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Ecological Design Case Study: A Church in Berkeley

by Todd Jersey

The new Calvary Presbyterian Church Social Hall and Education Building is located at 1940 Virginia Street in Berkeley, California. The building houses a private middle school (the East Bay School of the Arts), a church fellowship hall, a chapel meeting-space, and a kitchen. Both church and school make use of the gymnasium.

Like most insitutional clients, the building committee at Calvary wanted a functional, attractive building that was low-cost and efficient, maximizing the square footage built per dollar invested. As an architect with deep-rooted ecological and conservationist values, it was my job to design a building that employed ecological design strategies and resource-sensitive materials that concurrently made economic and functional sense.

The building explores several strategies to meet this challenge, including self-sufficient natural day-lighting in all spaces, thermal mass for passive solar heating, passive natural ventilation, radiant floor heating, durable low-maintenance materials, low- or non-toxic materials and finishes, and a celebration of rainwater cascading off the roofs to pools on the ground.

Since the church is in a primarily residentiall neighborhood, I paid careful attention to the building's height and bulk so that it is a graceful and respectful neighbor to the private homes nearby. I decided to employ a large gable roof as the structure's organizing form, and to bring light and proportion to the building by using a series of dormers that penetrates this large form. All dormers extend toward the sky maximizing their ability to capture light and giving the project a "winged" look. Dormers are excellent light regulators and also give scale and interst to large buildings. All of the rooms use these dormers as well as other strategies for controlling and balancing light in order to minimize glare and eliminate the need for electrical lighting during daylight hours. Subterranean rooms use angled cut slopes adjacent to high windows to direct reflective light onto their ceilings for blended and balanced natural lighting.

Natural ventilation coupled with high-efficiency radiant floor heating throughout the entire building allow occupants to regulate air temperatures and fresh air intake from room to room, saving energy. The building has one of the only gymnaiums with a radiant floor -- an appropriate combination because of the need for warm floors for athletic activities such as stretching, tumbling, yoga, etc.

Scuppers and gutters with open ends direct rainwater off the roofs to create a visual and spiritual connection to the environment. Sixteen scuppers on the round meeting room give a feeling of tranquility as water flows off them during a rain. The rainwater visibly meanders off the main roofs and falls into two special pools before leaving the building site. The school children have named these special devices "rainfountains."

Essentially, the form of the building emerges from a partnership with sun, wind, and rain, while responding to the neighborhood setting, the client's needs, and economic pragmatism. In urban ecological architecture we must create new types of buildings that address all of these issues.

In addition, the building was detailed such that each of its components is expressed as special or sacred. The rainfountains, careful detailing of wood components, celebration of natural lighting, and circular geometry of the chapel all help make this builidng a sacred place. I believe that in ecological

design, earth care is linked to practicing "sacred" architecture. When designers believe that all of the earth's materials are sacred or precious, we work to conserve them. When we do "use" these resources, whether in the form of industiral products of "natural" materials, we must carefully detail their integration into an harmonious whole that creates benefit for the human spirit.

The client particularly liked the use of natural light, the concept of using radiant floor heat and natural ventilation for comfort and cost savings, the use of water as an expressive element, and the careful detailing of the wood elements. The building's daily users like these elements as well. The structure came in on-budget and was not burdened by the eco-design concepts employed. My biggest disappointment was in having to use Douglas Fir for framing the walls. I couldn't get a source for sustainably harvested softwood to be cost-competivie, and don't like hiding lower-quality wood behind sheetrock. Where we employed wood that was not framing lumber (Douglas Fir and Western Red Cedar) I made sure these woods were visible and well detailed to take best advantage of their ability to enhance and beautify the building.

The Calvary Church Hall, though built at a modest $125 per square foot, has a unique feeling in that it reflects a careful and special use of earth's materials. This feeling is often missing from institutional projects that do not ask for their architect to incorporate ecological values or earth-based spiritual principles. When we, as designers, practice our work with this ethic, we create a mandate for ourselves to provide buildings that are responsible to legal and financial constraints while serving our clients, our community, and our earth.

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