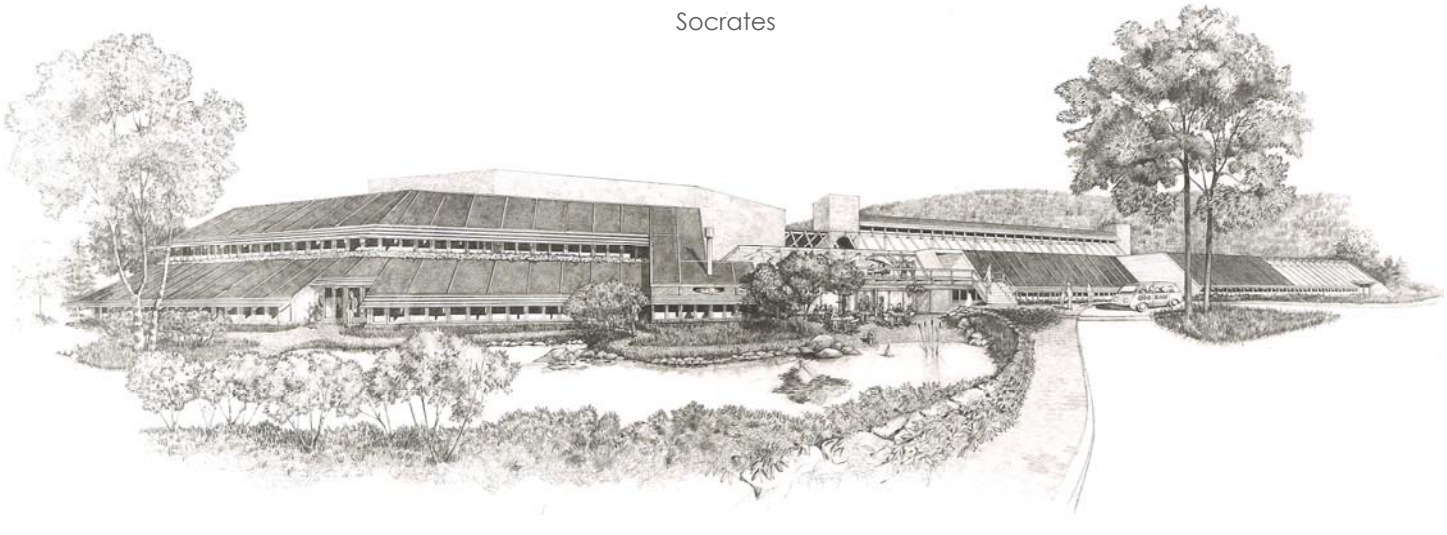
In houses that look toward the south, the sun penetrates the portico in winter, while in summer the path of the sun is right over our heads and above the roof so there is shade.

Socrates

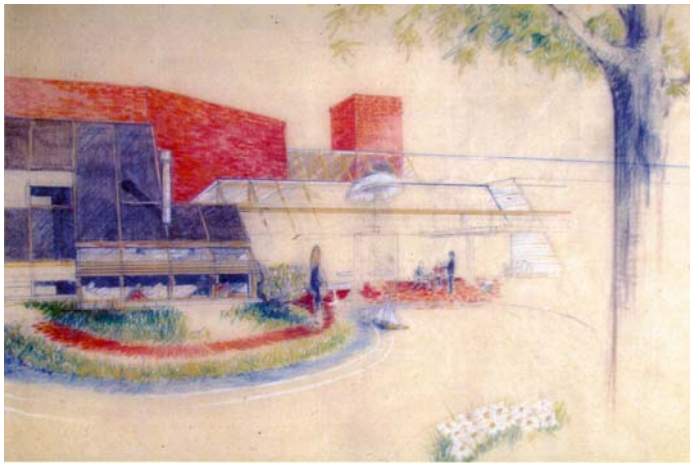


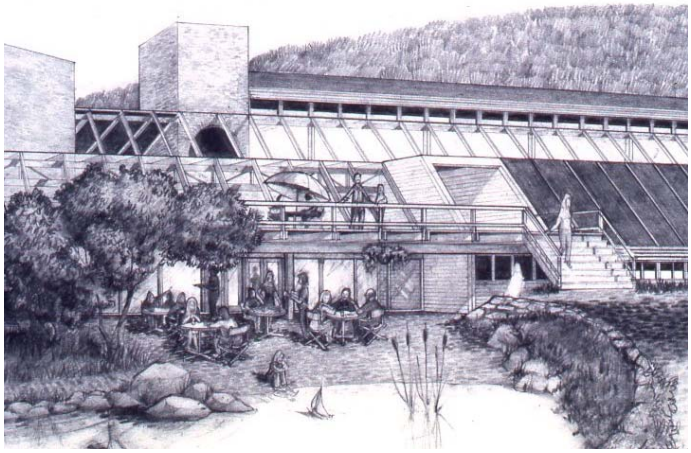
800 MAIN STREET

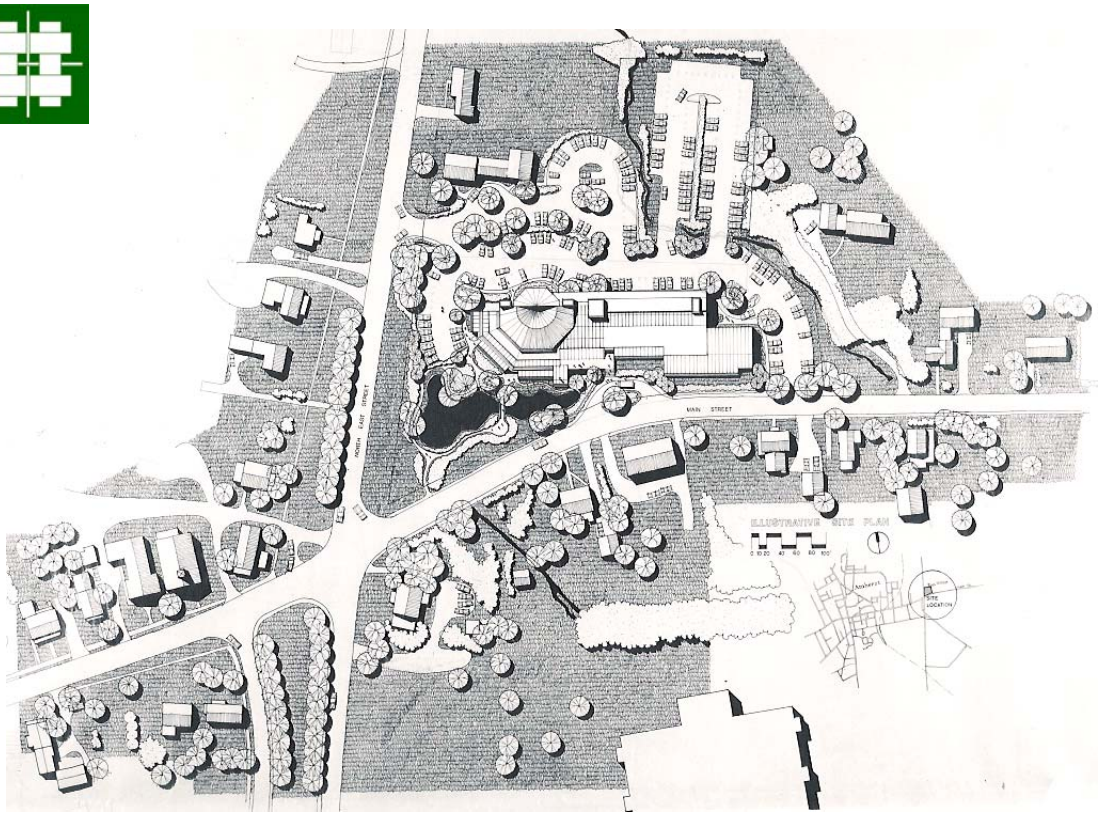
Amherst, MA

Initiated several months before the Arab's surprise October 1973 oil embargo, 800 Main Street was possibly the first public solar heated and cooled building proposed in the United States. Owned and developed by Fred Boyajian and designed by Phillip Lehn in collaboration with Brink Thorne, Mary and Allan Dietz, Ahmed Dadi, Nick Dines, and Sean Wellesley-Miller and Day Charoudi, the two Co-Directors of MIT's Solar Energy Lab, the passively and actively solar heated and cooled mixed-use town center included a performing arts center, shopping bazaar, restaurant / coffee shop, offices, health club, and sub grade heat storage facility to store coolness as well as heat. Computer modeling of the building's anticipated performance estimated that it would have saved more than 70% of the energy required by a more conventionally designed building.

While the project won a rare and difficult to obtain zoning variance in a well attended public hearing and was featured on the front pages of several newspapers throughout western Massachusetts, the widespread economic depression that followed in the wake of the Arab's oil embargo ironically undermined the project's financial viability. Despite our failure to attract an investor with the imagination, financial resources, and courage needed to realize the project's extraordinary promise, not all was lost. In addition to encouraging conservation and the greater use of solar energy throughout New England, the project also helped to promote and pass a new zoning policy that concentrated Amherst's future growth near its historic centers to minimize increases in infrastructural and commuting costs while preserving outlying family farms and open spaces.



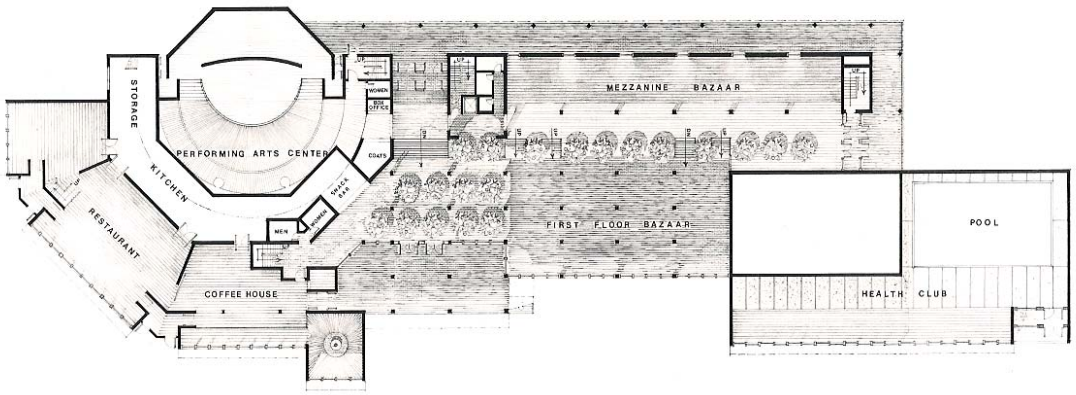




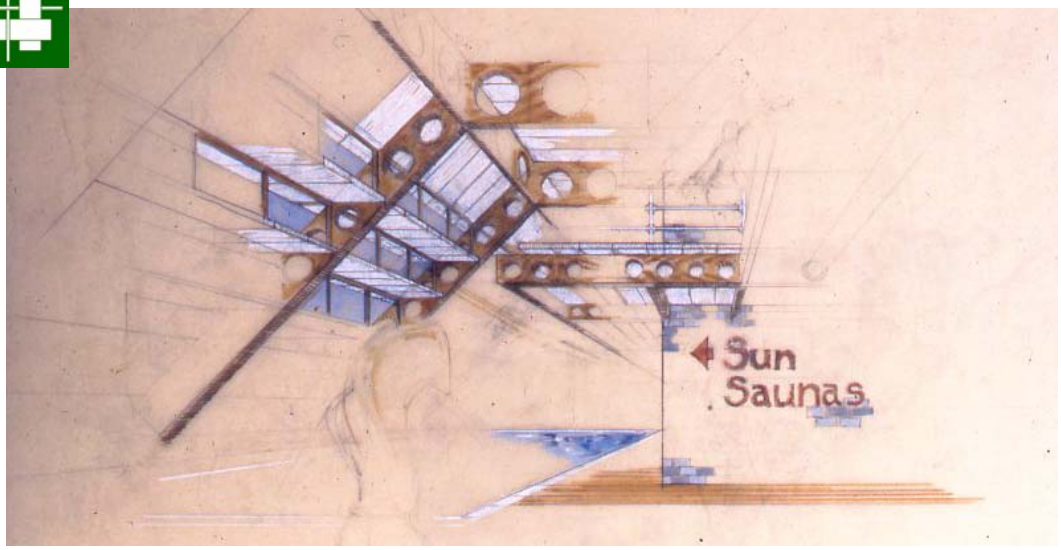
Landscaping Design and Site Plan by Nick Dines

ENERGY SAVING FEATURES

1. A relatively narrow, triangular shaped building section oriented on an east - west axis to maximize southern exposure, solar control and heat gain and minimize northern exposure and heat loss.
2. Exterior sun screens to reduce heat gain and operable windows to induce cross ventilation and convection cooling.
3. A tightly sealed and well insulated building envelope.
4. Hot & cold air collector & distribution loops to and through a sub grade heat storage facility.
5. 'Cloud Gel', a temperature sensitive - phase changing membrane to either heat or shade the building's central atrium and circulation spine landscaped with orange trees.
6. Maximum use of renewable native materials; minimal use of exotic and energy intensive materials.



MAIN FLOOR PLAN
Floor Plans by Mary Dietz



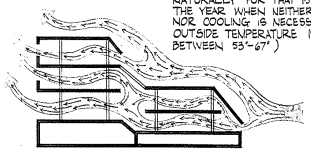
DESIGN PRINCIPLES FOR CONSERVING ENERGY

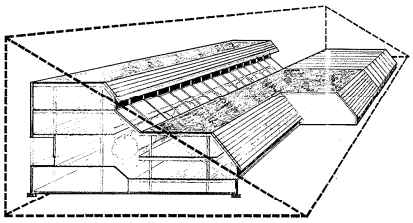
80% SAVINGS, HEATING
20% SAVINGS, COOLING

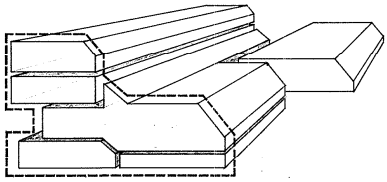
THE BUILDING'S ROUGHLY TRIANGULAR SECTION STRETCHING LINEARLY IN AN EAST-WEST DIRECTION ALLOWS US NOT ONLY TO MAXIMIZE THE BUILDING'S SOUTHERN EXPOSURE FOR HEAT COLLECTION BUT ALSO TO MINIMIZE THE BUILDING'S NORTHERN EXPOSURE TO REDUCE HEAT LOSS.

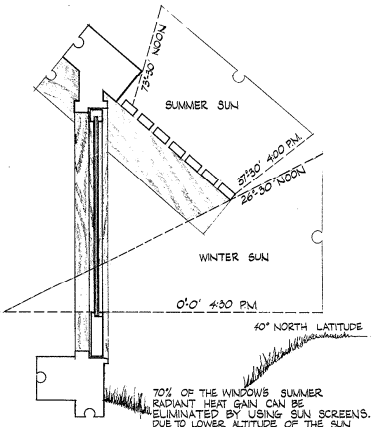
BY ACCOMODATING EACH DIFFERENT USE WITHIN THE CONFINES OF ONE CONTINUOUS BUILDING WE ARE ABLE TO MINIMIZE THE BUILDING'S SURFACE TO AREA RATIO.

OPERABLE WINDOWS ALLOW US TO VENTILATE THE BUILDING NATURALLY FOR THAT 15-20% OF THE YEAR WHEN NEITHER HEATING NOR COOLING IS NECESSARY (WHEN OUTSIDE TEMPERATURE IS BETWEEN 55°-67°)







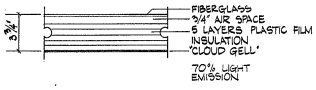


MINIMAL USE OF ENERGY INTENSIVE MATERIALS (STEEL, COPPER, ETC.) EXTENSIVE USE OF ONE OF AMERICA'S MOST BEAUTIFUL RENEWABLE RESOURCES- WOOD.

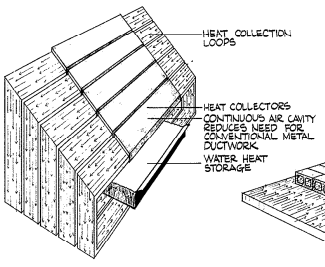
70% OF THE WINDOWS SUMMER RADIANT HEAT GAIN CAN BE ELIMINATED BY USING SUN SCREENS. DUE TO LOWER ALTITUDE OF THE SUN DURING WINTER, BOTH HEAT AND LIGHT WILL BE ABLE TO PENETRATE THE BUILDING.

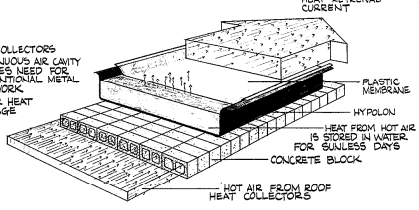
DUAL SOLAR HEAT COLLECTION SYSTEM

GREENHOUSE MEMBRANE



WHEN COMPARED TO A CONVENTIONAL ROOF THE COMPLETE SOLAR HEATING SYSTEM IS:
1ST YEAR, TWICE THE COST
5TH YEAR, THE SAME COST
10TH YEAR, - FREE ROOF!





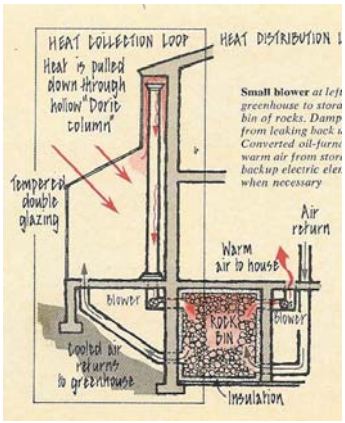
concept sketch & conservation diagrams by Phillip Lehn

An interdisciplinary collaboration of some of the nation's most renown thinkers and makers co founded by Jack Payne, Philip Molten , and Phillip Lehn in 1975 to create "joyful and sustainable communities." Contributing members included Warren Callister, Peter Kitchell, Walter Jackson, Fred Dubin, Martin Glesk, James Roberts, Sean Wellesley-Miller, Richard Aspenson, Day Chahroudi, Robert Conradt, Kenneth Craik, Jack Dangermond, Paul Davidoff, Robert De Voy, Anthony Downs, Erik Erickson, Joan Erikson, Paul Harris, Carolyn Konheim, Margaret Mead, Otto Paparazzo, George Putz, Charles Reynolds, Arnold Rosner, Morris Spector, Benjamin Stevens, James Trautman, and Doris Wright.

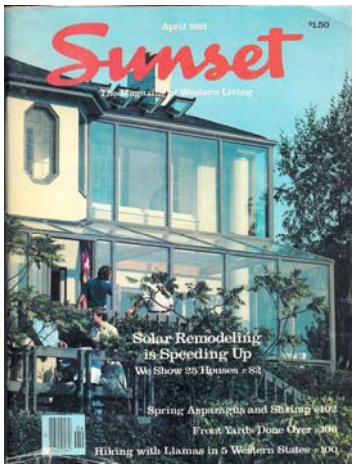
Projects included the study proposal: 'ENERGY CONSERVATION IN COMMUNITY DESIGN • An Analysis of Energy Budgets and the Design of Human Settlements' and a research and design proposal for a 20-acre solar heated and cooled riverfront community on the north bank of the Arkansas River (reflective as well as direct solar gain) between two bridges connecting North Little Rock to downtown Little Rock, Arkansas. Envisioned and assisted by Anne Bartley, Richard Arnold, Gene Levy, and Charles Crow, some of the state's most progressive leaders, CDRG's plan for North Little Rock's 'new town in town' was to have included many progressive ideas for education, preventative health care, and legal reforms intended to eliminate the profit motive from conflict resolution. Many believed that this effort to combine a more holistic approach to social reforms with more advanced, humane, and resource conserving architecture and urban design could have manifested a pivotal turning point in the history of community planning by inspiring similar developments throughout the world. Unfortunately, despite the promise of its global significance, the many important accomplishments of each of the group's members, their willingness to limit their compensation to the cost of their expenses, and several efforts to obtain private and public funding, none was forthcoming and the unusually rare opportunity was lost.

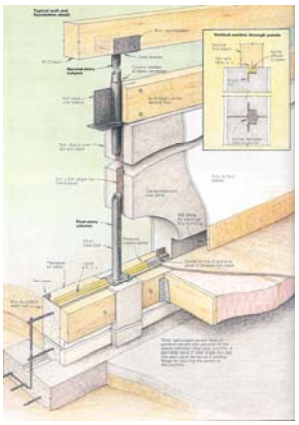
WINN RESIDENTIAL ADDITION & REMODEL
Seattle, WA

Designed and built by Ted Lehn and featured on the cover of the April 1981 issue of Sunset magazine, this hybrid passive and active heating and cooling sunspace addition lowered the house's annual heating cost from $1,300 to $400 during its first year of operation.



HEAT DISTRIBUTION LOOP





ATCHESON RESIDENCE
Orcas Island, WA

Designed and built by Ted Lehn and featured in the August / September 1988 issue of Fine Homebuilding, the Atcheson Residence demonstrated a unique light weight concrete and wood particle wall system with high thermal retention and resistance properties.

SOLAIRE ONE Edmonds, WA ▪ Designed and developed by Ted Lehn in 1981, Solaire One is probably Washington State's earliest solar heated multi-family residential development. Each of the eighteen actively and passively solar heated dwellings and private garden courtyards features a Trombe wall and a hot water and air collection and storage facility that originally saved approximately 65% of the space heating and 85% of the water heating for each unit.

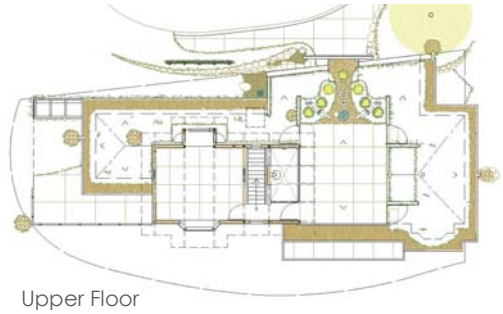
GREENWAY Edmonds, WA ▪ Green Tara Incorporated, 1992. Rich Haag and Phillip Lehn's site design and construction permit approval for a community of 28 affordable townhouses and forested wetlands preservation became one of Washington State's first 'low impact' residential developments. The plan features a much narrower and less intrusive road than originally required that drains storm water via continuous bio-filtration swales to a duck pond for secondary bio-filtration and further settling of sediments before naturally releasing significantly cleaner storm water into the wetlands. While Snohomish County's Planning and Public Works Departments originally opposed the project's innovative street and storm water management design, they have subsequently used the completed project proactively to promote those same design features to encourage lower site development impacts and more cost effective environmental benefits throughout the county.

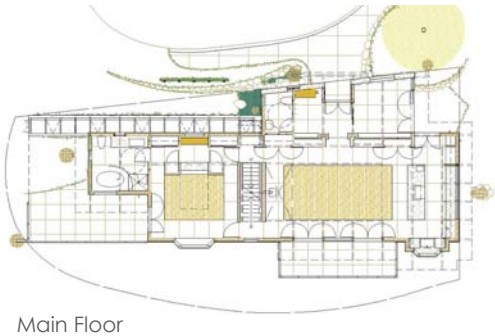
GREENNESS HOUSE DESIGN - 1 ☼ Edmonds, WA

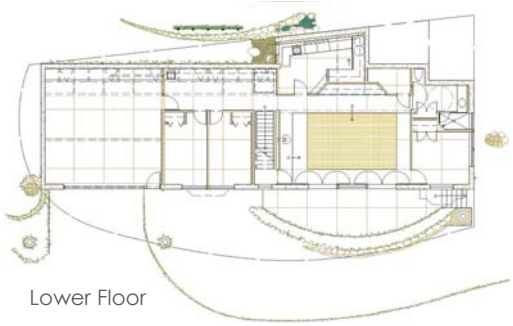
Before adding an active solar, wind, or geothermal assist, Greenness' first house design is expected to save 40% of the space heating and 45% of the water heating required by a conventionally designed house built to comply with the State's current energy code. This is particularly noteworthy given the project's many large, west facing view windows. Designed by Phillip Lehn for a working couple that entertain frequent guests and wish to perform much of their work at home and two young brothers that the couple had hoped to adopt, the design aspires to minimize its environmental costs by its rational economy of means, conservation of resources, and use of non-toxic and renewable materials. While the couple ultimately decided not to proceed with the project's construction, a complete set of construction documents have been prepared and its building permit has been approved. It was selected by the American Institute of Architects Seattle for their annual "What Makes it Green?" program, and it contributes to the research and development of the following design concepts and building materials that could be used for more popularly affordable homes and communities.

GREEN FEATURES

1. Passive solar heating: heat storage walls, stair ducts, reversible ceiling fans, "solar chimneys", and operable windows to induce and convey passive heating, cooling and cross ventilation,
2. "Green" or vegetated roofs,
3. Spaces and structural members sized appropriate to their use,
4. Extensive use of natural, fluorescent, compact fluorescent, and low voltage lighting,
5. Maximum effective thermal insulation,
6. Advanced framing insulated with recycled cellulose,
7. Movable insulation to cover windows and skylights at night.
8. Tighter construction to minimize infiltration,
9. Rastra insulated concrete walls with stucco finish
10. Extensive use of rapidly renewable bamboo for rain screen siding, shelving, cabinets, doors, stair treads, trim, and flooring,
11. Hydronic radiant floors of concrete, bamboo, and cork,
12. Heat recovery and ventilation systems with HEPA filters to recover 50% of heat from exhausted air
13. Waste water heat recovery system,
14. High efficiency boilers (90%+),
15. Certified "Energy Star" appliances,
16. Low flow water fixtures,
17. Extensive use of natural, less processed interior materials with benign finishes,
18. Extensive use of engineered wood products,
19. Multiple use spaces,
20. Barrier free accessibility throughout house,
21. Forest Stewardship Council (FSC) certified wood products whenever possible,
22. Drought tolerant landscaping, and
23. Partially earth sheltered to reduce exposure,


Upper Floor


Main Floor


Lower Floor

LEHN DESIGN COLLABORATIVE ☼ ARCHITECTURE INTERIORS LANDSCAPING PLANNING

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