



# WATER PETAL CASE STUDY BIRCH CASE STUDY HOUSE

The Birch Case Study House was developed by Dan Welch of [bundle] as an experiment in applying Living Building Challenge principles to single family living, while offering a laboratory of cutting-edge technology to the green building community. With respect to water, the house is completely off-grid. Along with his family, Welch harvests all of their water from rainfall and manages all of their domestic sewage on-site. It is the first building within the city of Bellingham to completely opt out of sewer and water connection. The thousands of dollars saved on permits and utility construction hookups for City Water and Sewer were invested in Net Positive Water technologies, including cisterns and composting toilets.

## SYSTEMS + POLICY

### RAINWATER HARVESTING

Rainwater is captured from the roof and fills two 5,000 gallon tanks. Downspout filters keep large debris from entering the tanks. Water from the cisterns is moved by a jet pump through two sediment filters and a carbon block before final UV filtration. Though the City of Bellingham encourages rainwater harvesting, this system had to be permitted through Whatcom County before the City could allow the building to waive municipal water connection. Welch used the County Department of Health's established guidelines for private rainwater catchment for potable use to obtain a permit, meeting Bellingham's requirement for evidence of adequate water supply ([WA RCW 19.27.097](#)).

### GREYWATER TREATMENT

A small septic system treats all of the greywater on-site, permitted by Whatcom County using the standards listed in Washington State Department of Health's "[Water Conserving On-Site Wastewater Treatment Systems](#)." Welch also designed a solarium planter with two feet of soil in the hopes of treating and using greywater closer to the source. The City of Bellingham was responsible for permitting this internal system via the Uniform Plumbing Code, but did not feel comfortable doing so without further research from a public health professional. The solarium is installed and awaits this additional research to be made functional.

### BLACKWATER TREATMENT

Welch permitted the composting toilets through Whatcom County Code Chapter 24.05. Though WCC 24.05 pulls from WA Administrative Code WAC 246-272A, which allows site-built systems, the local Whatcom code only allows for the use of pre-approved systems on the state's list. Welch made a case that the site-built system he proposed was actually more hygienic (as a batch rather than continuous composter), but ultimately was forced to install the proprietary toilet.

IMAGE COURTESY [BUNDLE]

### LOCATION

BELLINGHAM, WA

### TYPE

SINGLE FAMILY HOME

### SIZE

2,000 SQUARE FEET

### OCCUPANTS

5 FULL-TIME

### BIRCH HOUSE SOLARIUM



IMAGE COURTESY [BUNDLE]

### BIRCH HOUSE GREEN ROOF



IMAGE COURTESY [BUNDLE]