make a resolution to accept the final Stage 3 report (after review by the advisory committees and the director), and then submit the LWMP report to the minister for approval, with a copy to the director. The final scope of work should address the considerations detailed in Section 5 of these guidelines. The procedures include but are not limited to those described below.

4.4.1 Stage 1: Inventory of Existing Conditions and Development Projections (Long List of Options)

- Develop scope of work for Stage 1.
- Initiate public consultation process.
- Identify the plan area.
- Provide a description of existing infrastructure, environmental, social and economic conditions.
- Identify known problems in the existing liquid waste infrastructure (e.g. sewage treatment plant design and operation, sanitary sewer cross connections to storm sewers, sludge facilities, outfalls, public health risks and environmental risks etc.).
- Identify requirements to comply with the MSR.
- Reference official community plans.
- Reference local land use plans to describe existing land use and development and provide projections for future development.
- Identify plan criteria including applicable legislation, guidelines and criteria.
- Estimate water and sewage loadings.
- Identify existing volume reduction and source control programs, bylaws/licensing and outline options for enhancing these programs.
- Determine incidence of pump station overflows and sanitary sewer breaks and if cross connections between the sanitary sewers and storm sewers allow raw sewage to enter the storm sewer system. Develop concept design options for the mitigation of these problems.
- Identify extent of on-site sewage systems and problem areas.
- Identify the available database needed to assess effluent discharges to water and/or ground.

- Evaluate the environmental condition and risks associated with the proposed options.
- Identify boundaries of watersheds that lie wholly or partly within the plan area, describe existing stormwater management infrastructure, systems and programs. Identify hydraulic problems and if raw sewage or industrial waste can enter the stormwater system and where contamination can occur.
- Identify options for integrated resource recovery (see Section 5.14).
- Recommend stormwater management requirements and tasks for more detailed development in Stage 2.
- Describe existing septage and biosolids management programs, identify requirements to comply with the OMRR, and recommend biosolids management tasks for more detailed development in Stage 2.
- Develop concept design options with order of magnitude costs for wastewater treatment, use of reclaimed water, effluent disposal to address requirements for growth and development as well as requirements to upgrade on-site systems. Volume reduction and source control measures should be a basic component in the development of options. Concept options should be developed in light of current legislation and should consider long term goals of the provincial government.
- Obtain input from advisory committee(s).
- Conduct public review of options and incorporate feedback as appropriate.
- Evaluate options taking into account technical, economic, environmental, and social factors.
- Complete public consultation process at the draft report stage.
- Recommend short list of options for more detailed evaluation in Stage 2.
- Identify gaps in environmental database and recommend extent of additional data acquisition for Stage 2.
- Prepare the scope of work outline for Stage 2.
- Finalize Stage 1 report following analysis of public input and receipt of advisory committee review comments.

4.4.2 Stage 2: Detailed Evaluation (Short List of Options) and Preferred Option(s)

- Draft Stage 2 report with input from advisory committees.
- Continue public consultation process.
- Examine short-list options and associated costs in detail.
- Consider conducting an Environmental Impact Study to further refine options.

- Identify and discuss requirements to be included in operational certificates for facilities.
- Prepare the scope of work outline for Stage 3.
- Finalize Stage 2 report which contains recommended option(s).
- Submit Stage 2 report to the ministry regional office for review.

4.4.3 Stage 3: Summary of LWMP, Financing and Implementation Schedule

- Continue public consultation process.
- Further develop and evaluate recommended option(s) for sewage treatment, use of reclaimed water, and effluent disposal.
- Further develop and evaluate measures for volume reduction and source control programs. Prepare cost estimates including construction costs, operating and maintenance costs for the options and the cost to the local taxpayer. A present worth analysis of the alternatives should be included to determine which alternative may be least expensive over the long term.
- Further develop tasks for stormwater management. As a minimum, identify goals and objectives, initial requirements and commitments for a future stormwater management plan (e.g., data gathering, bylaw development, public education).
- Further develop tasks for septage and biosolids management. As a minimum, identify data gathering requirements and commitments for a future biosolids management plan.
- Carry out site-specific studies if needed to adequately allow the further development of options and their evaluation.
- Identify facilities to be regulated by operational certificates.
- Obtain input from advisory committee(s).
- Conduct public review of options and incorporate feedback as appropriate.
- Provide a list of recommendations for the LWMP.
- Complete the public consultation process at the draft report stage.
- Prepare scope of work outline for Stage 3.
- Finalize Stage 3 report following analysis of public input and upon receipt of the advisory committee review comments.
- Draft proposed operational certificate requirements for facility operation and environmental monitoring with advice from the appropriate regional ministry staff.

In some circumstances it may be appropriate to combine Stage 1 with Stage 2, or Stage 2 with Stage 3. However, it is crucial both to the success of the LWMP and to achieving the minister's approval that adequate opportunities for public involvement not be sacrificed when combining stages of the planning process. The regional ministry staff should be consulted when combining

plan stages or when there are any other deviations from the recommended process as outlined in these guidelines.

If during the liquid waste management planning process there are significant changes to the community's goals, official community plan, etc., it may be necessary to revisit some or all parts of Stage 1 or 2. Communication between the engineering and planning departments of local governments is essential for long term infrastructure planning.

4.5 Plan Approval

At the completion of the process, the minister will consider the advice of the director and ministry staff before responding to a request for approval of a LWMP. The minister must be satisfied that the LWMP has been prepared in accordance with the EMA and that adequate public consultation has taken place as no mechanism for appeal will be available after ministerial approval (see EMA Section 27(2)). Approval of the LWMP will occur when the minister issues a letter of approval. This letter may incorporate additional requirements to be imposed upon local governments as a condition of plan approval.

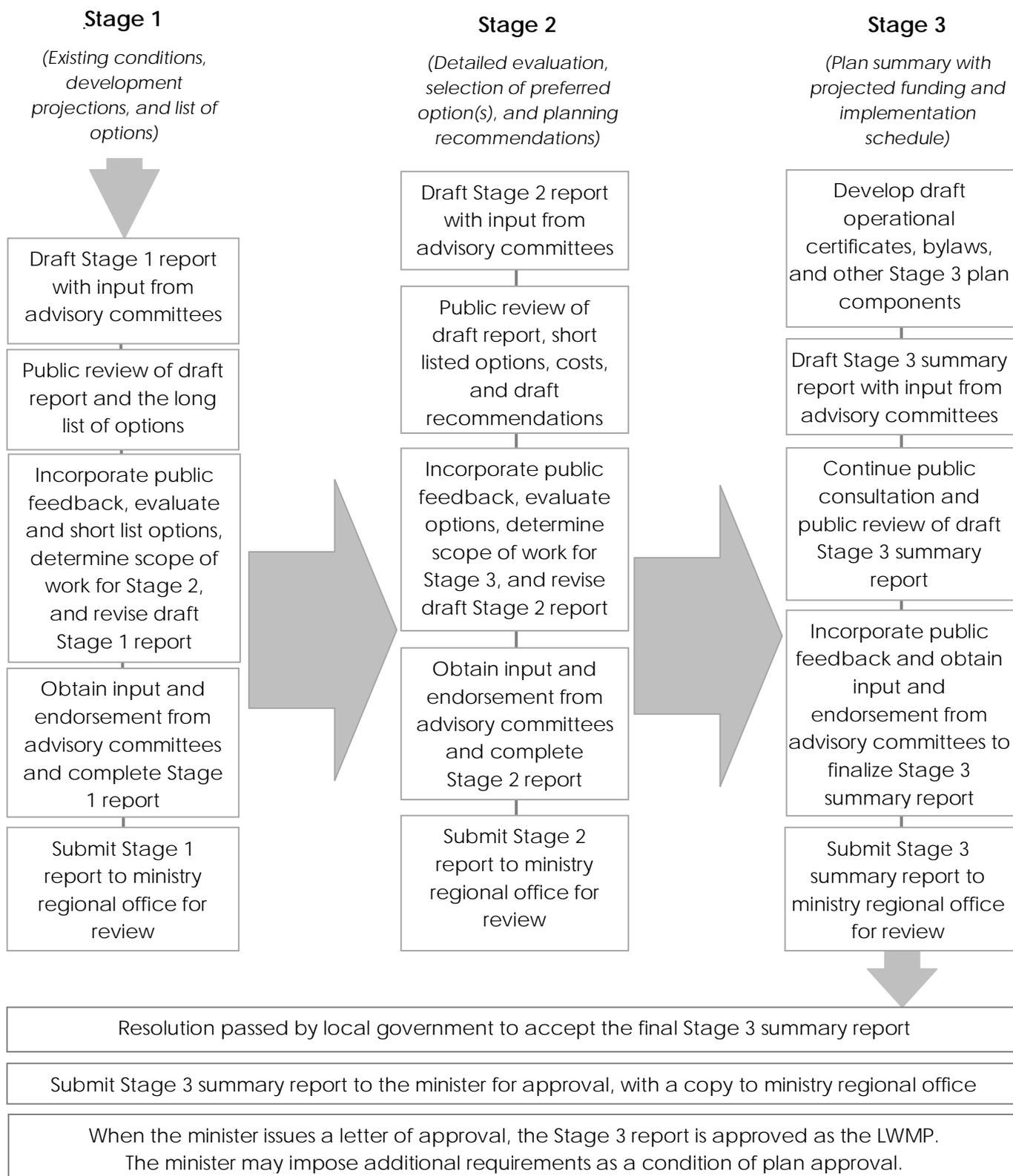
At this point the plan monitoring committee (see section 6.2) should be activated to ensure proper plan implementation.

The director will then issue operational certificates for each facility and the municipality can proceed with implementation procedures contained in the plan.

Diagram 1: Typical Three-Stage Planning Process

(Refer to Section 4.4 of the Guidelines for the Three Stage Process)

- Local government initiates plan voluntarily OR minister directs local government to prepare a plan
- Local government passes a resolution
- Local government establishes advisory committees and informs the ministry and other agencies
- Determine scope of work for Stage 1 and initiate public consultation process



5.0 Planning Components

5.1 Plan Area

When determining the plan area, special attention should be devoted to understanding the larger impact of guiding objectives and how they relate to the regional growth strategy and the official community plan, if applicable. Opportunities for cooperative planning with regional districts and/or adjacent municipalities should be explored at an early stage in the planning process.

A regional district can complete a LWMP that includes the entire district, inclusive of municipalities within the district. Alternatively, a district can elect to limit a plan area to a sector within the district, typically defined by political or watershed boundaries and/or land use as set out in land use plans.

5.2 Land Use and Development

The existing land use and population distribution should be presented, based on zoning and census data. Future land use and population projections should be based on the existing and anticipated land use plans. Whereas some land use plans include only short-term development projections, planning of water and sewer systems must consider much longer design horizons. Long term land use plans and population projections should be made in cooperation with the regional district and municipal planners to allow proper development of the LWMP.

5.3 Environmental Resources and Impacts

Environmental resources including plant and animal species and their habitat, groundwater, lakes, streams, wetlands, marine environments and other components of the local ecology should be identified and described. Threats to environmental resources should be identified in light of existing and planned development.

Environmental impacts associated with various options are an important part of the evaluation process. For the Stage 1 study, the assessment of environmental impacts using the available information, combined with input from provincial and federal environmental agencies, should normally be adequate to assist in identifying the relative environmental benefits and risks associated with the options under consideration.

For more detailed evaluations needed for short-listed options in the Stage 2 study, site specific data gathering and assessment will normally be needed to responsibly determine environmental benefits and risks. For surface and ground discharges and for treatment facility siting, the MSR and its companion document "Environmental Impact Study Guideline" provide direction for the environmental studies.

Discharges from outside the LWMP area may have an impact on receiving waters into which discharges are contemplated under a LWMP. The impact of outside discharges must be considered, to ensure that a realistic picture of the cumulative impact of all discharges is

adequately understood for both the short and long term. The environmental impact study must include an assessment of the combined impact of all relevant discharges. The interests of other government agencies and community stakeholders should be considered in developing the scope of environmental impact studies.

5.4 Existing Infrastructure

A LWMP should include the identification of the existing services within the plan area. These services may include the water, sewage, stormwater, transportation and biosolids management systems. Areas serviced by on-site water and sewage systems should be identified, including permitted discharges and those registered under the MSR. A description of the major components within each service system should be provided, along with any associated known or suspected problems. The capacity of the community water and sewage systems should also be determined, including population served and unit flows for use in determining future projections. Sewage and water quality should be analyzed to develop unit loadings for future projections.

5.5 Source Controls

An important LWMP component is a commitment to develop an effective source control program. Source controls are used to discourage the discharges of waste to the sanitary sewer and storm drainage systems that may pose a risk to workers and the public, damage infrastructure, degrade the quality of receiving waters, hinder the efficiency of treatment facilities, or affect the quality of biosolids. These discharges may enter the system via surface runoff, service connections from buildings, or from pumper truck discharges at treatment facilities (e.g. septage and trucked liquid waste from private businesses).

Existing source control measures should be documented in a LWMP. Major industrial, commercial, and institutional discharges to the sewer system and drainage systems as well as pumper truck discharges should be characterized in order to determine if existing source control measures are adequate.

Source controls can generally be implemented through either a regulatory or an educational approach, or through a combination of the two. The regulatory approach is typically focused on non-domestic (i.e., commercial, industrial and institutional) dischargers, often through sewer use bylaws. Source controls for both domestic household and non-domestic dischargers can also be undertaken through education to reduce the use and disposal of hazardous and toxic products. As appropriate, improved or added source control measures such as bylaws, codes of practice and education programs should be identified and evaluated. The measures considered should include pre-treatment of non-domestic high-strength or hazardous wastewater prior to discharge into the sewage collection system.

5.6 Volume Reduction

Water used in the home is the primary source of domestic sewage. Increasing the efficiency of potable water use results in reduced per capita water consumption. Reduced indoor water consumption, in combination with reduced inflow and infiltration, benefits the sewage system through reduced per capita sewage flows and potentially decreased demands on infrastructure. Existing water use patterns should be characterized by sector (residential, institutional, commercial, industrial) to determine which water uses contribute to sewage flows and which uses are amendable to water conservation measures. Projected water consumption and sewage flows should be based on the existing unit flows in conjunction with expectations and commitments for water conservation. Sewage quality loadings should be projected based on these long term water-use expectations and system loadings, including any anticipated loading reductions resulting from source control initiatives. Options that can further reduce sewage flows should be developed and evaluated.

5.7 Reclaimed Water

Sewage that is appropriately treated for a direct designated use can be, in some cases, beneficially used as reclaimed water. Potential uses for reclaimed water should be identified in a LWMP. The use of reclaimed water will offset demand on the potable water supply system, and may eliminate or defer the need to expand the water supply system. The use of reclaimed water dictates the need to jointly plan water, sewer, and drainage systems to ensure the development of an optimum long term plan.

The use of reclaimed water provides the dual benefit of reducing effluent discharges to the environment, and of reducing demand on the water supply, transmission and treatment system. Treatment standards for reclaimed water and permitted uses for reclaimed water are set out in the MSR and its companion document "Code of Practice for the Use of Reclaimed Water." Potential uses for reclaimed water should be identified and should consider requirements in the MSR when drafting operational certificates. Proper development and evaluation of reclaimed water options requires an in-depth assessment of both the waterworks system and the sewage system. Evaluation of potential reuse options should include the benefits of reducing demand on the waterworks system.

The siting studies required for new sewage treatment facilities should consider potential areas for use of reclaimed water so that the sewage conveyance facilities, the disposal facilities, and the reclaimed water facilities can be optimized.

5.8 Inflow and Infiltration

Inflow and infiltration (I&I) of surface and groundwater into sewage collection systems is a major cause for excessive wastewater flows. To assess I&I, existing sewage flows must be assessed to identify the volume of rainwater entering the system and the frequency of any sewer overflows that occur.

Similar to source controls, reduction of sewage flows through a combination of water conservation measures and I&I controls and elimination is an important part of a LWMP. Specific goals should be identified and supported by industry and public education programs.

Ideally, communities that experience high I&I in their sewage collection systems will have completed an investigative program of flow monitoring, smoke testing, and video inspection, to assess the sources of I&I. The investigative program findings can then be used to develop a cost benefit analysis for I&I reduction options. In the absence of an existing investigative program, the LWMP should initiate the program (minimum 1 year for small systems up to several years for a staged investigative program for larger communities). A staged I&I reduction program should be included as part of the LWMP recommendations.

5.9 Combined Sewer and Sanitary Sewer Overflows

Combined sewer overflows (CSO) in British Columbia are limited to a relatively small number of communities. It is the policy of the government to eliminate all CSO systems, therefore new or expansions of existing CSO systems should not be considered in a LWMP. The MSR sets out requirements for control of CSOs that may be incorporated into the LWMP for the subject municipalities. When developing a strategy to control these types of overflows local governments should target where highest volumes are entering the environment untreated. Sanitary sewer overflows (SSO) are also regulated under the MSR. The MSR sets out requirements for control of SSO that should be incorporated into the LWMP.

5.10 Wastewater Treatment

The MSR establishes the minimum level of treatment required for wastewater discharges in B.C. In addition, the CCME Canada-wide strategy was endorsed by the province and sets minimum standards for wastewater treatment plants across Canada that discharge to surface waters. The required level of treatment should be a key objective for local governments when options for wastewater treatment are being explored within the plan.

In urban areas with high population densities, centralized sewage collection and treatment systems with discharges for treated wastewater are the norm, however exploring various treatment options is strongly encouraged. Where appropriate, the LWMP should include estimated costs for servicing development areas with sanitary sewers (e.g., as set out in the official land use plan). The costs and benefits of providing sanitary sewer service to outlying areas may also be evaluated in a LWMP, particularly for areas that are known or suspected to have poor ground conditions for sewage disposal. Consideration of whether or not to accept high-strength wastewater from industry to the sanitary sewer system, as well as pre-treatment requirements for such discharges, should also be included where appropriate.

Sanitary sewers may serve a single, centrally-located treatment facility, or smaller (satellite) treatment facilities may be preferred for isolated pockets of development depending on the circumstance. Ground disposal of treated effluent may be an option for smaller treatment facilities. Reuse of reclaimed effluent may provide for reduced discharge to the environment.

In rural areas and in other areas with low density development, on-site systems (typically septic tanks with ground disposal fields) are the norm. On-site systems may also include advanced package treatment plants. Under favourable soil and groundwater conditions and when properly managed, on-site systems can form an integral part of a LWMP. Alternatively, a separate LWMP initiative may be useful to develop a long-term decentralized plan. For both existing development and for areas proposed for new on-site systems, the evaluation process should take into account the cumulative and individual environmental impact of adjacent existing and future on-site systems.

The benefits of using on-site systems in more remote or rural areas compared to centralized systems should be evaluated as part of the LWMP. Input from the Ministry of Health should be included in the evaluation of on-site systems. For existing development where on-site systems prevail, the LWMP should examine the management and performance of on-site systems (design, construction, maintenance), and compare the costs and benefits of well-managed on-site systems to centralized wastewater collection and treatment systems. Management of septage should also be considered and a plan for treatment and beneficial reuse or disposal of septage developed. Analysis should include the long term, or lifecycle, of the system. Options to correct problem areas should be developed and evaluated. The *Health Act's* Sewerage System Regulation and its guidelines as well as the MSR and its companion document the Environmental Impact Study Guidelines provide useful direction.

5.11 Non-Point Source Pollution

Point sources of pollution refer to discharges to the receiving environment from municipal and industrial wastewater treatment plants via outfall pipes. Municipal drainage works are an important source of non-point source pollution and must be evaluated within the LWMP process. Other non-point source pollution includes urban and agricultural runoff, discharges to ground from on-site sewage systems (normally septic tank systems), and discharges from vessels. The degree to which each non-point source is addressed will vary from community to community, and this should form part of the task of defining the scope of work for the LWMP.

5.12 Stormwater Management

Official community plans and land use plans sometimes include an urban drainage plan (UDP). Often UDPs form the basis of the stormwater management planning aspects. One of the most fundamental issues associated with stormwater management is the need to integrate the initial stages of the land use planning process with local watershed hydrology. If land development is undertaken without consideration of watershed hydrology, some of the most important opportunities for minimizing the adverse environmental impacts of the development may be lost.

The development of a UDP is the first step in stormwater management and should be initiated as soon as possible. The province has developed guidance documents to assist local governments in developing stormwater management programs; these and other documents

prepared in British Columbia are listed in Appendix 3. Numerous guidance documents are also available elsewhere (e.g., Ontario, Washington State). The guidance documents describe a wide range of management tools for stormwater, with an emphasis on preventing adverse impacts to watershed hydrology and water quality, rather than attempting to mitigate those impacts after development has occurred.

Development of a stormwater management plan can be a major undertaking, particularly if there are several watersheds in the plan area that have varying characteristics (e.g., urban, rural, forest, etc). The cost for preparing a comprehensive stormwater management plan may equal or exceed the budget for a three-stage LWMP. Watersheds frequently cross political boundaries, thus affecting two or more local governments. In many parts of the province, stream flow and water quality records are not available to properly assess system hydraulics and treatment requirements. In addition, some local governments do not have authority for stormwater management.

The ministry recognizes that each local government may have different priorities and schedules for developing liquid waste and stormwater management plans. Accordingly, liquid waste and stormwater plans may be jointly developed within a LWMP, or may be developed separately. This should be discussed with the director when developing the scope of work for the LWMP.

If a municipality elects to develop a stormwater management plan outside of its LWMP, the LWMP should include a summary of the stormwater management plan. The stormwater management plan should be linked to other LWMP initiatives, so that activities such as source control and education programs can be coordinated to avoid costly duplication of effort. In the absence of a separate stormwater management plan, the LWMP should incorporate, as a minimum, a commitment to initiate stormwater management planning with a proposed budget and schedule.

Stormwater management tools include land use and zoning restrictions, cluster developments, limits on effective impervious area, control of construction activities, public and private sector education, source control programs, requirements for treatment of industrial or commercial runoff, changes to local government operation and maintenance procedures, and supporting bylaws. The guidance documents should be consulted for assistance in developing an approach that meets specific goals and objectives.

Similar to stormwater management the requirements for managing agricultural and forestry runoff vary significantly within municipalities and regional districts throughout the province. Jurisdictional issues, authority to manage agricultural waste, and a limited data base with respect to quantifying and qualifying the waste stream are some of the complicating factors.

5.13 Septage and Biosolids

Management of residuals from septic tanks (septage) and treated sludge from sewage treatment plants (biosolids) is an important component of a LWMP. Septage can be treated with sewage sludge to allow beneficial reuse of the combined biosolids product. Alternatively, separate septage and sewage sludge treatment facilities as well as biosolids reuse options can be developed.

Long-term plans for beneficial use of biosolids can take several years to develop, depending on local opportunities and markets as well as the biosolid's character and volume. In some cases, local governments may have developed biosolids management plans as separate initiatives in advance of beginning a LWMP. In that case, the LWMP should include a summary of the biosolids management plan. In the absence of an existing biosolids management plan, the LWMP should incorporate, as a minimum, a commitment and schedule for initiating a program for the beneficial use of biosolids.

5.14 Integrated Resource Recovery

Integrated Resource Recovery (IRR) is an integrated, whole-system approach to planning and managing infrastructure to maximize the recovery of value from waste resources. IRR technologies and practices are new and evolving and should be evaluated during the LWMP. When cost effective, the ministry and local governments should embrace such options that adopt an IRR model. More information on IRR technologies and practices can be found on the Ministry of Community, Sport & Cultural Development's website:
http://www.cscd.gov.bc.ca/lgd/infra/resources_from_waste.htm

5.15 Cost Estimates

Cost estimates should be developed which provide detail on, but are not limited to, the following items:

- Capital, operating, and lifecycle cost estimates for:
 - Waste collection alternatives including trunk sewers and force mains;
 - Treatment alternatives;
 - Treatment site options;
 - Sludge and septic tank pumpage facilities; and
 - Final effluent disposal or re-use options.
- Present worth analysis of alternatives.
- Markets for recovered materials.
- Benefits derived from re-used or recovered materials.
- Cost to the province and municipality considering applicable grants and other external sources of funding.
- Stages of construction.
- A fiscal implementation plan with alternate financing strategies.

It is important that the basis and accuracy of the cost estimates be clearly laid out in each stage of the plan, and for the community to understand the degree of accuracy associated with cost estimates at each stage of the LWMP. Costs should also be presented as the cost per user to aid in communication with the public.

Appendix 1 provides a definition for each class of cost estimates (e.g. Class A, B, C or D). Normally in Stage 1, Class D estimates will be appropriate to evaluate the long list of options. In Stage 2, the accuracy of cost estimates for the short-listed options should advance to Class C level, and preferably Class B when a pre-design level of study has been carried out in support of an option.

6.0 Plan Implementation, Monitoring and Amendment

6.1 Plan Implementation

Following approval of the LWMP by the minister, local governments must proceed with the implementation measures contained in the plan. As described in Section 4.5, the approval letter may incorporate additional requirements to be imposed upon local governments as a condition of plan approval.

6.2 Plan Monitoring

Monitoring is critical to the long term success of the LWMP. Establishing timelines for deliverables and conducting assessment activities for determining the effectiveness of specific actions will ensure local governments receive high value for their commitment to the planning process.

Local governments must establish a plan monitoring committee to oversee and evaluate implementation of the plan. The plan monitoring committee should reflect the following interests:

- (a) The geography, demography and political organization of the plan area;
- (b) A balance between technical and non-technical interests;
- (c) Continuity with the advisory committee(s), if possible through inclusion of members of the committee(s) who have gained experience in development of the plan; and
- (d) Objectives of the ministry, through the inclusion of ministry regional staff.

The advisory committees and local governments, in consultation with the director, should provide the scope of work for the plan monitoring committee to advise local governments on all matters involving the implementation of the plan and evaluating its effectiveness. The scope of work should address the purpose, mandate, structure, meeting frequency and procedures for the plan monitoring committee. Local governments should establish a reporting structure for the plan monitoring committee that ensures that committee reports and recommendations are given open consideration by local governments.

Local governments shall submit a report to the director, on or before March 31 of each year, on the progress made with plan implementation, including plan elements completed and adherence to schedule and costs. This report should include annual reporting requirements as specified in operational certificates. Local governments may wish to include LWMP reporting in the annual report required under the Community Charter.

6.3 Plan Review and Amendment Process

Local governments must review the progress and status of LWMPs every 5 to 10 years, or more frequently during times of significant inflation or when circumstances have changed significantly from when the original plan was developed. The LWMP review will determine whether or not an amendment or update is required.

During the review, the cost estimates for capital expenditure and operations and maintenance costs should be updated to ensure costs are current. If a significant time elapses between plan development and implementation, an amendment should be undertaken. The following should be reviewed to ensure the plan is still relevant and current:

- Cost estimates;
- Objectives and outcomes;
- Approach and technologies;
- Regulations and standards;
- Official Community Plan and Regional Growth Strategy; and
- Public support for the plan.

While a full amendment may address all of the above, an update to the plan could be undertaken to revise cost estimates. The public should be made aware of a revision to cost estimates through advertisement, press coverage or other communications. If a full amendment of the plan is undertaken, more extensive public consultation should be part of the process.

Local governments that propose to amend or update an approved LWMP shall notify the director in writing of the reasons for the proposed amendment or update. Local governments should discuss requirements for plan updates and amendments with the director and will be required to undergo a consultation process unless deemed unnecessary.

Appendix 1 – Classes of Cost Estimates

Class A Estimate

This is a detailed estimate based on quantity take-offs from final design drawings and specifications. It is used to evaluate tenders or as a basis of cost control during day-labour construction.

Class B Estimate

This estimate is prepared after site investigations and studies have been completed and the major systems defined. It is based on the completion of preliminary design. It is used for obtaining approvals, budgetary control and design cost control.

Class C Estimate

This estimate, which is prepared with limited site information, is based on probable conditions affecting the project. It represents the summation of all identifiable project component costs. It is used to establish a more specific definition of project costs, to obtain approval in principle and for program planning.

Class D Estimate

This is a preliminary estimate which, due to little or no site information, indicates the approximate magnitude of cost of the proposed project. This cost estimate may be derived from lump sum or unit costs, based on the construction costs for similar projects. It is used for discussion and preliminary evaluation of options and to initiate the approvals process.

Appendix 2 – Regulatory Framework

Provincial and federal legislation affect the development of a LWMP.

- Provincial Legislation
 - [Environmental Management Act](#)
 - [Agricultural Waste Control Regulation](#)
 - [Municipal Sewage Regulation](#)
 - [Organic Matter Recycling Regulation](#)
 - [Health Act](#)
 - [Sewerage System Regulation](#)
 - [Public Place Sanitary Facilities Regulation](#)
 - [Drinking Water Protection Regulation](#)
 - [Fish Protection Act](#)
 - [Agricultural Land Commission Act](#)
 - [Farm Practices Protection Act](#)
 - [Local Government Act](#)
 - [Community Charter](#)
- Federal Legislation
 - [Regulation for the Prevention of Pollution from Ships and for Dangerous Chemicals](#)
- Other
 - [CCME Canada-wide Strategy for the Management of Municipal Wastewater Effluent](#)

Appendix 3 – Stormwater Management Guidance Documents

- Province of British Columbia
 - [Stormwater Planning: A Guidebook for British Columbia \(2002\)](#)
 - [Urban Runoff Quality Control Guidelines for British Columbia \(1992\)](#)

- Greater Vancouver Regional District
 - [Integrated Stormwater Management Planning: Terms of Reference Template \(2005\)](#)
 - [Best Management Practices Guide for Stormwater \(1999\)](#)

Appendix 4 -First Nations Consultation

The province of British Columbia has an obligation to consult with First Nations whenever the Province proposes a decision or activity that has the potential to affect aboriginal interests or treaty rights. The province may delegate certain procedural steps of First Nations consultation to proponents, including local governments. The steps primarily relate to the exchange of information about a proposed project with potentially affected First Nations whose interests are located in the vicinity of the proposed project. Ministry of Environment staff are prepared to advise local governments on how to carry out these delegated procedural steps.