PROJECT AT A GLANCE

Location: Lopez Island, WA
Project Type: Single Family
Award Category: Home Ownership
Project Completion Date: 06/03/2009

Project Size:
Number of Homes: 11 homes
Lot Size: 0.14 Acre
Density: 7 Units/Acre

Affordability:
(Relative to Area Median Income)
< 50% of AMI: 4 units
51-80% of AMI: 6 units
Market Rate: 1 unit
Retention of Affordability: Permanent, based on 198-year ground lease

Project Team:
Developer: Lopez Community Land Trust (LCLT)
Architect: Mithun
Project Manager: Brain Cloward, AIA
Contractor: Wellman and Zuck, LLC
Construction Supervisor: Pamela Pauly

Development Cost (per unit):

Land cost:	$11,000
Hard costs:	$177,000
Soft costs:	$48,000
Total:	$236,000
Grants/Incentives:	$124,000
Net Cost:	$112,000

Cost of Green (per unit):

Greening:	$31,300
Rebates/Incentives:	$18,500
Net Cost of Greening:	$12,800

Standards Used
No certifications, but used LEED for homes, BuiltGreen, and ENERGY STAR® as guidelines

Lopez Common Ground Cooperative

Lopez Community Land Trust

Lopez Common Ground Cooperative is an 11-home neighborhood located in the urban growth area of Lopez Village on beautiful Lopez Island in northwest Washington State. This community, which also includes an office and two rental units, was built in response to the increasing cost of living on the island. According to the County, "Working people and people who grew up in the islands have a hard time finding permanent housing in the county at prices local wages can support."

The project was a model for community involvement and local focus. The building and site were designed taking into consideration the local climate, regional habitat, and resources available on and around the islands. Homeowners along with dozens of volunteers, professionals, and interns assisted in the construction. The residents were also involved with both the design and with ongoing efforts to maximize performance. The office acts as a resource center, highlighting sustainable practices for visitors and local residents.

The homes were designed to produce as much energy as they consume, and data collected since completion have shown that several households have actually achieved "net zero" energy consumption.

Primary Goals

- Encourage community collaboration in construction of the homes.
- Achieve zero net energy consumption within first five years.
- Create a community that serves Lopez Island, and is also a national example for affordable, sustainable homes.

Measurable Performance Achievements (relative to code)

Energy Savings:	60% reduction
Water Savings:	30% reduction, 40% offset by rainwater
On-Site surface water:	100% capture

Green Features

Integrated Design Charrettes: Several design charrettes were held involving architectural firms, land use planners, water and sewer officials, county elected representatives, future home owners, plants specialists, and other professionals. These were supplemented with countless meetings in what became an interactive design, education, and construction process.

Location and Linkages: The Lopez Common Ground Cooperative (LCGC) is a very short walk from the village center, which includes stores, services, school, and library. The community sits along a Bike Smart roadway and each home is provided a shed for bike storage.

Site Design and Landscaping: While residents were given various options, most landscaping consists of native and climate-appropriate vegetation, as well as edible plants. The site is contoured to direct rainwater to bio-swales and French drains and ultimately into an on-site retention pond.

The private water company was unable to serve the project, so a state approved Class A potable water system and a rainwater collection system were developed. The rainwater system serves the toilets, clothes washers, and irrigation. Water from the retention pond can also be used for irrigation.

Architectural Design and Materials: The homes were designed to integrate with the natural local environment. Solar exposure analyses were used to inform the window and overhang design, to maximize heat gain and daylighting during winters while avoiding overheating in summers. Thick strawbale construction, using regional and local straw, was installed in north-facing and partial east and west facing walls to limit heat loss and improve the long-term durability of the homes. South-facing walls were wood-framed to enable greater window area and optimal solar heat gain.

Trim was milled fusing lumber from trees on site. Unused waste wood was chipped and used in walkways during construction. Cardboard and food waste was composted for gardens. Finishes utilize natural materials such as earthen plaster, American clay, and lime plaster.

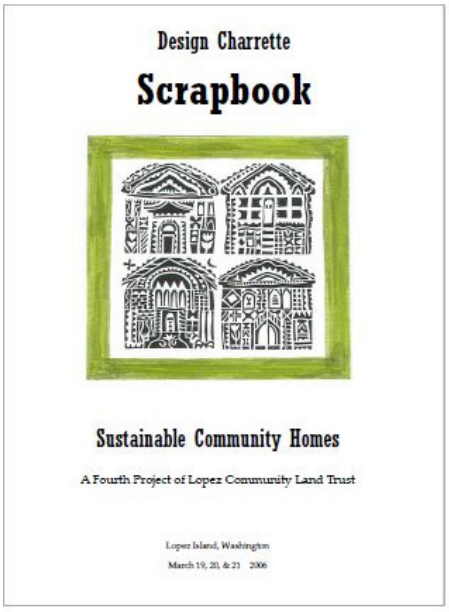
Energy Efficiency: Heating and cooling demands are reduced through the use of passive solar design, including appropriate placement of windows, overhangs, and thermal mass. Further efficiency is achieved through tight air-sealing, high-performance windows, and exceptional insulation in the walls, ceiling, and slab. Primary water heating is provided by solar thermal rooftop systems. Each home is served with a 3kW array of solar photovoltaic panels. Residents are able to track their consumption with in-home monitors.

Water Efficiency*:* A 38,000 gallon rain water catchment system offsets well water demand for toilets, clothes washers, and irrigation. Potable water demand is further reduced through the use of low-flow showers and faucets, dual-flush toilets, and front-load washers. Each unit includes water meters to help residents track and reduce water consumption.

Indoor Air Quality: Homes include whole-house fans, and are also designed for natural ventilation with operable screened windows in place to take advantage of prevailing winds. Units have no carpeting, with concrete flooring throughout instead. Interiors were finished with Low-VOC paints, and no garages were installed. Kitchens and bathrooms include exhaust to the outdoors to manage indoor moisture levels.

GREEN HIGHLIGHTS

- Holistic passive solar design, based on window choice, placement, overhangs, and thermal mass.
- 38,000 gallon rain catchment system serving toilets, washers and irrigation.
- High-performance envelope, including straw-bale on north-facing walls.
- Solar water heating and 3-kW PV system on each home.
- Low-flow showerheads and faucets and dual-flush toilets.
- Designed for natural ventilation to supplement whole house mechanical ventilation.



Project Significance

In an effort to engage the community and offset construction costs, the LCLT put together a broad team of talented volunteers and interns, making use of the wide skill-base and expertise of the group to achieve its goals. The interns and volunteers worked with the staff and residents to learn and implement green-building techniques.

This hands-on training has made the Cooperative an educational achievement, and it has enabled residents to better understand how the homes are designed to function. This understanding has reduced maintenance costs, and enabled a few homes to achieve a net zero energy profile within the first couple of years.

Lopez Common Ground Cooperative focused its design to take advantage of the strengths of the site – including solar gains to provide water heating and reduce space heating needs, prevailing winds for ventilation, rain fall to offset potable water demand, and a climate suitable for edible landscape options.

Partnerships & Collaboration

Partners included over 60 participating interns, 11 sweat equity households, local volunteers, the Project Management team, and:

Local, state and federal donors
Foundations
Dana Brandt, Ecotech Energy Systems
Christopher J. Webb PE, Webb and Associates
Joe Bullock, permaculture
Richard W. Hobbs FAIA, Strategy Design, Inc.
Erin Jacobs, Landscape Design MITHUN, INC.
C. Stephen Yu P.E. S.E. Principal, YU & Trochalakis, PLLC
Israel Gaphni PE, Sound Mechanical Consulting
Nick Gervasi, Site Superintendent
Andy Cochrane, President, PowerTrip Energy

Financial Strategies

Two revolving funds were used: Len Kanzer Memorial Fund and a loan through a state grant exclusively for affordable housing. LCLT has management responsibilities in perpetuity.

LCLT was able to save on construction costs by using primarily a volunteer labor force, including interns, community volunteers, and residents. Training and a small stipend was offered to volunteers along with a supportive work environment. Residents also earned sweat equity.

While the Cooperative did include PV and solar water heating systems, most of the energy performance was achieved through good up-front design. The use of passive solar strategies enabled the project to minimize heating and cooling demand, making it possible to avoid air conditioning and use simple low-cost heating systems.

75 percent of the cost of the PV system was funded through a combination of a generous grant and a rebate program provided by the utility. Additionally, the homes are net-metered to further reduce energy costs.

Project Financing

Funding Sources

Loans

Len Kanzer Mem. Fnd	$ 0.03 M
LCLT Revolving Ln Fnd	$ 0.05 M
Islanders Bank	$ 1.01 M
SHOP-HUD	$ 0.15 M
Total:	$ 1.24 M

Grants / Incentives

Private Foundations:	$ 1.30 M
Orcas Power & Light:	$ 0.05 M
Total:	$ 1.35 M

Development Costs

Land Cost:	$ 0.10 M
Building Cost:	$ 2.00 M
Soft Cost:	$ 0.50 M
Total:	$ 2.60 M
Grants / Incentives:	$ 1.35 M
Net Costs:	$ 1.24 M

Cost of Greening Project

Total Costs:	$ 0.35 M
Rebates / Incentives:	$ 0.05 M
Net Cost:	$ 0.30 M

Lopez Island Interns

"I came [to Common Ground] to learn about the architecture of buildings, but after being here I decided I wanted to pursue the architecture of community."

- Nathan Marsh, intern and Notre Dame student

"It was a continuous conversation: how do we build a more efficient home?"

- Natalie Wilson, resident

"I used to pay $200–$300 a month for electricity, and now paying $25 is one of the features that I really like… I'm closer to the village and the library is there and the clinic and the school is close by… I don't have to spend a lot on gas. I don't have to drive my truck. I ride my bike."

- Juan Velasquez, resident

Primary Contact

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Looking Ahead

Education and Outreach

Many of the interns and volunteers that worked on the project have returned to their schools and jobs and shared the experience of working on a sustainable, affordable community.

A thorough operations and maintenance manual was created that doubles as an educational booklet for visitors and the public. The manual includes photos, diagrams and schematics, and an explanation of many of the green building strategies used. It also identifies preferable native and edible landscaping options for residents, and details the sophisticated rainwater management strategies used throughout the site.

One innovative educational strategy at Common Ground is to provide residents with feedback on their energy and water consumption. This has helped residents pay close attention to use, and helps to create a community culture aiming for net-zero goals.

Challenges and Lessons Learned

"It truly takes a team" - this was the primary lesson learned at Common Ground. Having a diverse group working on these homes revealed new opportunities and improved the overall quality of the project. It also demonstrated the importance of a patient and committed construction supervisor, which Common Ground was fortunate to have.

On future projects, LCLT will seek out professional subcontractors that are more vested in an integrated systems approach to design and construction.

Common Ground faced a significant challenge with water supply, and it taught the team that even when code officials are involved as early as possible, green forward-thinking projects can present major challenges. All options should remain on the table during planning and design, and contingency plans should be made for any green building practice that may not receive approval by code officials.

Photos 1 and 2 courtesy of Mithun | Juan Hernandez; Photo 3 courtesy of Diana Luhn Bowe; Photo 4 courtesy of LCLT