

# METRO VANCOUVER

Replacement of combined sewers

## THE SCIENCE

The sanitary waste system takes wastewater discharged from toilets, sinks and other household plumbing through municipal sewer pipes to a treatment facility. An independent stormwater system transports rainwater underground in sewer pipes or above ground flow in ditches, sending this water into local surface water after some treatment. Independent (i.e. separated) waste and stormwater sewer systems have been municipal best practice for new developments for the past five or six decades. However, before current practices were adopted, the approach in Canada had been to service homes with a combined sewer system to carry both sanitary waste and stormwater.

Combined systems continue to serve many homes across Canada, particularly in older neighbourhoods. Combined sewers are designed to discharge untreated sewage into local receiving waterbodies during intense precipitation events.

Some local governments replace combined sewers when they approach the end of their service life, choosing to install independent sanitary and storm water systems. Nevertheless, many homes in Canada are presently serviced by combined sewers.

## THE TRIGGER

Metro Vancouver is seeking to eliminate the discharge of untreated sanitary waste during extreme rainfall events. The primary objective of the member municipalities of Metro Vancouver is to eliminate the discharge of pollutants,

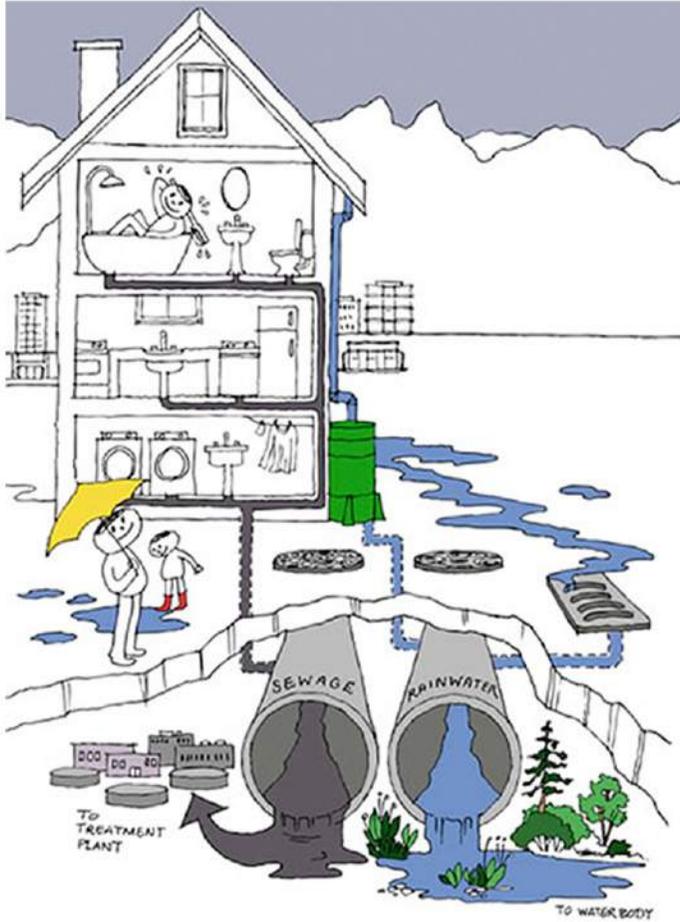
although a secondary impact of the approach chosen may be a reduction in the risk of damage to homes connected to combined sewers from the backup of sanitary wastewater.

The federal Fisheries Act prohibits the discharge of stormwater runoff that would negatively impact fish and their habitat. In order to understand and prevent changes in stormwater runoff quantity and quality, Metro Vancouver, its member municipalities, and provincial and federal environmental agencies combined their efforts in the formation of the Stormwater Interagency Liaison Group in 2002 under the provincially approved Liquid Waste Management Plan. This organization's main objective was to facilitate the co-ordination and sharing of common research related to stormwater management.

## THE APPROACH

In 2002, several environmental goals for the province were set under the Liquid Waste Management Plan. Since the largest impact of climate change in this area is expected to be increased frequency and severity of intense rainfall events. It was considered crucial for the Metro Vancouver area to improve stormwater management. Starting in 2002, Metro Vancouver initiated sewer studies analyzing long term rainfall records and climate change scenarios.

One of the goals of the Plan is the elimination of wet weather combined sewer overflows. In order to reach that goal, all combined sewer systems in Metro Vancouver will be replaced with



**Figure 18:** In a separated sewer system, stormwater is collected through storm drains and is conveyed through different pipes than household sewage. A separated sewer system eliminates combined sewer overflow (CSOs), prevents flooding by increasing capacity and allows stormwater to be used as a resource. (Source: City of Vancouver)

separated sewer systems.

Metro Vancouver has relatively young cities that experienced considerable growth in recent decades. Most of this expansion has been supported by modern sewer infrastructure. Some older neighbourhoods have legacy combined sewer systems but combined sewers are less common in Greater Vancouver than in many other large, older cities in North America.

## THE OUTCOME

In the Metro Vancouver area, the three municipalities with the highest percentage of combined sewers are Vancouver, Burnaby and New Westminster. Other

communities were developed more recently and were predominantly built with separate sewer systems. Vancouver, Burnaby and New Westminster have launched multi-year sewer separation programs, with regular reporting to the public in neighbourhoods where the work is completed, and a schedule for future work. Most combined sewers are to be replaced by 2050, with the last replaced by 2075.

The major challenge to emerge involves addressing sewer laterals on private property. The main purpose of the sewer separation program is the long-term elimination of wet weather combined sewer overflows into the ocean and Fraser River. To also reduce the risk of sewer backup, some work on private properties would need to be done. Sewer backups are generally caused by excessive amounts of rainwater inflow and groundwater infiltration entering the sanitary sewer, or by blockages caused by tree roots or debris in private sewer laterals. Excessive infiltration can occur when foundation drains and roof downspouts are incorrectly connected to sanitary sewers, or when the condition of the sewer lateral is poor, allowing excessive groundwater to flow into the sanitary sewer.

Metro Vancouver commissioned research to explore whether it would be feasible to implement a regulatory private sewer lateral certificate program in Metro Vancouver. The study reported that using the time-of-sale of a home or a property transfer as a triggering circumstance for requiring the rehabilitation of private sewer laterals

could be a feasible option for long-term management of inflow and infiltration from private properties. That option would imply a commitment from external key professionals in the building, plumbing, real estate and property transfer industries. Sewer lateral maintenance and rehabilitation tend to be far out of the average property owner's regular consciousness and, according to the report, "success is most likely to result from a staged timeline for implementation, to build understanding of the issues, acceptance of responsibilities, and move towards a general acceptance of the need for regular private sewer lateral maintenance over the long term." It would be the role of Metro Vancouver municipalities to enforce these recommendations through various programs or by-laws.

## A WORD FROM VANCOUVER

As explained by Robert Hicks, Senior Engineer, Liquid Waste Services Department for Metro Vancouver, "Private sewer laterals seldom receive any maintenance or inspection after their initial construction and most property owners do not know the condition of their sewer connections." The private portion of a sewer system is more difficult for municipalities to tackle because of complex jurisdiction issues. In Metro Vancouver, several jurisdictions, like the City of Surrey and Vancouver, have implemented sewer lateral replacement programs to minimize the long-term impact of inflow and infiltration.