



# Green Infrastructure & Stormwater Management CASE STUDY

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## Headwaters at Tryon Creek

**Location:** Portland, OR

**Client:** Winkler Development

**Design Firm(s):** City of Portland, Bureau of Environmental Services; Greenworks PC

**Landscape architect/Project contact:** Tom Liptan, FASLA

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**ASLA Chapter:** Oregon

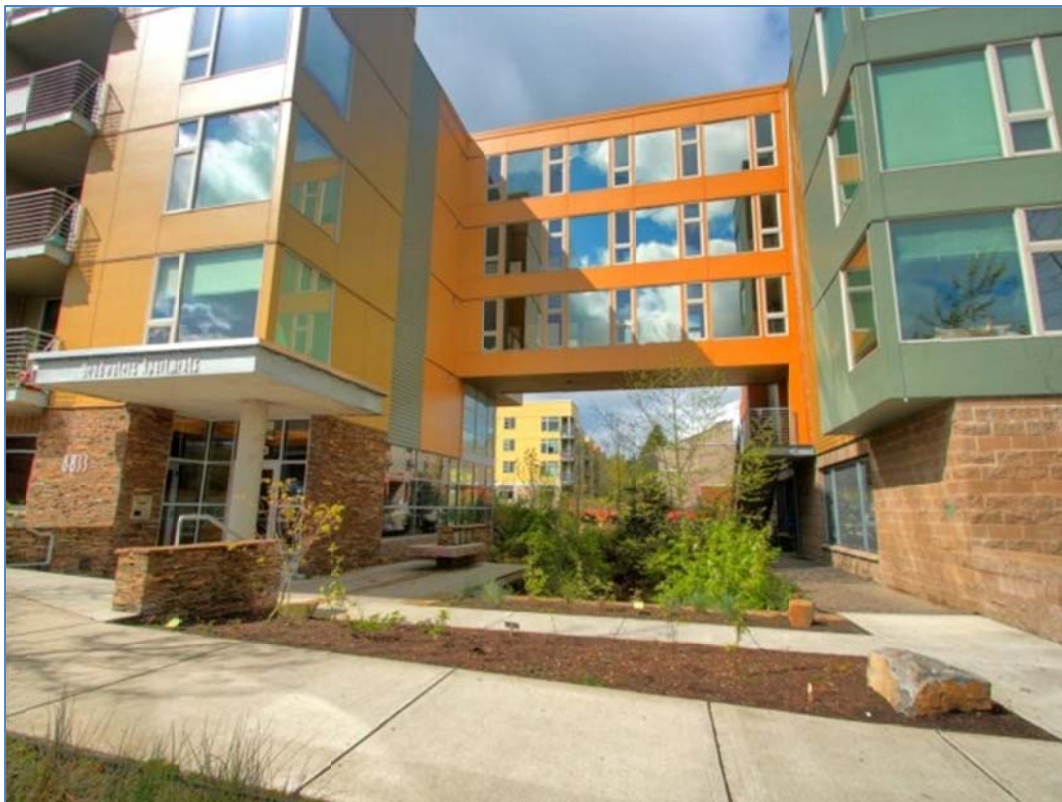


Photo: Headwaters Apartments

### Project Specifications

**Project Description:** Headwaters at Tryon Creek transformed a derelict site, piped creek, brownfield, degraded wetland, and poor transit into a sustainable development that “gives back” to its neighborhood and watershed. The project includes 14 rowhouses, 56 senior housing units and 100 market-rate apartments which has improved environmental and economic conditions with creek and wetland restoration, improved creek hydrology and water quality, reduced urban

heat island and energy consumption, increased property values, property tax revenues, improved transit for pedestrians and bikes, and restored wildlife habitat.

**Project Type:**

Multifamily residential, transportation, open space restoration, commercial  
Part of a redevelopment project

**Design features:** Bioretention facility, rain garden, bioswale, green roof, porous pavers, curb cuts, and stormwater flow-through planters were installed at building foundations.

**This project was designed to meet the following specific requirements or mandates:**

Local ordinance, developer/client preference, City stormwater management code. Creek daylighting was done voluntarily.

**Impervious area managed:** greater than 5 acres

**Amount of existing green space/open space conserved or preserved for managing stormwater on site:** 1 acre to 5 acres

**The regulatory environment and regulator was** supportive of the project.

**Did the client request that other factors be considered, such as energy savings, usable green space, or property value enhancements?** The developer constructed seating areas and overlooks to take advantage of views to the restoration, daylighted creek, stormwater facilities and associated wildlife. All units have views of a vegetated stormwater facility or other green space.

**Cost & Jobs Analysis**

**Estimated Cost of Stormwater Project:** \$500,000-\$1,000,000 (Public funding: Federal, state, regional, local)

**Was a green vs. grey cost analysis performed?** No

**Cost impact of conserving green/open space to the overall costs of the site design/development project:** Not available.

**Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)?** Not available

**Number of jobs created:** Not available

**Job hours devoted to project:**

Planning and Design: Not available

Construction: Not available  
Annual Maintenance: Not available

## Performance Measures

### Stormwater reduction performance analysis:

The redevelopment portion of the project (5 acres) was required to meet the city stormwater regulations and manages rain/runoff as follows: Detention of storms up to and including the 10 year event is achieved. Retention of small storms is achieved. Water quality treatment of 90 percentile storms is achieved. Partial distribution of captured rain through evaporation is achieved. For the retrofit portion of the project (4 acres) is retained, detained and treated to the 90 percentile storm.

**Community & economic benefits that have resulted from the project:** Adjacent apartment buildings have remodeled as a result of this project and the neighborhood has a dramatically improved look. It's proximity to a transit center and new bike lanes encourage alternative modes of transportation. All units sold quickly.

## Project Recognition

ASLA Oregon Honor Award, 2008; ACEC Engineering Excellence Award, 2008

## Additional Information

**Links to images:** [http://greenworkspc.wordpress.com/portfolio/community-planning/headwaters\\_149/](http://greenworkspc.wordpress.com/portfolio/community-planning/headwaters_149/)

<http://www.headwatersapartments.com/>

### Site History:

The site's original native conifer forest surrounded a tributary in the upper reaches of the Tryon Creek watershed and was logged and cleared for farmland during the settlement of Portland over 100 years ago. The creek became restricted to a tight channel cutting through open fields of agriculture and orchards until the wet clay soils proved too much and the site was abandoned for other unknown uses until the late 1940's. The immediate surroundings eventually developed into a busy village and around 1950 the site was developed as the Water Night Club. With this development the tributary was contained in a pipe to make way for the building and parking lot.

Over the years the site changed ownership, the building was abandoned and the site became a storage lot surrounded by a chain-link fence. In 1999, the developer purchased the property and, along with the design team and the city's environmental department, realized the

importance of the buried stream. It became the primary topic of concern: "Should it remain buried and out of the way or should it be revealed and brought back to life?"

Working with the City, the developer/design team's vision grew as economic and environmental opportunities presented themselves beyond the site's property lines. The site and portions of the right-of-way became the crucial link for connecting an upstream, forested wetland owned by the City and the downstream City-owned forested site that connects to the Tryon Creek mainstem. Many other partners were identified and allied to the project, including a total of five city bureaus, and regional, state and federal agencies. Grant funding was obtained for private property stream restoration through programs provided by the regional and state governments. The City's environmental department allocated almost \$500,000 for wetland, stream, raingarden and transportation improvements.

The development consists of a variety of housing types, including LEED Silver townhomes, affordable senior housing and market rate apartments. In the right-of-way the city identified that a 200-foot section of street was redundant and may actually impair safety. This was later confirmed by a traffic study and the street was removed, creating the crucial space for the creek to be daylighted. Surprisingly this is almost where the original creek once flowed naturally. To increase the length and area for this creek and rain garden, the city worked with adjacent property owners and identified site changes needed from them to maximize the project's beneficial impacts. Driveways were moved or even eliminated at no expense to the owners and with their full agreement, as these changes were viewed as desirable improvements. Stormwater runoff is captured from a nearby commercial area and conveyed to the rain garden, which is adjacent to the daylighted creek and built as a series of vegetated terraces cascading from one to the other, eventually connecting to the creek after filtration and detention of storm flows diminish.

Numerous issues arose during the design process, such as wage concerns which almost crippled the financing, but were resolved. Perhaps most disturbing was after permitting and site demolition, soil contaminants were discovered in excavated materials. The site was now declared a brownfield for clean up in order to keep the toxins from reaching the stream. Over 2,200 tons of contaminated soil were removed and replaced with clean gravel. The plans for construction could now proceed with the 450 linear-feet of restored stream on the private site. If not for the tenacity of the developer, this project and its many public benefits would not have been realized.

Ultimately more than 1,000 linear-feet of stream was daylighted. Stream design uses root snags, logs, rocks, boulders, and native plantings that create a meandering water path. Restoration practices were used to select and densely plant native trees, shrubs, and grasses throughout the restored upland wetland, stream channel, and raingardens. Native plantings also help shade the stream and create a natural vegetated buffer. The architects found an elegant and practical solution for the final building design which would allow the creek to go

between two structures and under a three level, enclosed observatory bridge. The entrance to the development allows the stream to take center stage with the breezeway entrance from the street. The architecture of the buildings and site elements fold and frame the stream with balconies, boardwalks, courtyard, seat walls, and bridges to embrace the view. Porous pavement is used in the parking lots. Infiltration and flow-through planters capture roof runoff, and downspout gardens diffuse and infiltrate storm water from the roofs. Eight eco-roofs totaling over 15,000 sq/ft capture and detain precipitation providing additional habitat. Green street infiltration swales display the conveyance of stormwater, collecting all runoff from adjacent public right of way. Instead of using pipe to convey runoff to the raingarden, a 70-foot concrete flume was used integrated with native plantings, along the public sidewalk. Water is celebrated as a resource in this community as it artfully finds its way to Tryon Creek.