

Juliana Walker
Sustainable Design
LEED-Clearview Elementary School

The concept of environmentally conscious design is one that has taken off in the relatively recent past. The Leadership in Energy and Environmental Design, or LEED, as it is commonly called is a rating system initiated by the U.S. Green Building Council (USGBC). LEED was a reaction to this environmentally conscious building concept. This rating system provides designers, contractors, owners, developers and users with clearly identified goals, to enable the building to have a positive impact on the occupants and the environment as a whole. I have chosen to explore the Clearview elementary school project in Hanover, Pennsylvania, which is a LEED-NC V.2/V.2.1 GOLD project, completed in 2003. As a home for a community of young students, I feel it is of even greater importance for this project to follow the LEED guidelines. This learning environment creates the perfect opportunity to instill an eco-friendly thought process which develops and continues naturally.

Clearview elementary school is a kindergarten through fourth grade elementary school in the suburban community of Hanover, Pennsylvania. Clearview was constructed on the same site as an existing elementary school, which was already serving the community. The existing building was left in tact for future redevelopment. By incorporating various LEED credits in the overall design, the team of professionals who created Clearview was able to achieve LEED GOLD certification. The incorporation of these credits would not have been possible if the team did not start with an integrated design process. During the process, professional, multi-disciplinary designers used the help of computer simulated energy models to work through designs with community members, school officials, teachers and other stakeholders in the project. (Designshare.com) This paper will explore the areas in which Clearview excelled, as well as the areas where Clearview could have pushed to achieve more of the LEED goals.

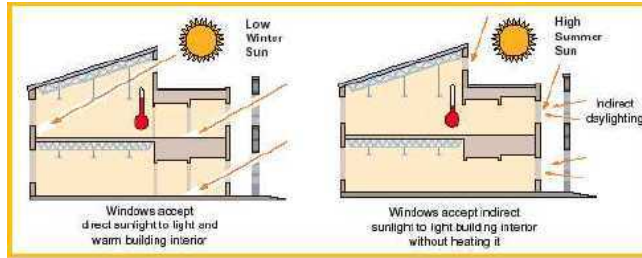
Sustainable site

Clearview elementary school has been built on the site of an empty lot; adjacent to one of the existing elementary schools which serviced the community. The existing building was kept in tact for future reuse, an expansion of Clearview elementary or another community organization. Building on this adjacent piece of land enabled them

to reuse and incorporate existing municipal storm water infrastructure. Clearview elementary avoided contributing to sprawl by as well as avoiding developing on important agricultural land with the use of the existing lot. (usgbc.org) During and after the construction process, all of the existing deciduous trees remained, without being disturbed.

Indoor Environmental Quality

This category had one of the greatest impacts on Clearview, achieving LEED GOLD certification, a level above the original goal of SILVER certification. There have been various studies conducted to test the performance of students in environments filled with natural light, versus environments that do not contain a great deal of natural sunlight. In varying degrees, all of the tests results found that students, teachers and employees have better test scores and performance rates in naturally sunlit environments. As a result of these findings, during the planning phase of this project, there was a great deal of thought given to the use of sunlight, both as an energy-less source of light as well as a temperature control system. With the use of different design elements such as strategically placed windows to accept light and heat from the low sun in the winter, and accept only natural light and not heat from the high summer sun, natural sunlight is able to reach "all educational spaces" at Clearview. This feature simultaneously provided the educational facility to act as a passive solar energy system. Along with correctly placed windows, horizontal sunshades and highly reflective white roof decking, the natural light was evenly dispersed. (Clearview Elementary School Highlighting High performance) Natural light is not the only element having an effect on the quality of an indoor environment. The use of geothermal heat pumps in each classroom helps to keep the classroom at a comfortable temperature during each season. Geothermal heat pumps make use of the constant 55-degree temperature underneath the earth's surface, using it to heat the air during the winter and cool it during the summer. Air quality is also an important feature in the overall quality of the Clearview environment. There have been permanent sensors installed throughout Clearview, which help to monitor the fresh air that is filtered into the space. The air will change, based on the temperature humidity and carbon dioxide levels that are in each given space. This air is filtered through floor-mounted diffusers, which delivers air at a much closer level to where people are taking it in, versus the typical ceiling-mounted diffusers.



Section through the West side to show the use of Natural light during the Winter vs. Summer Months

Materials and Resources

The materials chosen for a project can go beyond the basic thoughts of recycled content and recycling the waste from construction. Clearview took this category to another level, by not only using materials with high recycled content, but also recycling 75% of construction waste. The design team also found materials and resources that enhanced the building envelope. ICF (Insulating Concrete Form) was the material that was used for the majority of Clearview's construction, which is made with a fly ash component that helps to give the cement an air tight quality. ICF increases the thermal comfort of the interior environment without increasing the energy expended, which would typically be used to do so. The team specified materials that have efficient means of insulation, such as cellulose which, in turn, cut back on HVAC loads for heating, and cooling and enhanced the quality of Clearview's interior environment. Materials were also chosen based on their life cycle analysis and the manufacturing proximity to the project. Materials from rapidly renewable resources, such as wheat board, were chosen over casework made from standard wood products.

Energy and Atmosphere

Upon completion, Clearview is expected to use 40% less energy than a conventional school. The team of designers were able to achieve this in a variety of ways. They started with simply orienting the building in an efficient way. This orientation helps to maximize solar gain and minimize heat loss. This orientation is complimented by the deciduous trees that were untouched, act as a natural sunscreen during the summer. (AIA.org) Energy is also reduced by many of the materials that were chosen such as the ICF that was discussed earlier and triple pained windows to enhance the building envelope.

Water Efficiency

Clearview used many basic water conservation and efficiency systems. This category seems to have the most basic solutions in this project. Waterless fixtures, such

as urinals, were installed and new toilets with varying amounts of water were used for different types of flushes. Automatic faucets were also installed in bathrooms. Combined with these efforts was the planting of indigenous species of plants to cut down on the amount of water to keep them alive. Even with just these simple decisions, Clearview is expected to use 30% less of the potable water. (USGBC.org) I think this project would have benefited from more exploration within the area of water efficiency. The other aspects of this project seem to have been truly explored and the best options were implemented. I would like to see something more creative used for these credits as well, maybe something that incorporated the reuse of rain water. An option incorporating an idea similar to this could have been explored during the integrated design process, but may have been eliminated due to this project coming in so close to a conventional schools cost. However, Clearwater was able to reuse existing water line infrastructure, which is a sustainable practice of reuse.

Innovation and Design Process

Clearview received 5/5 points for the Innovation and Design Process credits. They were able to receive a perfect score through the integrated design process that started with local community meetings even before the actual design process began. It continued with the collaboration of all the design professionals from the various disciplines in conjunction with the schools representatives. The design professionals worked through various concepts with computer modeling to help represent the various options for use of daylight as well as energy efficient options.

I see Clearview elementary as a testimony to how far environmentally conscious design has come, and will continue to go. In 2003, Clearview elementary, a LEED GOLD certified building, was completed for \$6.35 million, just \$150,000 more than a conventional school was built for that year. This 2% difference in initial cost saves the school district about \$18,000 a year in energy, while giving students a more productive and healthier place to learn. Through this process, Clearview elementary has gained a tremendous amount of success. The quality of life for all of the occupants of the building has increased on a day to day basis, as well as with their long-term health. Clearview's principal has said, "Students and staff are better at focusing on learning rather than the environment. They're not distracted with cold temperatures, squinting to see the board and other daily stresses." (sundogusa.com) A well designed "Green" building, LEED certified or not, will automatically enhance the overall experience for an individual. Eco-friendly environments will better a person's physical and emotional comforts, because they are surrounded by positive environment.

The USGBC's LEED program has its place in the world of design and construction. Overall, it is a powerful tool, which has been able to help raise awareness and excitement about the prospect of environmentally conscious design. For most projects, the goal of a LEED certified building gives a design team a place to start. This list of credits helps to make it an easier and much more defined way to design. My concern with all the excitement and enthusiasm that is being raised is the loss of focus, of the overall project. In my experience, which I here begin to develop with the design of LEED certified buildings, sometimes the goal of the building gets lost with the excitement of it becoming a LEED certified building. If in the end, when a project is complete, it doesn't meet the needs of the end users, how environmentally conscious will it really be? Will there be something new to replace it ten years down the road, when the building should have been designed to be intact for the next 100 years? I think LEED certification can be a successful guide to build a healthier safer world, as long as it is used in the correct context so that it can really make an environmental difference.

Sources

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