WASTEWATER TREATMENT

WHAT IS WASTEWATER TREATMENT?

Wastewater treatment is the process of removing contaminants from wastewater collected from homes and businesses through the sewerage system. Wastewater contains a number of different types of waste products. The treatment process is designed to remove total suspended solids (TSS) and reduce the biological oxygen demand (BOD) of the treated effluent.

Primary treatment is a mainly mechanical process that removes between 30 and 40 per cent of BOD and 50 per cent of TSS. Iona Island and Lions Gate Wastewater Treatment Plants both provide primary treatment to the wastewater before the effluent—the remaining water—is released into the surrounding marine environment.

Secondary treatment is a biological process that removes up to 90 per cent of BOD and TSS. Lulu Island, Annacis Island and Northwest Langley Wastewater Treatment Plants provide secondary treatment to the wastewater before the effluent is released into the Fraser River.

For more information, visit our Wastewater Treatment page.

IS SECONDARY TREATMENT REQUIRED?

A Canada-wide Strategy for the Management of Municipal Wastewater Effluent was endorsed by the Canadian Council of Ministers of the Environment (CCME) in 2009. Canadian provinces are updating their environmental regulations to align with the new strategy. Metro Vancouver’s Integrated Liquid Waste and Resource Management Plan, approved by the Minister in 2011, is aligned with the new strategy.

In July 2012 the federal government announced a new regulation under the Fisheries Act to establish the strategy in federal law. The regulation prescribes four deleterious substances and the discharge standard that must be met by Canadian wastewater facilities:

- Carbonaceous biochemical oxygen demand not to exceed 25 mg/L
- Suspended solids not to exceed 25 mg/L
- Total residual chlorine not to exceed 0.02 mg/L
- Un-ionized ammonia not to exceed 1.25 mg/L

Transitional authorizations are part of the regulation to allow time for municipalities to upgrade or replace the facilities that do not meet the new standard. The new standard is indicative of secondary level treatment and facilities providing only primary level treatment are not able to meet the new standards.

IS SECONDARY TREATMENT JUSTIFIED FROM AN ENVIRONMENTAL POINT OF VIEW?

Secondary treatment has significantly higher removal rates for biochemical oxygen demand and suspended solids than primary treatment. Primary treatment only removes substances that settle or float. Dissolved substances are not removed in primary treatment, but are in secondary treatment. Secondary treatment is now the regulatory baseline standard across Canada regardless of environmental conditions.

THE IONA ISLAND WASTEWATER TREATMENT PLANT IS ALSO GOING TO BE UPGRADED. IS A SIMILAR PROCESS GOING TO BE ESTABLISHED FOR THE IONA PROJECT?

The Lions Gate Wastewater Treatment Plant will be replaced and the Iona Island Wastewater Treatment Plant upgraded to provide secondary treatment. The Lions Gate Wastewater Treatment Plant will be replaced with a new facility by 2020 and the Iona Island Wastewater Treatment Plant will be upgraded as soon as possible but no later than 2030. There will be separate processes established for each project given the unique conditions and location.
WILL CHLORINE GAS BE USED AT THE NEW PLANT?

No, chlorine gas, commonly used for disinfection of municipal water and wastewater, will not be used at the plant. The new Lions Gate Secondary Wastewater Treatment Plant will use ultraviolet light and sodium hypochlorite (similar to household bleach) for disinfection of reclaimed water. All chemicals will be contained and handled so as not to present a risk to the public.

LOCATION

WHY CAN'T THE NEW PLANT BE LOCATED AT THE EXISTING SITE UNDER LIONS GATE BRIDGE?

The existing Lions Gate plant is located on lands being returned to Squamish Nation in accordance with the Cut-off Lands Settlement Act. Some cut-off lands have already been transferred and the treatment plant lands will be the final remaining parcels that are part of the transfer.

WILL THE PRIMARY AND SECONDARY TREATMENT PLANTS BE LOCATED IN DIFFERENT PLACES?

The existing primary treatment plant site is being decommissioned entirely. The new plant will include both primary and secondary treatment on the new site. After 2020, there will not be a wastewater treatment plant at all on the existing site.

IS THE NEW PLANT LOCATION SUITABLE GIVEN CLIMATE CHANGE AND DISASTER MANAGEMENT CONCERNS?

The new site is fairly flat and low lying. Based on provincial guidance and predictions on sea level rise over the coming century, critical equipment will be placed several metres above the existing grade or otherwise protected. The plant will be built to meet the post-disaster requirements in accordance with the building code.

ARE THERE EXAMPLES IN OTHER URBAN AREAS OF FACILITIES SIMILAR TO THE NEW LIONS GATE SECONDARY TREATMENT PLANT?

There are similar plants in Washington State: in Blaine, Seattle and Edmonds. In BC, there are plants in Kelowna, Penticton and Vernon, which are built in urban neighbourhoods.

SENSORY IMPACTS

WHAT WILL THE PLANT LOOK LIKE?

Modern treatment plants are built so that they integrate into the community. They don’t necessarily have the industrial look of traditional treatment plants. The new plant will be designed to meet community needs and modern standards.

WILL IT SMELL? HOW WILL YOU CONTROL ODOUR?

Odour control will be a priority in the design and operation of the plant. All air associated with the plant will be managed and treated using odour control and air treatment technology. This technology has been proven in plants sited in urban centres.

HOW WILL YOU MEASURE FOR ODOUR IMPACTS?

The plant will be designed so air is put through scrubbing systems before it is discharged into the atmosphere. Modern approaches require odour control systems that ensure virtual elimination of odour complaints when plants are located in urban areas.
COMMUNITY & ENVIRONMENT

HOW WILL THE PLANT BE INTEGRATED WITH THE COMMUNITY?
Metro Vancouver is committed to building a working relationship with the community to ensure the project meets the needs of local residents and the region. Metro Vancouver will be seeking input from the community throughout the project.

HOW WILL THE DESIGN IMPACT THE ENVIRONMENT AROUND THE PLANT?
Metro Vancouver has a responsibility to protect and enhance the natural environment while ensuring liquid waste is managed affordably, safely and effectively. Our goal is to work towards returning all elements of liquid waste to the environment in a way that is protective of our waterways.

WILL THE PLANT INCREASE TRUCK TRAFFIC IN THE AREA?
To support Integrated Resource Recovery, organic materials could be diverted to the new facility, thereby, increasing truck traffic.
Currently, about five truckloads of biosolids (removed during the treatment process) a week are being moved from the existing plant. Depending on the technology used, the amount of material moved by trucks may increase or decrease.

HOW DO I PROVIDE MY INPUT TO THE PROJECT TEAM?
Share your comments with us via email or telephone at 604-432-6200. You can also join our email list to receive updates on projects and public involvement opportunities.

COST

HOW MUCH WILL IT COST TO BUILD A NEW SECONDARY TREATMENT PLANT FOR NORTH SHORE COMMUNITIES?
Metro Vancouver has completed the Project Definition phase and Indicative Design of the Lions Gate Secondary Wastewater Treatment Plant project, and based on current design considerations, the estimated cost of the project – including decommissioning of the old facility – is approximately $700 million.

LIONS GATE SWWTP COSTING

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HOW WILL THE PROJECT AFFECT MY TAXES?
The utility fees that residents, businesses and industries pay for the regional sewerage system and wastewater treatment will increase, but it’s too early to calculate the exact percentage increase or dollar figure.

In 2013, the average household in the Metro Vancouver paid $171 for liquid waste services provided by Metro Vancouver that year. The 2013 cost was a one per cent or $2 increase from the $169 average household cost in 2012.

The additional cost for secondary treatment on the North Shore cannot be estimated yet because many cost-related decisions haven’t yet been made. In addition, Metro Vancouver does not yet know how much money the federal and provincial governments will contribute to help pay for wastewater treatment upgrades required by the Government of Canada and provincial and federal environment ministers.
Federal wastewater effluent regulations – announced by the Federal Environment Minister in July, 2012 – make it mandatory that a secondary treatment plant is built and is operating on the North Shore by the end of 2020.

Metro Vancouver and its North Shore member municipalities will notify the public of the estimated increase in utility fees once this data is available.

**WILL ALL COMMUNITIES IN METRO VANCOUVER HELP PAY FOR A NEW SECONDARY TREATMENT PLANT, OR WILL COMMUNITIES ON THE NORTH SHORE HAVE TO PAY THE ENTIRE BILL?**

Currently, all member municipalities help pay for the capital costs of upgrading regional wastewater treatment facilities, which protect the environment and human health.

Municipalities pay charges that are based on measured volumes of wastewater going into regional sewer mains which lead to wastewater treatment plants. Municipalities pass on those charges to residents, businesses and industries, in utility fees or annual property tax bills. It’s a user-pay model.

A long-standing cost allocation formula now determines what percentage of capital costs are paid by the North Shore Sewerage Area and the three other sewerage areas in the region, and what percentage of capital costs are paid by the region as a whole. (The North Shore Sewerage Area encompasses the City of North Vancouver, the District of North Vancouver and the District of West Vancouver.)

Currently, 100 per cent of the operating costs of a treatment plant are paid by communities in the sewerage area where the plant is located. The capital costs of secondary treatment will be shared, with 70 per cent paid across the region (including the North Shore) and 30 per cent paid by the North Shore Sewerage Area.

The Metro Vancouver Board is reviewing the current cost allocation formula for secondary treatment upgrades.

**ARE THERE PROVINCIAL OR FEDERAL INFRASTRUCTURE PROGRAMS TO HELP FUND THE PROJECT?**

Metro Vancouver is actively seeking funding support from both the Province of B.C. and the Government of Canada.

The regional district needs federal and provincial funding to help pay the capital costs of secondary treatment, so local taxpayers do not have to pay the entire bill. In the past, the federal and provincial governments have made substantial funding contributions to waste treatment upgrades, in this and other regions.

The existing Canada – BC Infrastructure program is fully allocated and expires in 2014. In 2011, the federal government announced its intention to develop a new long-term infrastructure program that would be put in place when the current program expires in 2014. In the 2013 budget, the federal government announced a new $14 billion Building Canada Fund that will run from 2014-15 to 2023-24. It includes a $10 billion Provincial-Territorial Infrastructure Component to support projects of regional and local significance, including wastewater treatment.

Federal and provincial funding support will help create thousands of direct and indirect jobs and help ensure Metro Vancouver can complete the secondary treatment project before the federal regulation's 2020 deadline.

Metro Vancouver will inform the public when federal and provincial governments make a decision regarding funding support.

**WHY SHOULD RESIDENTS, BUSINESSES AND ALL LEVELS OF GOVERNMENT INVEST IN SECONDARY TREATMENT?**

Sewerage systems and wastewater treatment plants prevent the spread of waterborne diseases and protect the receiving environment so our liquid waste does not harm water quality and living things in the fresh and marine waters where treated effluent is released. Secondary treatment is an additional treatment step that takes place after primary treatment and removes about 95 per cent of the organic materials in wastewater.

Upgrading to secondary level treatment has been a federal and provincial requirement since the 1990s, when Metro Vancouver was ordered to upgrade the Annacis Island and Lulu Island treatment plants.

In 2011, the B.C. Environment Ministry approved Metro Vancouver’s Integrated Liquid Waste and Resource Management Plan. The plan confirmed the Lions Gate primary plant would be upgraded by 2020 and the Iona Island primary plant would be upgraded by 2030. These are the last two remaining primary treatment plants in the Metro Vancouver region.
HOW WILL PRIVATE PUBLIC PARTNERSHIPS BE ASSESSED?

The provincial policy that has been established is that projects receiving $50 million or more of provincial funding a Public Private Partnership (P3) will be considered the base case unless there is a compelling reason to do otherwise. Federal funding from the P3 Canada program is only available for projects using Public Private Partnerships.

As part of the Project Definition Phase, work will be undertaken in consultation with Partnerships BC and P3 Canada to assess the value of a P3 for the design and construction of the new plant.

Procurement options – such as whether the new plant will be designed and built using a traditional Design-Bid-Build, an alternative Design-Build approach or where a P3 option such as Design-Build-Finance-Operate-Maintain will be chosen – are policy and cost-related issues that will also be reviewed by the Board, as part of the Project Definition Phase.

WHY DOES METRO VANCOUVER HAVE A 15-YEAR AMORTIZATION POLICY?

The amortization approach for capital works financing based on a 15-year term has been in place since 1996. It has been re-affirmed by the Board as recently as 2010. Metro Vancouver's long-range capital plan continues to identify significant investments required for the water, wastewater and solid waste infrastructure in the coming decade and beyond.

Given this continuous need to invest in infrastructure, the shorter amortization approach has avoided the compounding of debt, deferral of debt payment to future generations and has minimized the interest payments associated with Metro Vancouver's debt financing. This has helped Metro Vancouver continue to benefit from an AAA credit rating through the Municipal Finance Authority of B.C.

The Metro Vancouver Board Finance Committee has the mandate to review and recommend the financial approach and strategy to the Board.

CAN THE PLANT GENERATE A PROFIT OR RECOVER RESOURCES THAT HAVE ECONOMIC AND ENVIRONMENTAL BENEFITS?

Wastewater treatment plants provide a basic service that communities need. That user-pay service is not a business which generates a net profit.

Metro Vancouver and many other leading utility providers around the world are converting liquid waste into resources to help pay for some of the financial costs of wastewater treatment. The use of liquid waste as a resource also conserves resources and can displace energy that might be generated by the combustion of non-renewable fossil fuels.

For example, a co-generation facility at the Annacis Island Wastewater Plant uses fats, oil and grease to generate energy-rich biogas in a controlled environment. The biogas is used to generate electricity, to help power the region's largest wastewater treatment plant.

The biosolids produced in Metro Vancouver plants are rich in nutrients and organic matter. Today, they are being used to:

- Rehabilitate land where mining or other activities have removed soil and vegetation,
- Fertilize lands to improve vegetative production,
- Create soil for landscaping purposes.

At North Shore's new secondary treatment plant, the design will include:

- Biogas to be used on site for energy, using either co-generation engines (producing electricity and heat), boilers, or upgrading to biomethane that could be sold to Fortis BC for injection into a natural gas pipeline or for use as vehicle fuel.
- The operations building would house an effluent heat recovery system, using heat pumps to extract heat for sale to nearby existing or new district energy systems.

Reclaimed water will used at the plant for industrial purposes. Discussions continue with local industries on the potential to offset their use of drinking water with reclaimed water from the new plant.