

## **CAPITAL REGIONAL DISTRICT CORE AREA WASTEWATER MANAGEMENT PROGRAM**

### **GOALS AND STRATEGIES**

The CRD Board has made a bold and innovative move to depart from a traditional centralized approach to wastewater treatment to a more distributed wastewater treatment strategy. This distributed approach allows the CRD to take best advantage of the existing sewerage infrastructure, while setting the direction for more localized wastewater management with potential water reuse and energy recovery opportunities. The scheme will see a new centralized secondary treatment plant at Macaulay Point, one of the two existing major wastewater discharge locations. Two or more decentralized water reclamation plants will be constructed in the upper reaches of the sewerage system.

The advantages of this distributed treatment approach are three fold. First, it reduces the size of the Macaulay Point secondary plant, as the upstream water reclamation plants reduce the flows reaching the plant. Second, by strategically locating the upstream water reclamation plants, this approach creates local opportunities for future water reuse and heat recovery from the wastewater. Third, by reducing the existing wastewater flows in the lower portions of the sewerage system, capacity is freed up to handle a greater portion of the wet weather wastewater flow – greatly reducing the frequency and volumes of the current sanitary sewer overflows (SSO). A wet weather flow treatment only plant will be constructed at the other major discharge point, Clover Point, to handle the surplus flows during wet weather periods prior to discharge to the ocean.

The real innovation of this strategy is the flexibility that it will provide the CRD in the future decades. The CRD will no longer need to build larger and larger pipes in the ground to transport the wastewater long distances to a central treatment plant site. There will also not be the need to continually expand the central plant to handle higher wastewater flows due to growth – the decentralized water reclamation plants will handle growth in the outlying communities. These plants will utilize advanced treatment technologies to take advantage of phasing opportunities and "just in time" construction to accommodate needs.

This strategy will also allow the CRD to continue to incorporate new directions in overall community development. New or re-development projects, such as the Dockside Green development, fit well with the strategy adopted by the CRD Board in that they blend the advantages of local water reuse with reduced demands on the water infrastructure, while using the capacity of the community sewerage systems for the management of surplus wastewater flows and residuals management.

The Core Area Wastewater Management Program is an exciting direction. In order to keep the Program on track and to assist the decision making as the project moves through development and implementation, it is beneficial to adopt a series of goals and accompanying strategies. Three primary goals are:

#### **Goal 1 – Protect Public Health and the Environment**

This is fundamental goal of wastewater management. The CRD is committed to not only meeting the required regulations but also in planning ahead in a proactive manner to ensure that emerging and future public health and environmental issues can be addressed in the decades to come.

#### **Goal 2 – Manage Wastewater in a Sustainable Manner**

Wastewater has traditionally been considered in the context of "disposal". The strategy adopted by the CRD has changed this approach. The CRD is committed to moving towards the goal of sustainable wastewater management during the detailed planning and implementation of the Program. A sustainable wastewater management approach will be one that continuously moves the CRD forward in terms of the

integration of water, energy, waste and infrastructure management within the triple bottom line values of the community.

### **Goal 3 – Provide Cost Effective Wastewater Management**

Cost effective wastewater management optimizes the existing investment in wastewater infrastructure while thoughtfully moving ahead in the implementation of new strategies and infrastructure investments. The CRD will consider the best integration of public and private sector resources to deliver the wastewater management service in a manner that provides the best value to the community.

In order to achieve the goals, it is necessary to develop strategies. Strategies define the approach to be taken to accomplish the desired outcome or goal. A number of strategies may be pertinent to a goal and, in fact, strategies may overlap to achieve more than one goal.

The principal recommended strategies to accomplish the goals are:

#### *Strategy 1 – Integrate community growth and development with wastewater management planning*

Realistic projections of the rate of population growth and the location of this growth in the community are critical to making the best decisions on wastewater management infrastructure investment. Identifying how development or re-development will occur and, in particular, where opportunities may exist to achieve the desired distributed wastewater management strategy is also key in the development of the Program. Specific elements are:

- Carry out a comprehensive study of the community development and population growth.
- Identify potential development or re-development areas that may create opportunities for water reuse and resource recovery.

#### *Strategy 2 – Adopt a risk-based wet weather flow management plan*

The CRD and its member municipalities face a significant challenge in managing the wet weather flow situation. The Program calls for a multi-faceted approach that includes water conservation, continued I&I reduction, optimization of existing capacity in the interceptors through a distributed treatment approach and selective treatment of wet weather overflows. It will take several decades to meet the Province's goals of SSO and CSO elimination. The CRD needs to tackle this issue based on a risk management approach that considers the triple bottom line impact and makes decisions for upgrading on a priority approach. Elements include:

- Continue to analyze the existing situation in terms of actual and unit wastewaters flow and overflow volumes on return frequency basis, based on the severity of the wet weather flow event.
- Utilize the above information to predict future conditions based on the distributed wastewater management strategy.
- In concert with the Province, develop a wet weather flow management strategy that will achieve the goals over a period of time. Priorize upgrade projects, based on a risk assessment approach that considers the economics, the social impacts / benefits and the environmental benefits.

*Strategy 3 – Accommodate future growth through a distributed wastewater management strategy*

Growth in the CRD will primarily be through re-development within the existing urban area or through new development, particularly in the West Shore communities. The distributed strategy calls for a centralized secondary treatment plant at Macaulay Point, as well as two or more decentralized water reclamation plants. Given the location of future growth and the gradual decrease in wet weather flows over time, it should be possible to limit any future expansion at the centralized plant and handle the majority of the flows from future growth at the decentralized plants. This has a number of advantages in terms of the neighbourhood acceptance of the central plant and on the ability to use "just in time" construction in the decentralized plants. Critical to this strategy is proper planning in the Program Development phase. Key elements are:

- Identify and evaluate sites for two decentralized water reclamation plants – one in Saanich East and one in the West Shore communities. The attributes of these sites are that they should be near the existing interceptor trunk sewers, offer a potential opportunity for water reuse and recovery, offer an opportunity for neighbourhood integration and allow the discharge of surplus effluent to the marine environment.
- In concert with community development planning, evaluate the opportunities for additional decentralized water reclamation plants within the sewerage area. These opportunities will likely be focused on new development areas or larger re-development areas where integrated water management concepts can be utilized as part of the development planning.
- Further evaluate the concept of "liquid treatment only" water reclamation plants, where the residuals from the plants are discharged into the adjacent interceptor trunk sewer. The residuals are thus blended with the raw wastewater and processed at the central plant at Macaulay Point.
- Carry out more detailed planning for a "wet weather flow only" plant at Clover Point, as part of the overall distributed wastewater treatment strategy.

*Strategy 4 – Consider wastewater as a resource*

The strategy adopted will not only deal with the near term regulatory requirements for secondary treatment but will create an opportunity to consider wastewater as a resource, instead of a waste production of society that requires disposal. Specific elements of this strategy are:

- Evaluate local water reuse opportunities as part of the siting of the decentralized water reclamation plants. This could include reuse for irrigation or non-potable urban or industrial reuse, as well as for wetlands or stream flow augmentation.
- Evaluate opportunities for heat recovery from the wastewater at both the centralized and decentralized plants.
- Carry out more detailed planning for residuals management at the centralized wastewater treatment plant at Macaulay Point. Review opportunities for additional processing at the site for energy recovery at the plant or with local partnerships.
- Continue planning for the Biosolids Management Facility at the Hartland Road site. Consider how this will integrate with residuals processing and transportation at the centralized plant or at other plants. Also consider opportunities for integration with solid waste management at the Hartland Road landfill.

- Evaluate opportunities for biosolids management utilizing land application. Consider these options in conjunction with biosolids processing technologies incorporating biogas and thermal energy recovery at the Facility.
- Consider the impacts and potential mitigation of the Program decisions on green house gas emissions and the overall impact and opportunities created by potential climate change.

*Strategy 5 – Adopt technologies that meet or exceed current requirements yet provide future flexibility*

Wastewater technologies will continue to develop over the future decades. The lines between traditional definitions of "primary, secondary and tertiary" treatment are blurred. A critical part of the Program strategy is to recognize technology change and to make decisions that will allow technology change to be incorporated in the ongoing wastewater management program. The strategy needs to consider:

- Consider a blend of treatment technologies to meet the specific needs to the treatment application.
- Design treatment facilities to allow the retrofit of new technologies in the future that may allow greater performance, smaller footprint, energy optimization or lower cost.
- Plan and design the Biosolids Management Facility to consider the potential for future technological change or increased integration with solid waste management.

*Strategy 6 – Integrate wastewater management facilities into the community*

The integration of the proposed wastewater treatment plants into the community creates both a challenge and a potential opportunity. The strategy should not be – how can these facilities be "hidden" but rather what decisions can be made to make them in tune with the neighbourhoods. In planning these facilities, the key elements are:

- Design the facility to blend with the surrounding land use. Select an appropriate architectural theme and develop the site with consideration of the desired green space and access requirements.
- Select stringent odour management targets appropriate to the setting. The targets may be no odour at the property line or no odour outside of the buildings, if the site has multiple uses.
- Consider the potential for both short term and long term water reuse and energy recovery in the local community in the plant planning and design.
- Consider the opportunities for multiple use of the site. For example, integration of learning or recreational facilities could be considered.