SHADES OF GREEN

Design DNA principles give way to sustainable solutions

By Peter Hoffmann

The adoption of green building principles by the healthcare industry is a positive and necessary development that will have far reaching effects on medical design and construction. While green healthcare shares many attributes of other green building market segments, it also has unique aspects generated by the special requirements of the healthcare field, including heightened human needs, efficiency and technological complexity. Furthermore, even within the medical field, sustainable building will develop different shades of green to adapt to the particular circumstances of a project.

Three healthcare projects — two completed and one just beginning construction — demonstrate different approaches to green building rooted in the specifics of the respective projects, but also reinforce the idea when fundamental sustainable design principles are embedded in the design DNA, the solutions will be sustainable as well as compatible with various rating systems.

All three projects share certain common green design aspects: solar orientation, daylighting, views to nature, reduction of heat island effects and regional materials — zero or low-cost basics that every facility should integrate. But in addition to the integration of baseline green building principles and products, all go one step beyond and respond sustainably to the unique circumstances of their patients, staff, locale and mission.

PHOTO: ROBERT CANFIELD

At Children's Medical Center Legacy, grasslands and natural water features provide an interactive healing garden as well as a visual focus for the patient rooms above.

Patient rooms at Chickasaw Nation Medical Center are all visually connected to the landscape with large, well-placed windows. A lower window offers a vista of the native landscape while the higher one provides the patient with a view of the sky when reclined in bed.

A series of trails at Chickasaw Nation Medical Center connects an interior courtyard with an existing creek beyond; an outdoor chapel and 'smudge pit' are located along the path. The façades of interlocking of metal, wood and glass were inspired by Chickasaw weavings and handicrafts.

CHILDREN'S MEDICAL CENTER LEGACY, PLANO, TEXAS

For Children's Medical Center, the approach to sustainability is rooted in both the special needs of pediatric patients and tapping the healing power of nature. The site planning began with the 100-year-old "Tree of Life" oak tree, which became the focal point for the site design. The tree anchors an outdoor healing area used for storytelling and patient therapy.

Site design was a top priority in providing unobstructed views of the multiple water features and grasslands from every patient room. This same level of indoor to outdoor connection was also achieved in the indoor gardens and public spaces with abundant floor-to-ceiling glazing. The connection was further reinforced by the use of native limestone that serves as an exterior cladding and, when pulled inside, as a natural interior finish.

The design team maximized the use of nature, daylight and color throughout the facility benefiting not only patients and families but also the caregivers who make the facility an important teaching hospital. Finally, to reinforce the distinctive pediatric qualities of the facility, the surrounding fields were restocked with grazing cattle and horses. The 328,000-square-foot hospital, which was designed in association with Zimmer Gunsul Frasca, is certified through the Green Guide for Healthcare Buildings and won a 2007 Environmental Vision Award for its outstanding recycling success.

CHICKASAW NATION MEDICAL CENTER, ADA, OKLA.

Chickasaw Nation Medical Center is notable because its sustainability is rooted in the specific culture and environment of the Chickasaw Indian Tribe. Eschewing a generic approach to healthcare, the 358,000-square-foot facility responds to specific customs and needs that influenced the design. The project reflects a culture that respects and appreciates nature and incorporates the beauty of the site and deference to its ecology as fully as possible into the design.

As the whole site is seen as a healing environment, the facility does not focus on a contained healing garden but rather melds with a series of natural landscapes that surround the building and anchor it into the landscape. Within these landscapes of native grasses the design team located traditional elements such as a smudge pit and chapel. The landscapes are visually connected to the "town center," an important civic venue for the Chickasaws that emphasizes a connection to extended family. Several large light wells penetrate the volume of the medical center to provide access to light and views for staff as well as patients.

Chickasaw and other Native American culture and art influenced the development of the architectural character of both the interior and exterior of

PHOTOS: ART GRAY

the medical center. Ceiling and floor geometries were influenced by Chickasaw neckwear patterns, while entrance canopies were inspired by traditional basket geometry. Throughout the facility traditional patterns and colors that have spiritual and cultural meaning reinforce the tight link between hospital and Chickasaw culture.

LAKEWAY REGIONAL MEDICAL CENTER, AUSTIN, TEXAS

Lakeway Regional Medical Center's unique shade of green derived from a complex owner that asked for a facility that felt more like a hotel, was cost effective and ultimately would achieve LEED Silver and Austin Green Builder certification. A small hillside site and a climate characterized by extreme temperatures and frequent droughts also impacted the final design solution.

The architectural response is multifaceted, but finds its inspiration in both the local landscape and the newest sustainable technologies. Natural materials are used throughout, helping achieve LEED points related to indoor air quality concerns, providing a rich non-institutional palette and connecting the project to its environment. The landscaping around the building was configured to optimize controlled daylighting inside, as well as provide shaded gardens and water features that enhance the hospitality ambiance the client was seeking. What best defines this 270,000-square-foot hospital is the seamless integration of natural themes with technologically advanced and cost-effective MEP systems.

FOCUS ON LIGHTING

High-energy costs are of ongoing concern to most healthcare organizations. Electric lighting makes up a majority of those costs. At Lakeway, the problem was addressed by understanding the lighting needs for every room. The large array of lighting requirements revealed through discussions with users was codified into a simplified set of lighting-control systems. The goal was to have useful lighting control scenarios that would employ a variety of sensors and timers to dim or turn off lights as much as possible, but do so in a way that was intuitive and unobtrusive to the users, understandable to the contractor and easily maintained by the hospital facility group. Questioning standard solutions resulted in major reductions of lighting loads as well as concomitant HVAC loads, which in turn generated savings by reducing the size and cost of equipment.

Sunshades/light shelves in the surgery waiting area at Lakeway Regional Medical Center modulate the southern sunlight and bounce it deep into the interior of the space, illuminating the rich palette of natural and low/no VOC materials, which help forge the link between inside and outside. Sophisticated lighting and HVAC solutions reduce energy consumption.

NEW HVAC IDEAS

Another area targeted for major energy and operational cost savings is the cooling system. In the past, condenser loops relied on cooling towers to reject the heat from the chillers. At the same time, a building heating boiler provides hot water to reheat air delivered by VAV boxes. Essentially energy is being used to cool and then reheat. At Lakeway, the solution was a system that used a heat recovery chiller to heat water and provided building heat. Normally wasted heat was harvested from the cooling tower for a useful purpose. In the operating room cooling system, desiccant heat recovery wheels were used to save energy and permit a lower dew point supply air temperature to the ORs. This process allows lower room temperatures that many surgeons prefer, without risking visible condensation or fogging in the OR. In conjunction these strategies provide both energy efficiency and human comfort, making this an exceptionally green hospital.

The healthcare field's unique needs, combined with its leadership in Evidence-Based Design and need to keep an eye on the bottom line, are shaping a more nuanced version of sustainability. This will lead to increasingly innovative solutions responsive to specific locales and populations. n

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