LEED Certified Lab Offers Lessons In Efficiency, Project Management

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A Florida water management district put in practice what it preached — energy and water use efficiency and conservation — in the design of its new environmental services laboratory. And in the process, the South Florida Water Management District (SFWMD) used project management and quality control tools that resulted in a project that was well under budget, with only 3 percent in change orders, and achieved LEED gold certification.

SFWMD focuses on water quality, water supply and flood management throughout southern Florida from Orlando to the Florida Keys. When the regional agency decided to build the laboratory, its mandate to designers was to design a building that was green and energy efficient, and would showcase ways to conserve and efficiently use water. SFWMD wanted to practice what they preached to their constituent communities and to the 7.7 million residents within the district.

The lab is one of the most productive of its type in the country and it completes between 16,000 and 28,000 analyses per month, amounting to more than 200,000 annually. The lab is the site where SFWMD scientists test for the amount of nutrients in surface and groundwater, salinity levels, and other water quality parameters. The lab maintains a database available to other scientists and the public at www.sfwmd.gov containing the more than 5 million water quality testing results it has produced over the last 30 plus years.

With money tight and a local economy in disarray, SFWMD was also concerned that building a new facility in tough times be seen as wise spending. The budget had to reflect that. Using consensus building, project information management (PIM) software and design review tools, the new 36,000-square-foot environmental services laboratory in Florida was completed for $8.2 million, or $228 per square foot.

The SFWMD was committed to achieving LEED gold certification to underscore its mission and commitment to the environment. Some of the water and energy saving meaures in the facility include:

- Greywater collection system for non-potable uses.
- Low-flow fixtures and hand sensors for potable water to cut water use.
- Pervious concrete in parking areas and sidewalks to reduce pollution from runoff.
- High-efficiency mechanical and electrical systems.
- Efficient window and lighting systems.

- Off-peak ice-storage system to reduce daytime air-conditioning needs.
- Roofing and pavement with reflective materials to keep the building and adjacent areas cooler.
- Recycled, low-emitting and regional materials.
- Spaces set aside for bicycles and low-polluting transportation to encourage efficient transportation.

Laboratory Construction Project Management Strategies Prove Effective

It was important to SFWMD that the project management process be highly efficient. Several tools proved effective for the laboratory construction project: consensus building process, project PIM software, an extensive quality control/peer review process, and online, live project meetings.

Initially a half-day kick-off meeting with team consultants was held with all stakeholders, users, and SFWMD managers contributing their expectations of and vision, needs, and criteria for the project. All team members were heard and also understood the concerns and wishes of others. The information gathered during this initial phase informed the criteria that were used to create the 30 percent design documents.

As often is the case, not all project team members were using BIM (building information modeling). Yet the project needed a tool that would keep everyone informed at all stages to avoid conflicts and miscommunication. Using PIM software the team could deal with the flood of deliverables, sketches, revisions, and suggestions earlier in the design process. SFWMD introduced DrChecks to the design team. DrChecks is a web-based, fully functional, paperless design review tool developed by the Corps of Engineers. Because the design team was geographically spread out, periodic progress meetings were held using GoToMeetings, which uses an interactive, classroom-style format.

The basis of design review entailed a daylong presentation that outlined the criteria and where the project was headed, and showed sketches and information for each segment of the project. During the afternoon each discipline — HVAC, electrical, plumbing, etc. — broke out into separate sessions to review preliminary designs in that area. These breakout sessions resulted in good discussion about the issues and specific suggestions to improve the project: for example, using preferred vendors, revising room sizes and adding a deck for outdoor experimentation. Then the basis of design report was submitted, and here is where DrChecks came into play, as peer reviewers logged in questions, concerns, and suggestions. The design team responded until each item was resolved.

This phase was followed by a series of three one-hour presentations to the client management team. The first covered the process for resolution of the issues from the basis of design report. Meetings after

30 percent design and when the final design submittals were ready went through a similar process. When an issue could not be resolved among designers and the staff assigned to the project, SFWMD management staff would make the final decision.

The SFWMD was focused strongly on quality control. The laboratory collects and stores many sensitive water samples and conducts numerous tests on those samples. The building's design and systems needed to achieve near-mission-critical standards. Two weeks were added to the schedule for the design team's quality control efforts at each submittal phase. SFWMD hired an outside peer review firm and asked many of its staff to participate in the peer review process using DrChecks. Reviewers entered comments into the system, and the project team answered them. The process went back and forth until all issues were resolved.

The outcome of this process and the extensive access to design documents in pre-construction phases of the project bore fruit during construction. Change orders on the project were only 3 percent of project costs. There has been some grumbling in the industry about using a transparent, on-line peer review process. But after review by many eyes, the plans were better and resulted in fewer changes. As another indicator that documents were clear, with few areas open for interpretation, eight construction bids came in well under budget and within a narrow 7 percent spread.

When the project moved into construction, the use of PIM software kicked in. The team used the software to manage the RFI (request for information) process. When RFIs were received via email, they were logged in, assigned to a team member for review and response, and assigned a due date — generally seven days. The response to each RFI was also checked through the quality control process. Some submittals were reviewed by all team members, others by a specific team member.

A final goal of SFWMD was to have a facility that could withstand high-velocity winds with no or minimal damage and with emergency backup systems capable of self-sustaining operations for seven days. The design includes an emergency power backup system that can provide seven days of self-sustained operations in a major storm event. The system includes 480/277-volt service with step-down transformers to produce 120/208-volt secondary power. Diesel fuel is stored onsite in aboveground, double-walled tanks. The system is tested on a regular basis.

The completed facility, designed to withstand Florida's infamous hurricanes, incorporating energy and water efficiency, and using efficient and money-saving project management methods, represents the culmination of successful process and planning methods.

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