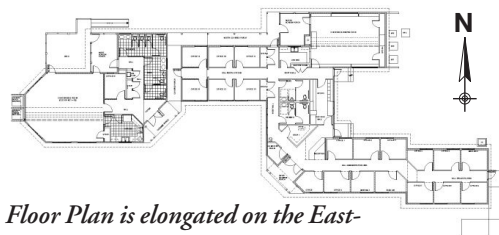




ENERGY STAR® New Building Design Case Study **RAFI Office Building, North Carolina, USA**

RAFI-USA (Rural Advancement Foundation International – USA) is a private, nonprofit organization in Pittsboro, North Carolina working with rural farmers to promote conservation and agricultural biodiversity, as well as advising farmers of their rights and opportunities. In their new building, they wanted to provide offices for the organization staff, six rental offices for like-minded small nonprofits and space for the Don Pollitt Conference Center.

The client's desire was to obtain a "green" design, one that did not damage the existing site, utilized the existing buildings components in their new building, reduced landfill debris, and provided them with a state of the art sustainable building and a pleasant working environment.



Floor Plan is elongated on the East-West axis to maximize solar benefits

A full day green design charrette was conducted soon after RAFI-USA bought the 2.8 acre site in downtown Pittsboro in the summer of 1997. Participants included members of the community, staff, board members, town and county officials, architects, designers, and engineers. The exercise included a walk through the land and the existing house to



Dan Pollitt Conference Center — Southwest view. Effective building shape, location, and orientation optimizes energy efficiency with increased daylighting and passive solar opportunities.

analyze the possibility of reusing the structure and to gain familiarity with the land and its features. Under the shade of the big old oaks, three teams came up with a list of priorities that later became part of the program for the new building.

Proper siting and orientation of the building were critical issues of the program and design approach. The impact on the existing site was minimized by locating the building on the footprint of the old building and preserving all the beautiful old hardwood trees. No development took place in the northern third area of the property, which has steep slopes, a drainage area, and a pond. The landscape does not require irrigation. Driveway and parking areas were designed to minimize stormwater runoff by using gravel instead of impervious materials. The building is one story elongated on an East-West axis to maximize the use of natural lighting. All offices have South-

The Environmental Protection Agency's ENERGY STAR is a recognized symbol for exemplary energy performance in buildings, homes, products, and appliances. The ENERGY STAR software tool, Target Finder, and new building design guidance can help you set an energy use targets, incorporate energy design strategies, and achieve energy performance goals.



facing glazing, supplemented by indirect energy efficient lighting and task lighting. Temperature, lighting and airflow are controlled individually by the users.

The energy consumption target was set in the early stages of design, and Energy 10 (a computer simulation software developed by NREL and distributed by SBIC) was used to model the building's energy consumption. Knowing the energy consumption target aided discussions with engineers to determine optimal sizing for the HVAC system. Subsequently, design energy was compared to the target. The Environmental Protection Agency (EPA) has developed an energy performance rating scale where you can establish an energy consumption target and compare design energy consumption to actual energy performance of similar buildings. The software tool, Target Finder, helps professionals establish an energy consumption goal for five distinct building types during conceptual design phase. Target Finder complements Energy 10 by providing actual energy performance to compare to the design energy consumption.

The results were presented to the staff and Board members at the end of Schematic Design and followed up through the rest of the design process. Energy 10 ranking of the energy efficient strategies suggested a reduction of 70% in lighting needs and of 50% in cooling requirements, and almost the elimination of the heating capability. Daylighting, high efficiency HVAC and energy efficient lighting were the most important strategies to achieve this performance.



Conference room with South-facing clerestories for daylighting. Interior daylighting with supplemental energy efficient lighting reduces long-term operating costs and improves indoor environmental quality.

The design provides users with a light-filled environment in which working should be a pleasure. These same characteristics also contribute to efficient building operations and reduce long-term operating costs. In addition to serving as a model for energy conservation, the building showcases various methods of achieving environmentally responsible design such as passive solar, use of daylighting and energy efficient lighting, natural cross ventilation, and good indoor air quality.

The RAFI-USA building's annual energy use was benchmarked using EPA's rating scale and ranked in the top 10 percent. The energy consumption (year ending July 2002) was 25.1 kBtu/SF, at an operating cost of 0.60 \$/SF. It's also the first office building in North Carolina to be awarded the EPA-ENERGY STAR® Label, and is a testament to the designer's ability to achieve high performance buildings through attention to energy issues during the design process.

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