Kowalsky-Dupre Ecoroof Final Report

Project Summary

Owners: Greg Kowalsky and Renee Dupre
Address: 128 NE 74th Ave Portland Oregon, 97213
Project Type: small storage shed for single family residential
Ecoroof area: 192 square feet, 4% slope
Orientation: facing west, partial shade
Design and Construction: by owner
Construction Timeframe: October 2011 to March 2012

Background

Our home, a 962 square foot farm house, was built in 1900 and sits on a 3,700 square foot lot. There are many benefits of living in a small home, but one of the downsides is limited storage, which is why we decided to build a shed for bikes and landscaping tools. Despite the small lot and city location, the backyard is comfortable, quiet and protected by two large cedar trees. An Ecoroof was selected to integrate the shed into the yard and add visual green space, while offering the pragmatic benefits of increased storage and minimizing stormwater runoff. We chose to slope the shed roof from back to front so that the Ecoroof was more visible from the yard and street.

Design

The modified post and beam structure was designed in Google SketchUp, a free 3-D design program that is easy to learn. The storage area is approximately 8'x12' with 18" overhangs on the side and 36" overhang in the front and a 12" overhang in the back. This will provide significant protection for the shed structure during Oregon's long wet season and a 12' by 16' roof area.

The roof is supported by 2"x6" rafters on 12" centers with ¾" plywood sheathing. We consulted framing code, online engineering calculators, and a friendly mechanical engineer to verify structural capacity. To simplify construction we wrapped the entire roof perimeter with 1"x12" cedar to create a shallow tub to hold the soil. With a ¼" drip edge, 5.5" rafters and ¾" sheathing, there was room for 5" of soil.

We used a single piece of EPDM liner for water proofing. The liner was readily available and in stock locally in roles 15' wide that are cut to length. This allowed us to cover the roof with a single piece. We added a perforated PVC drainage pipe along the bottom edge of the roof underneath the soil and connected it to a single outlet. The outlet is a simple hole through the corner of the roof in the overhang area, which is sealed with a bulkhead fitting. The bulkhead fitting is connected to a rain chain. A small French drain captures water that does runoff the roof.

We purchased an Ecoroof soil mix from Phillips Soil Products, who are on Portland's Ecoroof resource list. They provided a certified extensive mix and were friendly and easy to work with, even though we only required 2 cubic yards of soil.

We selected two types of sedums for the majority of coverage. Two types of grasses were placed on about 1/3 of the roof, near the front and the side, so that the Ecoroof can easily be observed and recognized from the ground and street.

We placed a soaker hose on the roof connected to a timer for irrigation. The slope of the roof and capillary action of the soil allow for relatively even watering.

Construction

The majority of the time was spent clearing and isolating invasive bamboo from the project area and framing the shed. Installing the liner, soil and plants takes a lot longer relative to typical shingle roofing. Since shingles go up so quickly though, the extra construction time and effort for the Ecoroof was small. We wrapped the liner up and over the sidewalls to isolate the roof and concealed the liner with cedar trim. We picked up the soil in bulk sacks, backed the pick-up truck to the shed and manually threw the soil on the roof one shovel at time. This was quick and easy for a small project. Working on weekends, we cleared the area in October and were dried in with the liner on by the end of December. Soil went up in January and plants were added in April.

Cost

The total cost of the shed was approximately $2,750. The portion of the cost specifically for the roof was approximately $1,300. Estimates for a conventional shingled roof are $300, although the slope and design of roof would change significantly, which might require additional cost.

Green Roof Cost		
Green Roof Soil	$	192
Waterproof Liner	$	267
Plants	$	333
Drainage	$	35
Rafters	$	119
Sheathing	$	107
Rim containment	$	128
Flashing	$	56
Drip House	$	24
Hose	$	20
Water Timer	$	40
Total	**$**	**1,321**

Traditional Cost		
Shingles	$	88
Felt	$	21
Rafters	$	88
Sheathing	$	79
Flashing	$	28
Total	**$**	**303**

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Conclusions

This was a fun and rewarding project that has met our goals for an attractive, low impact way to add basic storage to a small house. The City was easy to work with, and an Ecoroof was relatively easy to design and install. We had hoped irrigation would not be required after a few years. Now that it is August, it is apparent the soil dries out quickly, especially on the portion of the roof with more sun. Irrigation for two months a year may be necessary for a healthy roof, but that remains to be seen.