

# Lake Whatcom Water Quality System

Bellingham, Washington



Getting

Less



from a Lot

American Public Works Association

Technical Innovation Award

2005

# Getting Less from a Lot

## Lake Whatcom Water Quality Protection

### Bellingham, Washington

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The City of Bellingham is dedicated to eliminating pollutants that enter Lake Whatcom, the drinking-water reservoir for over 85,000 Whatcom County citizens. It was found that concentrations of pollutants were entering the lake at Bloedel Donovan Park, particularly during stormwater-runoff events and from boating activities.

The three-acre parking lot at the park serves hundreds of vehicles every day as visitors enjoy Bellingham's busiest park. These vehicles leave oil and other automotive fluids on the asphalt, and these pollutants were carried down the gently sloping surface and into Lake Whatcom with the next rain.

As the lake's largest and most accessible public boat launch, the park is the site of significant boat-launch activity. Although boaters are prohibited from dumping bilge water on the site, it has been difficult to control this activity. The bilge water from motorized watercraft typically contains amounts of oil and gas that drain out as well. Historically, this polluted bilge water ran back into the lake.

This combination of pollution from vehicles and boats became a serious concern for Lake Whatcom water quality. The City's Engineering Department analyzed the situation and developed a plan that incorporates four systems to filter the stormwater and the unwanted bilge-water runoff from 95% of the parking-lot surface before it enters the lake (see site plan drawing A).

These systems are:

- 1) Rain gardens to treat and infiltrate runoff (detail sheet C);
- 2) StormFilter® vaults to filter pollutants via a series of cartridges filled with filter media (detail sheet B & C);
- 3) A sand filter to treat road runoff that enters the park from the bordering arterial (detail sheet B); and
- 4) Infiltration galleries that accept pre-treated water and further cleanse the water by infiltration (detail sheet B & C).

Public Works Engineering staff designed the water quality system. Construction was accomplished with the assistance of several city departments and the Washington Conservation Corps. The total cost of the project was \$123,324, funded by the City of Bellingham Storm and Surface Water Utility with a small grant from Puget Sound Action Team.



## RAIN GARDEN

The first of these elements is the rain garden, a relatively new concept in stormwater management. These micro-scale features harness the natural processes of plants and soil to capture pollutants while adding beauty to their surroundings. Native plants are placed in the garden for minimal upkeep and survivability.

The rain garden at the entrance to the park.

The Bloedel Donovan project incorporates two of these rain gardens in our pollution-control plan. One of the gardens is situated at the entrance to the park. Prior to its installation, stormwater from the upper parking lot and Electric Avenue, the adjacent arterial, drained through pipes into Lake Whatcom. Now the rain garden infiltrates most of that stormwater after treating it by means of soil and vegetation. Stormwater that exceeds the rain garden's capacity overflows to a filter cartridge system and infiltration gallery. The rain gardens not only enhance the quality of the stormwater but add beauty to the site as well.



Indigenous plant life thriving in rain garden.

# Rain Garden

This "Rain Garden" was created by the City of Bellingham Public Works Department to filter pollutants and slow the flow of rainwater washing off the parking lot into Lake Whatcom. The Rain Garden is one of many methods that can be incorporated into the landscape to reduce the impacts of development on the source of our drinking water.

HOW IT WORKS:

① Rainwater runs off the parking lot into Rain Garden.

② Pollutants are filtered out of rainwater as the water seeps through mulch, soil & gravel layers. Water exits the Rain Garden into ground water.

③ In large storms overflow from the Rain Garden flows into a second treatment area before entering Lake Whatcom.

PLANTS:

Yellow Monkeyflower (*Mimulus guttatus*)  
 Black Twinberry (*Lonicera involucrata*)  
 Nootka Rose (*Rosa nutkana*)  
 Kinnikinnick (*Arctostaphylos uva-ursi*)  
 Evergreen Huckleberry (*Vaccinium ovatum*)  
 Common Snowberry (*Symphoricarpos albus*)

These plants were selected because they can thrive in very wet soil and very dry soil. They are native to the Pacific Northwest which means they are adapted to our weather and resistant to local pests and therefore eliminate the need for fertilizer and pesticides.

Funded in part by:

PUGET SOUND WATER QUALITY ACTION TEAM  
Member of the Bloedel

To learn more about this new approach and how you can help protect our lakes and streams, contact the City of Bellingham Public Works Department, 676-6961 or Planning Department, 676-6982.

Interpretive sign in rain garden at park entrance.



Boat-launch area prior to construction.

The second rain garden is located at the lower end of the park near the boat launch. Because stormwater and pollutants from boats and vehicles using the parking lot flowed directly down the boat ramp and into the lake, this rain garden was designed to capture runoff that could not be treated by filter vaults or other means. Runoff is directed to the rain garden by a simple asphalt berm. The water is treated and infiltrated rather than flowing directly into the lake.



Construction of lower rain garden.



Construction inspectors performing a walk-through of the final project.



A rain garden doing its job.

### StormFilter® VAULT

The second method used for pollution protection is the StormFilter® vault. Two vaults were used on this project, one for the lower parking lot and one near the upper parking lot. These are proprietary devices from Storm Management, Incorporated, of Portland, Oregon. Water on the



Parking lot prior to installation.

lower parking lot is diverted by a berm to the vault instead of flowing directly into the lake. Media cartridges within the vault provide treatment. For these installations, the City uses perlite as the filter medium.



Completed StormFilter® system.



Filters in the vault.



## SAND FILTER

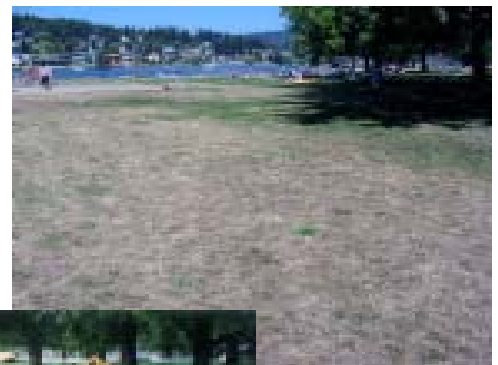
The third method is a sand-filter structure designed to capture stormwater from Electric Avenue. This arterial street was connected to the Bloedel Donovan piping system, redirecting runoff into the sand filter for treatment. As with the other stormwater-control installations, this system does not detract from the function of the park or the enjoyment of its visitors.

The sand filter, behind a cottage-stone wall.

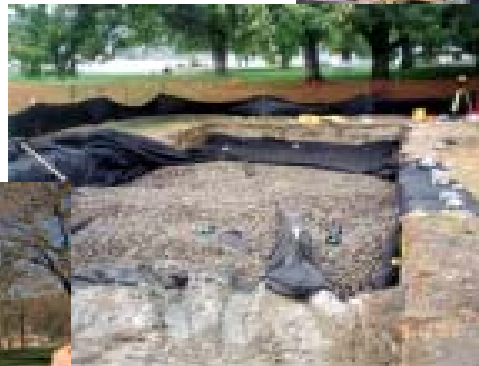
## INFILTRATION GALLERY

The fourth water-treatment process consists of two infiltration galleries. These systems take water cleaned by the other systems and infiltrate it into the ground. Water from the filter vaults and overflow from the sand filter and the upper rain garden are directed to this final treatment process. The systems were installed at the westerly side of the park near the playground and swimming area. The infiltration galleries operate without disrupting the functionality and beauty of the park.

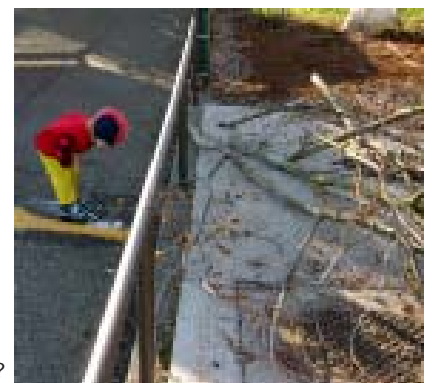
Playground and swimming area prior to construction.



Filter system under construction.



The system after construction.



Where did that water go, anyway?