

Sustainable Design and Historic Preservation

"The Department of the Interior is committed to a leadership role in preserving our Nation's heritage. This commitment is based upon the public trust, requiring the use of scientific, cost-effective, and innovative techniques to better manage and restore our lands and facilities."

Bruce Babbitt
Secretary of the Interior

"Historic preservation is intrinsically a form of sustainable conservation. The built environment represents the embodied energy of past civilizations...historic preservation is conservation in every sense of the word."

Guiding Principles for Sustainable Design, [Draft],
August, 1993; NPS Denver Service Center

The National Park Service, through its Guiding Principles for Sustainable Design, recognizes human civilization as an integral part of nature, and if we are to survive as a civilization, then we must protect the environment. Sustainability has been defined, in part, as the ecological balance that allows us to meet our needs without compromising the ability of future generations to meet theirs. This approach encourages environmental stewardship through a less consumptive lifestyle; the reduction of polluting forms of manufacture and chemical byproducts that may be damaging the ozone; and the practical reuse of existing and renewable materials. The retention and careful reuse of existing buildings, particularly historic buildings which have a strong connection to our past, is an emerging focus of sustainability nationwide.

The study of sustainability is still in its infancy, and the contribution of historic preservation to the broader field of environmental sensitivity is gaining

appreciation. Historic architecture, particularly vernacular architecture, is by its very nature "green" because it is deeply tied to the land. The use of locally available materials; careful siting of buildings to take advantage of natural prevailing winds and sun patterns; the reliance on natural systems of solar heating and ventilation utilizing physics of thermal mass and transport of air movement; and the use of durable materials means that many historic buildings already meet many of the principles outlined for new structures intended to be of a sustainable design. The role of historic features, such as porches, awnings, large windows, skylights, roof ventilators, deep projecting overhangs, and deciduous shade trees should not be overlooked by modern designers.

Most research and product development for sustainable design has been for new construction with little attention to the rehabilitation of existing or historic structures. Sustainable design encourages the use of natural and renewable materials, new technologies for control of energy use, materials and products that have a long life and can themselves be recycled, and materials that can efficiently be maintained and renewed. Much of the work in sustainable design by the National Park Service has come from our Denver Service Center as a response to the Vail Symposium convened by the National Park Service in 1991. While much of the work of the National Park Service is within the parks, our responsibility for

The Presidio of San Francisco was designated a National Historic Landmark in 1962, and these buildings which were constructed as part of the Letterman Hospital Complex between 1899 and 1933 now house the Thoreau Center for Sustainable Design. Photo by Richard Barnes.



protecting historic cultural properties is nationwide and extends to assisting owners of National Historic Landmarks and properties listed in or eligible for the National Register of Historic Places. The Heritage Preservation Services Program, through the administration of Historic Investment Tax Credits, is beginning to publicize rehabilitation projects that reflect environmental awareness and sustainable design.

A recent tax credit project that celebrates sustainable design is located at the Presidio of San Francisco, California. The National Park Service received control of the Presidio of San Francisco in 1994 as part of the transfer of the property from the U. S. Army to the Golden Gate National Recreation Area. As part of the transfer of property, the National Park Service developed a Master Plan that allows appropriate reuse of existing military buildings through long-term ground leases.

This set in place the opportunity for a public-private partnership to rehabilitate the historic buildings for a continued use with tax credits being available to investors in the rehabilitation. A key concept in the development of the Presidio was to respect the ecological systems and landscape of the San Francisco Bay and to protect the historic character of the site which was designated a National Historic Landmark in 1962. To that end, the first lease was awarded to The Tides Foundation and Equity Community Builders to develop an environmentally sensitive center for the study of the environment in four of the historic Letterman Hospital Complex buildings on the site. Known as the Thoreau Center for Sustainability, the project has set high standards for environmental design that is a model for future rehabilitation projects within historic buildings.

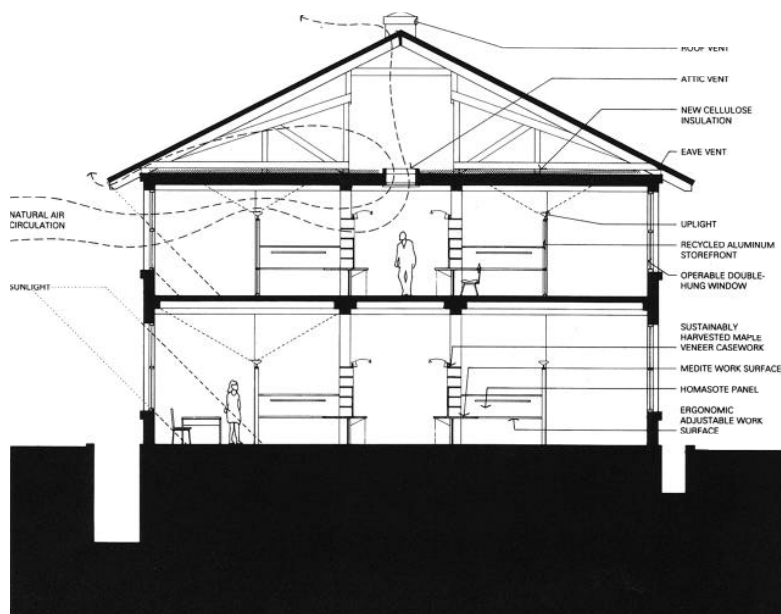
What is Sustainable Design?

While sustainable design is still being defined by many, for architecture there are perhaps four major principles.

- Provide a healthy environment for the workplace: good ventilation—strive for at least six air changes per hour as opposed to the traditional four; use of natural lighting, appealing work spaces, circulation patterns that encourage pedestrian movement; elimination of chemicals, air particulates, formaldehyde fumes, solvents, volatile organic compounds.
- Select building technologies and materials that are “green”—use materials that are biodegradable, recyclable, and made from renewable resources and that have been manufactured in a way that has not damaged the environment; select replacement materials that have a high percentage of recyclable content; select long-lasting and low-energy use products, such as specialized light bulbs; retain materials in place to the extent possible; consider thermal glazing which can be added to historic windows.
- Consume less energy in the new systems in the building than market standards—reduce ambient lighting and increase task lighting; use sensors, timers, and motion detectors to control energy use to fixtures; consider low wattage features, individual or zoned controls; use the most efficient energy system or alternative energy sources available, such as photovoltaic cells; keep systems and finishes well maintained to work at peak efficiency; consider use of low-wattage bulbs to reduce office lighting from 4 watts/sq.ft. to less than 1 watt/sq.ft. which will have a direct effect impact on cooling requirements.
- Have a recycling plan for waste and water—establish areas for collection of recyclable materials by type (paper, plastic, glass, vegetable matter); consider composting for gardening/grounds use; select materials based on the ability to recycle them later; use captured rainwater for irrigation; and consider options for use of grey water from non-contaminated sources in the building.

What are Historic Preservation Principles?

The guiding principles for historic preservation are found in the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. The standards address the treatments of preservation, rehabilitation, restoration, and reconstruction and are based on the premise that historic buildings have intrinsic architectural value based on their architectural style, construction technologies, craftsmanship of materials, integrity of design, and condition. To be eligible for federal funding or the Historic Investment Tax Credit program, most buildings undergoing improvements for a new or continued use must meet the *Standards for Rehabilitation*. These standards require the retention of historic character, significant historic materials, the judicious application of new additions, where needed, that are sensitive to the design, scale, and materials of the historic building, and the retention of site and landscape features that contribute to the historic setting.



This typical section through the building illustrates how the building utilizes original features that provide light and cooling air while the selection of new materials are sustainable. Drawing courtesy Tanner Leddy Maytum Stacy Architects.

The architects and design team for the rehabilitation of the Letterman Hospital worked with the NPS Guiding Principles for Sustainable Design and met the Secretary of the Interior's *Standards for the Treatment of Historic Properties* which afforded the for-profit investors an investment tax credit valued at 20% of the multi-million dollar rehabilitation. The Thoreau Center for Sustainability is the first partnership venture in the new Presidio of San Francisco Trust and the mixed-use project brought together more than 20 non-profit organizations that work with environmental issues. It was important that their offices and public spaces reflect the values of sustainable design, impressive architectural design, and respect for historic preservation.

The Thoreau Center for Sustainability met both the principles of sustainability and historic preservation. The historic hospital buildings, built between 1899 and 1933, were mostly three-story wooden or masonry buildings comprised of large open wards, large corridor systems which could accommodate wheeled gurneys, covered porte-cochere entrances, large double-hung windows, and simple interior features of wainscoted walls and in some places stamped-metal tin ceilings. The new design for the offices retained the large open wards using glass and aluminum systems (recycled materials) for the development of perimeter offices without eliminating the natural light to interior work spaces. The wide corridors were utilized as part of the office areas with attractive shelves, files, cases, and office systems constructed from non-endangered wood and recycled substrates. The historic stairs were retained and under the state historic building codes, the use of fire sprinkler systems and glazed walls at the corridors made the stairs a pleasant, light-filled area. The enclosure of the ambulance driveways at the porte-cocheres used infill window systems that retained the large expanse of opening. The south facing areas are now conference rooms with sun shades for use on hot afternoons. The offices are not centrally air-conditioned since the climate is mild and the windows are operable. To accommodate computer climate control, the central computer closet is air-conditioned with a small unit. The steam boiler systems were upgraded and the radiator systems were retained and improved with some controllable thermostats. The artificial lighting use is kept low with a reliance on daylight and the use of long-lasting florescent bulbs and detec-

The firm of Tanner Leddy Maytum Stacy Architects designed the multi-million dollar rehabilitation to meet the clients needs for an environmentally sensitive showcase project and to allow the for-profit investor to be eligible for a 20% Historic Tax Credit by meeting the Secretary of the Interior's Standards for Rehabilitation. The building shown here retained the historic exterior materials and the historic windows, while the new entrance canopy includes photovoltaic cells as part of the improved energy efficiency of the rehabilitated building. Photo by Richard Barnes.





These two interior views show the light and airy work spaces and the inviting staircase connecting two floors of offices. The extensive use of natural materials, recycled materials, or renewable materials illustrates that sustainable design can work well with historic buildings. Photo by Richard Barnes.

tors that turn off the lights when there is no activity for a designated period of time.

The most educational aspect of the rehabilitation from a sustainable perspective may be the wide array of products selected by the architects' for their "green" qualities. Materials were selected that were from renewable resources, from recycled sources, or were biodegradable. Some of the unseen materials are the cotton insulation in the crawlspace and attics that are 95% recycled from post-industrial cotton fibers; medium density fiberboards for substrates made from 90% recycled wood fibers and bound together with formaldehyde-free synthetic resins; and cellulose insulation for perimeter walls made from 85% recycled newsprint. Some of the surface finish materials include acoustical tiles made from 85% recycled materials from steel slag wool and cellulose fibers; aluminum storefront systems for interior office partitions and new window infill from recovered aluminum; ceramic floor tiles made from 70% recycled glass from automotive and airplane windshields; linoleum made the old-fashioned way with linseed oil and natural components used for flooring and countertops. The painted surfaces reflect light and the paint is formulated to be free from irritants that affect people sensitive to chemical odors. The handsome cabinetry and wooden panels utilized in the offices and corridors are fully sustainable. The substrate is from recycled wood fibers and the veneers are from managed forests that are not clear-cut. The maple veneers and woods used are not from endangered species.

The success of the rehabilitation of the Letterman Hospital Complex can be duplicated in other historic rehabilitation projects. The architects evaluated the historically significant aspects of the buildings and then retained them as new



features were selectively added. Much of the historic building exterior, the historic windows, the interior plan and stairs, flooring and stamped metal ceilings remain. Just by retaining historic materials they are, in effect, recycled in place and do not put a strain on landfills. For the deteriorated materials that were removed from the buildings, almost 75% were recycled into new products. The pleasant office environments, the inviting and well placed staircases that discourage the use of the elevator, the feel of natural/organic materials in the selection of finishes, the natural gardens and experimental medicinal herb production utilizing captured rainwater, the open cafe in the wide historic corridors, and the ease with which accessibility requirements were integrated has been beneficial to all — the tenants, the individual historic building, the Presidio, and the larger environment. It is a model that can and should be considered when historic buildings are being rehabilitated.

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