KERBY STREET HOMES

Making Speculative Green Homes a Success

How does a developer successfully create an attractive, sustainable development on a small infill lot in one of Portland's inner neighborhoods? Ask Aaron Blake of Reworks. He transformed an underdeveloped 10,000 square-foot lot with safety concerns into a showcase of green building practices. The new homes and associated sidewalks and street trees have improved the livability of the neighborhood and helped advance city and regional goals for density and development.

Using Liquid Sunshine to Reduce Water Use

Each of the Kerby Street Homes features a rainwater harvesting system. This system reduces water use by approximately 25 percent. Developer Aaron Blake noted that the most challenging aspect of installing the rainwater harvesting system was coordinating the numerous trades people involved in the installation.

First, excavators dug the pit for the cistern and drywell; next the plumbing contractor installed the supply line; then the general contractor installed the cistern and electrical system; after which the roofer installed the standing-seam metal roof; and finally the gutter contractor installed the gutters and downspouts that fill the cistern.

Using Real Sunshine to Reduce Energy Use

The Kerby Street homes were built as a speculative development, but all four were sold to homebuyers during the construction phase. Before construction was completed, Mr. Blake explored solar options with future owners. All the homeowners expressed an interest in solar, so Mr. Blake worked with Mr. Sun Solar to pre-wire the homes.

During the rough-in phase of mechanical systems, Mr. Sun Solar, Inc. ran copper piping and electrical wire from the roof to the mechanical room on the ground floor for the future installation of the solar arrays. Pre-wiring and plumbing assured that the systems were properly integrated into the house instead of retroactive installation that incurs the hassle and cost of retrofitting the systems after construction.

At the end of the project, the solar thermal panels were craned onto the rooftop and secured to the roof. In the mechanical area of each home, an 80-gallon solar storage tank with a heat exchanger was set and plumbed to the domestic hot water tank. On one house, a 2 kW photovoltaic array was installed on the roof beside the hot water panels and hardwired to an inverter in the garage that sends the energy generated back to the grid.

Find more City of Portland resources for healthy living at www.portlandonline.com/bps

Bureau of Planning and Sustainability
Innovation. Collaboration. Practical Solutions.

City of Portland, Oregon
Sam Adams, Mayor • Susan Anderson, Director

Printed on 100% post-consumer recycled paper that is manufactured using 100% certified renewable energy.

These features were attractive to homebuyers due to their potential for significant long-term savings. Blake reports that these homes sold for higher prices than similar sized new homes in the area.

These systems require very little long-term maintenance. Occasionally, the solar collectors should be cleaned of dust and the fittings checked for any sign of leaks. Similarly, the rainwater harvesting system, despite its many components, is relatively low-maintenance. The roof washers and the gutters need to be checked for debris and cleaned twice a year, and the cistern cleaned annually. The other components require no routine maintenance and operation of the system is virtually hands-free.

Energy-Saving Heating and Cooling Systems

The Kerby Street Homes also feature a combination of both innovative and relatively simple energy saving systems. In addition to high-quality insulation and passive solar design elements, the radiant hydronic in-floor heating system with a concrete thermal slab provides even, comfortable heat, with a 30-50 percent energy savings over a forced-air system. The homeowner needs only to set the temperature once during the season to establish a comfort level that is maintained at all times. Blake reports that the homeowners have said they are pleased with the way the comfort and energy savings offered by the heating systems.

Another energy saving system is heat recovery ventilation (HRV). The intent of the HRV is to provide fresh air to a space, while using the exhaust air to preheat the intake air. The HRV is operated with a control that allows for a range of settings that control speed, filtration, and humidity. The user sets the unit to exchange air continuously at a relatively low speed for routine operation and adjusts the humidity control to eliminate condensation. The HRV is also outfitted with a HEPA filter and a particulate filter to remove any air-borne allergens.

Other Sustainable Features

The homes feature a variety of other sustainable elements:

- Green (vegetated) roofs over each porch.
- Fiber cement siding installed over a rain screen system.

- 50 percent fly ash added to concrete foundation walls.
- Driveways with pervious pavers to reduce water runoff.
- Low/no-VOC finishes and materials: Formaldehyde-free MDF trim, wheat-board cabinets, bamboo treads and flooring, and wool carpet and recycled denim carpet pad, as well as low VOC paint.
- Use of sprayed-in foam insulation in the demonstration home that is about twice as air-tight as a fiberglass batt-insulation.

Energy and Water System Financial Savings and Benefits

Costs	
▪ Thermal Envelope (Durafill insulation)	$5,000
▪ Radiant Hydronic Floor System	$9,011
▪ Solar Hot Water system	$5,100
▪ Solar PV System	$9,200
▪ Rainwater Harvest System	$4,786
▪ Native landscaping/small yards	$5,071
▪ Low-flow toilets and showerheads	$ 1,200
TOTAL	$39,368
Offsetting Grants and Rebates	
▪ Incentives: GIF Grant (builder assistance)	$3,500
▪ Federal Tax Rebates (for Solar Systems)	$2,820
▪ Energy Trust Incentives	$6,660
TOTAL	$12,980
Projected Operational Cost Savings	
▪ Heating –approximately 50% annually	$780/year

Resources and Suppliers

Reworks, Inc. ▪ *www.reworksinc.com*

Energy Trust incentives ▪ *www.energytrust.org*

Parr Lumber ▪ *www.parr.com*

Pacific Hydronics ▪ (no local Web site)

Wolcott Plumbing ▪ (no Web site)

Bear Electric ▪ *www.bearelectric.com*

Willamette Graystone ▪ *www.willamettegraystone.com*

Mr. Sun Solar ▪ *www.mrsunsolar.com*

Bell Heating ▪ *www.bellheating.com*

Project Partners

EnergyTrust of Oregon

Environmental Services City of Portland
working for clean rivers

Portland Water Bureau
FROM FOREST TO FAUCET