PROFILE

Article by Amy Eagle · Photography by Joe Fletcher Photography

HIGH TECH, HIGH

Advanced engineering supports hospital's environment of care

PROJECT OVERVIEW

PROJECT NAME: Mills-Peninsula Medical Center
LOCATION: Burlingame, Calif.
TOTAL FLOOR AREA: 630,000 square feet (hospital is 450,000 square feet; medical office building is 180,000 square feet)
NUMBER OF FLOORS: Seven, including the lower level
NUMBER OF BEDS: 241 built-out and 70 shelled
PROJECT COST: $640 million
CONSTRUCTION COST: $489 million (includes hospital, medical office building, four-story parking structure and 20 acres of site work)
GROUNDBREAKING DATE: November 2006
OPENING DATE: May 2011

PROJECT TEAM

OWNER: Mills-Peninsula Health Services, a Sutter Health Affiliate
ARCHITECT: Stantec (formerly Anshen+Allen)
GENERAL CONTRACTOR: Turner Construction Co.
INTERIOR ARCHITECT: Anderson Brulé Architects Inc.
MEP ENGINEERING: Ted Jacob Engineering Group Inc.
STRUCTURAL ENGINEERING: Rutherford & Chekene
MEDICAL EQUIPMENT PLANNING, PROCUREMENT, INSTALLATION AND TRANSITIONING SERVICES: RTKL Associates Inc.
LANDSCAPING: Antonia Bava Landscape Architects

Larry Kollerer, project manager, Mills-Peninsula Medical Center, says that in designing the hospital and adjacent medical office building, the project team also wanted to "do everything we could possibly do to make the buildings and spaces within the buildings as healing as possible."

Advanced care, community focus

The exterior forms and materials of the medical center were chosen to balance a sense of sophisticated medical care with a community focus at the hospital, says Kevin Day, AIA, LEED AP BD+C, senior associate from the San Francisco office of Stantec (formerly Anshen+Allen). The building is designed to communicate confidence in the care provided at the facility and to convey a warm, friendly welcome.

Modern materials provide the desired image and give the building long-term durability, according to Day. Light-colored precast concrete was treated with several textures, from ribbing to a smooth, sandblasted finish, to give the material interest. The precast relates to honey-colored granite installed at ground level.

An aluminum curtainwall that gives the building a modern expression is softened by the aluminum's champagne color, which changes from silver to medium brown to nearly green depending on the light, says Day. The designers worked to achieve a masonry feel using contemporary materials by placing aluminum plate panels with differing tones adjacent to one another on the exterior of the building. "We didn't want a shiny, monolithic, industrial look. We wanted the metal to shimmer," Day says. The design is meant to be fresh and approachable.

Exposed architectural steel and trellises crafted from extruded aluminum tubes help shade the patient rooms on the top floors of the patient towers and reflect light, providing the building with a radiant glow during the day. The undersides of canopies at the main and emergency department (ED) entrances are highlighted with real wood veneer, which makes the entrances easy to locate and gives them a more hospitable appearance.

Pamela Anderson-Brulé, president and principal of design, Anderson Brulé Architects, San Jose, Calif., says it was noted during a design workshop with hospital staff that the ED is the first experience many patients and families have with the hospital, making it critical that the interiors of the ED lobby and main lobby have a similar feel. Each of these spaces features seating arranged to facilitate family conversations, along with plenty of natural light and views of exterior landscaping.

The medical center cafeteria is located on the main floor of the adjacent medical office building, easily accessible from both the main lobby and ED lobby in the hospital. The cafeteria features a variety of seating options, including outdoor seating. Brighter colors, cushioned seats and hanging light fixtures contribute to a high-end dining experience that attracts not just patients, visitors and staff, but local residents and volunteers. The cafeteria design "speaks to the hospital as a community member," says Susan Porter, senior interior designer, Anderson Brulé Architects.

Aiming for efficiency

In addition to the main lobby and ED, the first floor of the medical center includes preoperative and postoperative services, surgery and radiology. One of the advantages of building a replacement facility from the ground up is the

SEISMIC SYSTEM allows hospital to prepare for the big one

PROFILE

Mills-Peninsula Medical Center, Burlingame, Calif., is located 1.5 miles from the San Andreas fault zone. "There will be a large earthquake in the lifespan of this building. It's not a matter of 'if,' it's 'when,'" says Thomas Lauck, SE, principal with structural and geotechnical engineering firm Rutherford & Chekene, San Francisco.

Based on the history of seismic events at the building site, the medical center is designed to withstand an 8.5 magnitude earthquake centered in Burlingame.

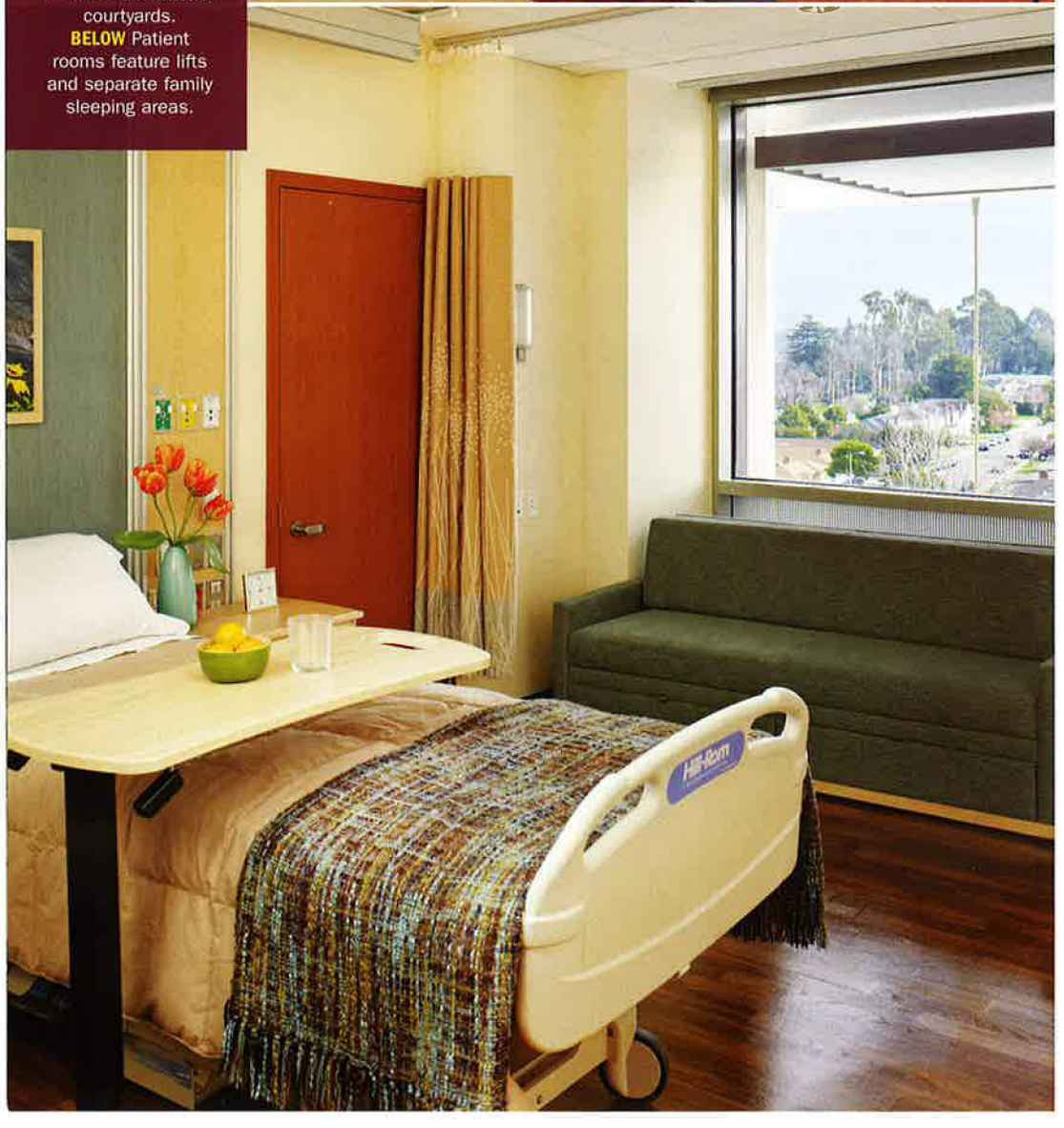
The base-isolated structure is supported on friction-pendulum bearings under each of its 171 columns. These bearings will allow the building simply to rock in "a gentle sliding motion," according to Lauck, in the event of an earthquake. The building will then recenter itself on the concave bearings. While the ground may move violently, the hospital will not. "We expect no damage within the building at all. Basically the items within the building will remain right where they are," says Larry Kollerer, project manager, Mills-Peninsula Medical Center.

A covered moat around the medical center provides 30 inches of empty space in which this movement can occur. Connections for utilities coming into the hospital are designed with joints that allow them to move in multiple directions, to prevent the interruption of utility service. The building's elevator pits terminate above ground to keep them from being sheared off by building movement.

The stainless steel bearings are protected by rubber seals and inspected regularly to ensure they are not contaminated with any debris that could cause them to lock up. The bearings are coated by a bonded material with a specified friction coefficient that prevents the building from moving simply due to strong winds.

"Hopefully, we won't get the seismic occurrence that would do extreme damage to our neighborhood," says Kollerer. "But if we do, I think we're in a situation where we will continue to operate and provide the medical care that the community will need after a seismic occurrence like that." ■

TOP Isolators at the base of each primary structural column allow the building to move independently from the shaking ground during an earthquake. **BOTTOM** The base-isolated structure can withstand an earthquake by moving (or allowing the ground to move) up to 30 inches in any direction.



SOOTHING SPACES

ABOVE The ICU receives natural light from both exterior windows and interior courtyards.

BELOW Patient rooms feature lifts and separate family sleeping areas.

opportunity to "get those adjacencies correct" for operational efficiency, says Kollerer. The medical office building adjoins the hospital on every floor, allowing physicians to move quickly between inpatient and clinical functions.

The hospital's two patient towers are L-shaped, to create a more compact floor plate that minimizes walking distances for nurses on the patient units. The towers are positioned facing away from one another, a design that allows for long-range views from each patient room of the San Francisco Bay; the San Bruno mountains; or the city of Burlingame, which is known as the "city of trees."

Interior elements

The interior design includes materials and colors representing elements of nature. Wood veneer, wood-look vinyl, stone-look laminates, and carpet and fabric with subtle, natural patterns combine to create a healing environment throughout the building. A calming color palette of blues, greens and teals supports this concept, which provides a unifying theme for the facility.

Realizing that different parts of the hospital, such as the surgery department and the birthing center, evoke different emotions, the interior architects worked with hospital staff to designate "environment zones" within the building. The materials and patterns used in each zone address the specific experiences of patients, visitors and staff in that area, as well as specific maintenance requirements.

The birthing center, for example, features a home-like design with wood-look flooring, a comfortable rocker in each room and glass-tile details in the bathrooms. Softer, more feminine colors and patterns are meant to appeal to female patients. A color change at each patient room

doorway aids with wayfinding.

The interior design of the neonatal intensive care unit addresses the joys and concerns of parents whose infants are admitted to this unit. Colorful patterns on the walls and in the flooring favor a nursery atmosphere.

The surgery department is designed to be warm and welcoming, but also to help patients and their families understand that the hospital has the latest technology for patient care. Here the interiors feature a cleaner, crisper design with less hidden medical equipment.

Defining the experience

The service delivery plus the environment defines the experience for patients and their families at the facility, concludes Anderson-Brulé. **HFM**

Amy Eagle is a freelance writer based in Homewood, Ill., who specializes in health care-related topics. She is a regular contributor to *Health Facilities Management*.

SPEC SHEET

PRINCIPAL DESIGN MATERIALS **Carpet:** Atlas Carpet Mills Inc., Mohawk Industries Inc., PacifiCrest and Shaw Industries Group Inc. **Curtainwall:** Oldcastle BuildingEnvelope **Door hardware:** Markar Architectural Products, McKinney Products Co. (hinges), Norton Door Controls (closers) and Sargent Manufacturing (exit devices and locksets) **Doors:** Besam (entrance and sliding doors) and Kawneer North America (entrance doors) **Elevator cab finishes:** Forms+Surfaces **Flooring:** Altro (quartz tile), Amtico International (resilient vinyl tile), Johnsonite (rubber base and resilient sheet vinyl) LG Hausys Floors by Shaw Industries Inc. (resilient sheet vinyl), Mannington Mills Inc. (resilient sheet vinyl), Mohawk Industries Inc. (vinyl composition tile) and Nora Systems Inc. (rubber sheet flooring) **Glass:** CSG Architectural Glass **Laminated wood veneer:** Oberflex **Metal veneer:** Stoller Metals **Paint:** ICI Paints, Master Coating Technologies and Sherwin-Williams Co. **Paneling:** Trespa International **Plastic laminate:** Formica Group, Panolam Industries and Pionite Decorative Surfaces **Resin sheets:** Veritas **Roofing:** Sika Sarnafil (elastomeric roofing) **Skylights:** O'Keeffe's Inc. **Solid surface counters:** DuPont and Wilsonart International **Tile:** Daltile (main and emergency department lobbies, public and staff restrooms and patient toilets), Interceramic Inc. (staff restrooms) and Roca Tile Group (main and emergency department lobbies, public restrooms and public elevators) **Upholstery and cubicle curtains:** Architex International **Wall protection:** Construction Specialties Inc. **Wallcoverings:** Colour & Design Inc., Innovations, Lanark Wallcovering, Maharam, RJF International Corp., Source One Wallcovering and Wolf-Gordon Inc. PRINCIPAL FURNISHINGS **Casework:** Northwestern Design Inc. (custom cabinetry) **Exam room seating:** Fixtures Furniture **Family birth center patient room seating:** Carolina Business Furniture and Nemschoff Inc. **Fixed seating:** Krug Inc. **Office furniture:** Allsteel Inc., Herman Miller Inc., Kimball International Inc., Steelcase Inc. and Workrite Ergonomics Inc. **Office seating:** Fixtures Furniture, Humanscale and Kimball International Inc. **Patient room bedside cabinet:** Hill-Rom **Patient room seating:** Nemschoff Inc. and Weiland **Physician lounge seating:** Leland International **Reception furniture:** Carolina Business Furniture, David Edward, Humanscale, Kimball International Inc., Krug Inc., Martin Brattrud and Nemschoff Inc. **Sleep sofas and chairs:** KI and Nemschoff Inc. **Table lamps:** Nessen Lighting **Tables:** KI (side tables and conference tables) and Krug Inc. (side tables) **Waiting room seating:** Krug Inc. MAJOR MEDICAL EQUIPMENT **Birthing lights:** Kirlin Co. **Computed tomography, fluoroscopy, general radiology, interventional catheterization, nuclear medicine and magnetic resonance imaging:** GE Healthcare **Electrophysiology catheter, endovascular laboratory and interventional radiology equipment:** Siemens Corp. **Headwalls:** Amico Corp. **Intensive care unit booms:** Hill-Rom **Operating room integration:** Stryker Corp. **Operating room lights and booms:** Steris Corp. **Remote navigation (in Siemens electrophysiology catheter laboratory):** Stereotaxis INFRASTRUCTURE **Boilers:** Bryan Boilers **Building management system:** Johnson Controls Inc. **Chillers:** Carrier Corp. **Electrical equipment:** Eaton Corp. **Fire safety:** Honeywell International Inc. **Generator:** Detroit Diesel Corp. **HVAC (misc.):** Huntair Inc. (double-deck air handling units utilizing fan-walls)

Information provided by Anderson Brulé Architects Inc. and Stantec.

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SUSTAINABILITY plays big role in infrastructure systems

The design and construction team at Mills-Peninsula Medical Center, Burlingame, Calif., used the "Green Guide for Healthcare" as a model to assess sustainable design strategies for the project.

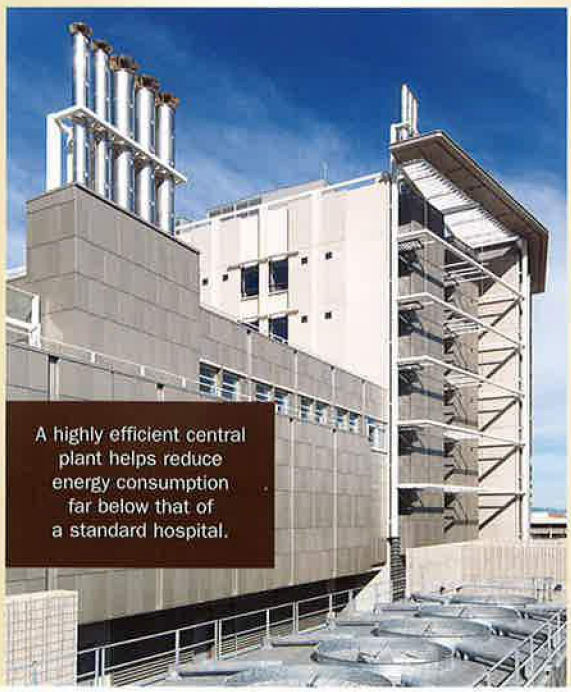
An integrated design approach assured that the primary building systems were tuned to operate at peak efficiency says Kevin Day, AIA, LEED AP BD+C, senior associate from the San Francisco office of Stantec (formerly Anshen+Allen). By performing energy consumption, thermal comfort and life-cycle cost analyses, the team determined it could target a reduction in energy costs of up to 33 percent compared with a typical current code-compliant California hospital.

At Mills-Peninsula Medical Center, a variable air volume system allows hospital engineers to adjust the number of air changes, and automatically controls air supply needed in patient rooms and nonclinical areas of the building according to ventilation requirements and heat loads. With this system, each patient room has its own temperature control, giving patients more autonomy over their environments.

The building features 100 percent outside air with no air recirculation. A run-around heat recovery system captures heating and cooling energy from the air exhausted from the building. This energy is used to preheat or precool incoming air, as necessary.

By reducing energy demand, the project team was able to eliminate one air-handling unit, a two-cell cooling tower, one boiler and one chiller from the original design. "It turned out the system with one of the lowest first costs was also one with the lowest life-cycle costs," says Day. Combined with high-performance glazing and exterior sun shades, the mechanical plant is expected to save the hospital more than $15 million over 25 years.

Recycling and waste diversion also were important to the project. One clever solution involved a 400-foot-long section of a major San Francisco water supply pipe that was relocated from the center of the site. Rather than divert the unused portion of the pipe to a landfill, it was left in place and repurposed as a retention tank for on-site water management. ■



A highly efficient central plant helps reduce energy consumption far below that of a standard hospital.