



2nd Avenue SEA Street, Seattle, Washington

Full Mitigation Best Practice Story

State-wide, Washington

Seattle, WA - The 2nd Avenue Street Edge Alternative (SEA) Street project was a pilot project undertaken by Seattle Public Utilities to redesign an entire 660-foot block with a number of Low Impact Development (LID) techniques. The goals were to reduce stormwater runoff and to provide a more “livable” community.



Throughout the design and construction process, Seattle Public Utilities worked collaboratively with street residents to develop the final street design. The design reduced imperviousness, included retrofits of bioswales (landscape elements intended to remove silt and pollution from surface runoff water) to treat and manage stormwater, and added 100 evergreen trees and 1,100 shrubs.

Conventional curbs and gutters were replaced with bioswales in the rights-of-way on both sides of the street, and the street width was reduced from 25 feet to 14 feet. The final constructed design reduced imperviousness, or resistance, by more than 18 percent.

An estimate for the final total project cost was \$651,548. A significant amount of community outreach was involved, which raised the level of community acceptance. Community input is important for any project, but because this was a pilot study, much more was spent on communication and redesign than what would be spent for a typical project.

The costs for the LID retrofit were compared with the estimated costs of a conventional street retrofit. Managing stormwater with LID techniques resulted in a cost savings of 29 percent. Also, the reduction in street width and sidewalks reduced paving costs by 49 percent.

The avoided cost for stormwater infrastructure and reduced cost for site paving accounted for much of the overall cost savings. The nature of the design, which included extensive use of bioswales and vegetation, contributed to the increased cost for site preparation and landscaping. Several other SEA Street projects have been completed or are under way, and cost evaluations are expected to be favorable.

For this site, the environmental performance has been even more significant than the cost savings. Hydrologic monitoring of the project indicates a 99 percent reduction in total potential surface runoff, and runoff has not been recorded at the site since December 2002, a period that included the highest-ever 24-hour recorded rainfall at Seattle-Tacoma Airport. The site is retaining more than the original design estimate of .75 inch of rain.

A modeling analysis indicates that if a conventional curb-and-gutter system had been installed along 2nd Avenue instead of the SEA Street design, 98 times more stormwater would have been discharged from the site thus reinforcing the benefit of the LID retrofit.

Activity/Project Location

Geographical Area: **State-wide**

FEMA Region: **Region X**

State: **Washington**

Key Activity/Project Information

Sector: **Public**
Hazard Type: **Flooding**
Activity/Project Type: **Flood Control**
Activity/Project Start Date: **01/1997**
Activity/Project End Date: **12/2007**
Funding Source: **Other Federal Agencies (OFA)**

Activity/Project Economic Analysis

Cost: **Amount Not Available**

Activity/Project Disaster Information

Mitigation Resulted From Federal
Disaster? **No**
Value Tested By Disaster? **Unknown**
Repetitive Loss Property? **Unknown**

Reference URLs

Reference URL 1: <http://www.epa.gov/owow/nps/lid/costs07/>
Reference URL 2: <http://www.fema.gov/hazard/flood/index.shtm>

Main Points

- The 2nd Avenue SEA Street project was a pilot project undertaken by Seattle Public Utilities to redesign a 660-foot block with LID techniques.
- The new design reduced imperviousness, included retrofits of bioswales (landscape elements intended to remove silt and pollution from surface runoff water) to treat and manage stormwater, and added 100 evergreen trees and 1,100 shrubs.
- Conventional curbs and gutters were replaced with bioswales in the rights-of-way on both sides of the street, and the street width was reduced from 25 feet to 14 feet.
- The final constructed design reduced imperviousness, or resistance, by more than 18 percent.
- Managing stormwater with LID techniques resulted in a cost savings of 29 percent.
- The reduction in street width and sidewalks reduced paving costs by 49 percent.
- A modeling analysis indicates that if a conventional curb-and-gutter system had been installed instead, 98 times more stormwater would have been discharged from the site thus reinforcing the benefit of the LID retrofit.