

# ECO•LABORATORY

AN URBAN, HIGH-RISE RESIDENCE FOR ECOLOGY AND SOCIAL COLLABORATION

There is no silver bullet for sustainability, no “magical solution” to create beautiful net-zero consumption environments. It takes the dedication of an interdisciplinary team to unite *living site* and *living building*. Recognizing a living building’s dependence on multiple systems, Eco•laboratory is a synergy of economics, culture and environment. It is more than a building; its parts are inspired by a self-sustaining, diverse ecological system. Eco•laboratory merges a neighborhood market, basic shelter, vocational training facility and public sustainability educational center into a financially viable downtown residential development.

Technically, this project is “off the grid;” contextually it is completely connected.

At the corner of Elliott Avenue and Vine Street in downtown Seattle’s Belltown neighborhood sits a community garden on a 7,200 sf lot behind three WWI-era, working class cottages. What started in the 1980s as a gardening project became a workable, shared vegetable “P-Patch.” Through political support and citizen activism, Belltown cultivated this plot into its very own community green space, holding rapid development – now zoned to allow 120’ residential buildings – at bay.

The P-Patch is a model for neighborhood activity and involvement. Expanding upon this urban agricultural amenity, Eco•laboratory fills the block with an expanded garden, growing into the new building and around the three historic cottages which are maintained and continue to house local writers-in-residence.

The densely assembled residences and urban agriculture of Eco•laboratory integrate with a second amenity between Vine Street and Wall Street – an 87-year old charity dedicated to helping the working homeless and encouraging their self-reliance through provided meals, hygiene, eye care, social services, training, and job placement. Just as the building’s systems work in synergy to protect our environment, social circles and programs interconnect to promote socio-economic health and welfare.

**The Living Building Challenge** requires attention to six petals of prerequisites.

**Site** is the initiator for Eco•laboratory, providing potential for a new type of development. Integration and reverence for historical context are essential, as is the recognition of inevitable development and necessary, positive progress. Rather than treat site and building as separate entities, Eco•laboratory extends itself into the landscape, and extends the landscape in to the building. Earth tubes pull fresh air from the outside into living spaces. The water and nutrient cycles support vegetation inhabiting common areas of the building.

**Materials** in Eco-laboratory are chosen with a desire for visibility, transparency, and education.

Concrete walls use fiber-optic aggregate to reveal the systems within and allow light to permeate inner spaces. Reclaimed local shipping containers are given new life in the main living unit module. Nearly all demolition waste is re-absorbed by new site construction and fill.

The **Energy** approach is two-fold: passive conservation channels natural forces to drive stack-effect thermal control, and active harnessing of solar, wind, biofuel, and hydrogen fuel sources generate electrical power. The different forms of power generation complement one another; solar photovoltaics are most effective during calm, sunny days, while wind turbines generate more energy in stormy weather.

**Indoor Quality** is seamlessly integrated with passive energy strategies. Earth tubes draw in fresh air from the site and through indoor occupied spaces. User operability and proximity to light, air and vegetation throughout the building enhance resident comfort. A concrete wall along the north building's corridor aids in the thermal stack effect and promotes efficiency through thermal inertia. The double glazing system on Eco-laboratory's north and east facades gives superior insulation value and natural lighting to reduce heating and lighting loads, while intentional heat gain on the south and west faces activates the greenhouses and drive the stack-effect.

**Water** is collected through impervious surfaces and introduced into the building's water cycle. A living machine converts black water to grey and potable water. This water supplies the building's residents, indoor vegetation, and exterior landscape. Infiltration and subsequent evapo-transpiration resume in the P-Patch at the low point on site and the tail-end of the cycle.

**Beauty and Inspiration** are not only found in aesthetic form, but in the aesthetics of performance, through the experience of place and lasting value for visitors and residents, with the satisfaction of a site's potential brought to fruition.

The social aspects of Eco-laboratory, amidst a new sustainable economy, fasten together the ecological building systems. Eco-laboratory provides meals, hygiene, and shelter for the working poor and homeless. Grey water introduced via the water cycle is employed in bathing and laundry facilities. Produce harvested from hydroponics and an expanded P-Patch contributes to daily meals. A training center teaches residents about urban agriculture, Eco-laboratory's systems maintenance, food preparation, farmers' market operations, and public outreach. For those dedicated to reintegration into society, longer-term housing comingles with market-rate housing (that sustains the complex financially). A public farmers' market is integrated as a neighborhood amenity supplied by Eco-laboratory's harvest. Long vistas to the sound and proximity to downtown make the market plaza a desired regional attraction, which increases the potential for sustainability education.