

Street Edge Alternatives (SEA Streets) Project

Seattle, WA (2001)

Background:

Seattle Public Utilities constructed a drainage project at 2nd Avenue NW known as a Street Edge Alternatives (SEA Streets) project. It involved the complete reconstruction of the street and its drainage system to reduce impervious area and install stormwater detention ponds. It was completed in the spring of 2001, and designed to provide drainage that more closely mimics the natural landscape prior to development than traditional piped systems. To accomplish this, Seattle reduced impervious surfaces to 11 percent less than a traditional street, provided surface detention in swales, and added over 100 evergreen trees and 1100 shrubs.

The method they used to achieve this goal was to maximize the stormwater time of concentration and the sites detention volume, without compromising homeowner access and parking needs on the street. They also sized the swales to detain the pre-developed two-year, 24-hr storm event, while not allowing infiltration. Finally, they hydraulically connected the swales into three groups, with each group controlled by a flow control structure. Detention volume achieved by the swales was 2,500 cubic feet; 37% more volume than would have been required by their drainage ordinance.

Monitoring:

Two years of monitoring show that the SEA Streets project has prevented the discharge of all dry season flow and 98 percent of the wet season runoff. Whereas all events in the baseline monitoring period, which occurred mostly in the dry season, created a discharge.

Conclusions:

One of the primary drainage goals was to use surface retention or detention to reduce 2-year, 24-hour storm event (1.68-inches) peak runoff rate and volume to pre-developed conditions. The SEA Street design resulted in reduced total volume of stormwater within its 2.3-acre capture area by 97 percent for two consecutive years. This significantly reduced the impacts of urban environments on streams inhabited by salmon. The SEA Streets design fully attenuates 2300 ft^3 (65.2 m^3) of runoff, which represents the volume produced by approximately 0.75 inch (19 mm) of rain on its catchment. Mean storm quantity at Seattle-Tacoma International Airport is 0.48 inch.

The project exceeds Seattle's stated goals, but falls short of the Healthy Waters Aspirational Goal. Also the site was designed to only detain a large portion of a storm's flow and not retain it. It captured up to 97% of runoff from all storm events within a 2 year period. That is different, and less stringent, than capturing 97% of the runoff from all storms and retaining that volume onsite. Also, water quality was not monitored. It was assumed flow reductions would reduce contaminant loads, but no data exists to quantify any reductions. Since the bulk of the storm eventually leaves the site anyway, reductions of contaminant levels would not likely be impressive.