Case Study 8.8 Seattle's Thornton Creek Water Quality Channel

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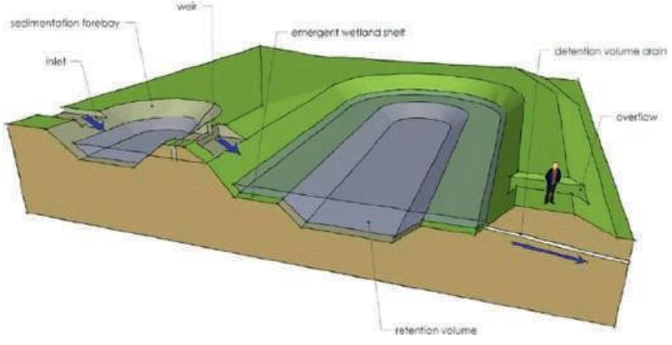
Keywords	Stormwater treatment, green infrastructure, public space, ecosystem-based adaptation
Population (Metropolitan Region)	3,613,621 (U.S. Census Bureau, 2010)
Area (Metropolitan Region)	15,209 km² (U.S. Census, Bureau, 2010)
Income per capita	US$56,180 (World Bank, 2017)
Climate zone	Csb – Temperate, dry summer, warm summer (Peel et al., 2007)

The Thornton Creek Water Quality Channel, located at the headwaters of the South Branch of Thornton Creek, Washington, is a multipurpose water management project providing multiple environmental and social benefits to the urban population of Seattle. This facility addresses the problem of both heavy sedimentation and polluted water flow into the natural creek in the hilly catchments of Seattle. The integrated water treatment and management plant captures runoff from the human-populated upstream watershed areas and treats it before it flows into Thornton Creek and Lake Washington. The environmentally sound water cleaning facility occupies minimal space but provides multiple spatial and environmental benefits to the local community. It has also led to the development of a new neighborhood that is emerging as a growing urban center of the city. The facility can be termed as classic example of urban green infrastructure.

INNOVATIVE AND RESILIENT DESIGN

The project uses natural drainage system revival technology simulating the natural process of water flow to clean polluted and silted water and allow the cleaned water to flow through natural percolation and seepage systems year-round. The environmentally friendly design (Case Study 8.8 Figure 1) has developed natural landscaping and public pathways giving easy access to citizens to different public facilities and private buildings located throughout the area.

This model project offers the last-available opportunity to improve the quality of stormwater runoff before it reaches the creek. The channel design diverts stormwater from the drainage pipe under the site to a series of surface swales landscaped with special soils and native plants. These ponds interrupt runoff speed, allowing water to seep into the soil and removing pollutants in the process. The channel regulates the water flow both during wet and dry weather, allowing for continuous cleaning of stormwater.



Case Study 8.8 Figure 1 *An innovative natural drainage design.*

The community-driven project turned into a collective action effort that met the broad objectives of major stakeholders and fulfilled their common goals. The design has allowed development of diverse types of residential buildings, job-creating private-sector enterprises, retail shops, and rest and recreation places while preserving a natural environment. This is in contrast to what existed before – a gray and brown parking lot. The provision of public open space has been used to raise environmental awareness thus providing long-term benefits, albeit of intangible nature. The facility has attracted significant private-sector investment in terms of the residential and commercial complex. The modest US$14.7 million that it cost to build the Thornton Creek facility is believed to have generated more than US$200 million in the form private-sector–led investment in the city, thus catalyzing the Northgate neighborhood as a vibrant urban center of Seattle (Benfield, 2011).

ADAPTATION STRATEGY

Carved out of a former mall parking lot, the Thornton Creek Water Quality Channel provides public open space for Seattle's Northgate neighborhood while treating urban stormwater runoff from 680 acres of North Seattle. This project grew out of grassroots efforts to transform the piped Thornton Creek that ran under the parking lot to a natural water catchment system. Political leaders overcame a number of barriers that stood between developers and environmentalists by establishing a broad-based Northgate Stakeholder Group to find a way to integrate private development, public open space, and a major stormwater facility. What resulted through these collective efforts is an adaptive and resilient urban ecosystem management project providing multiple climate change adaptation and social benefits.

Opened in 2009, this catalytic natural space provides pedestrian connectivity among a major transit hub, community services, housing, and retail outlets. There is a continuous expression of water flowing, pooling, and cascading in the channel. During and after storms, the full capability of the broad channel bottom is engaged for water-quality treatment. Overlooks and bridges allow users to enjoy the channel habitats and wildlife. Seat walls, benches, and interpretive artwork contribute to an inviting environment where visitors can linger and learn in a high-performance landscape (see Case Study 8.8 Figure 2).

The project has resulted in:

- A successful community process that balances public and private goals in support of environmentally compatible development and socioeconomic sustainability developed in a highly contested urban space
- The ability to catalyze more than US$200 million in investment in adjacent private residential and commercial development, generating jobs and economic opportunities
- An illustration of how to transform a former mall parking lot, a common "grayfield" in many American communities, into an aesthetically and environmentally productive urban landscape.
- Water-quality treatment for runoff from 680 acres within a beautiful setting where visitors can learn about natural systems and the restoration of a historic creek.

- Increases in open space in the Northgate Urban Center by 50% to provide an oasis of native vegetation for neighbors and wildlife, thus promoting urban biodiversity.

The key lessons learned are that (1) multistakeholder processes and community-driven initiatives lead to change in developing urban resilience, and (2) both bottom-up and top-down processes are necessary, provided the city government recognizes and internalizes both in urban ecosystem-based adaptation planning and implementation.

Case Study 8.8 Figure 2 *Thornton Creek in Seattle: An example of human-developed biodiversity and ecosystem.*

Case Study References

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