

RUDOLPH AND SLETTEN

GENERAL AND ENGINEERING CONTRACTOR'S JOURNAL

HOOKED ON CONSTRUCTION

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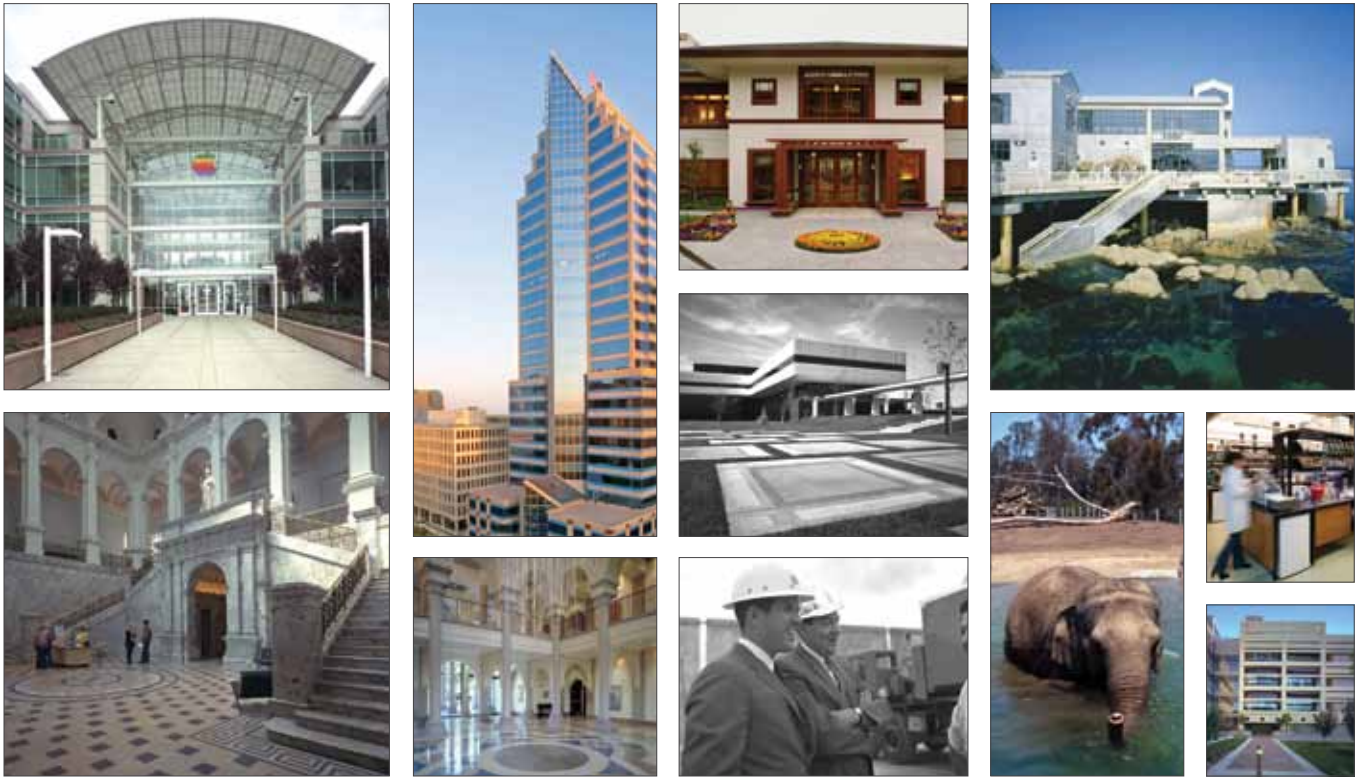
Preconstruction Achievement

Planning and Delivering up a
Successful Healthcare Project

One Big Room Builds the
UCSF Smith Cardiovascular
Research Center

Green Education:
Sustainability in Higher Education

Apple Computers Research and Development Campus (1984); Stanford Cantor Center for the Visual Arts (1998); Bank of the West Tower (2009); University of San Diego Shiley Center for Science and Technology (2003); Lucasfilms Big Rock Ranch (2002); Memorex Research Facility (1969); Onslow "Rudy" Rudolph and Ken Sletten, the company's founders; Monterey Bay Aquarium (1984); San Diego Zoo's Elephant Odyssey (2009); Gladstone Mission Bay Laboratory Building (2004); Stanford Beckman Center for Molecular and Genetic Medicine (1989)



BUILDING 50 YEARS

of trust, innovation and technology

From humble beginnings, Rudolph and Sletten has grown into a leader in construction. From biotech and technology to hospitality and healthcare, Rudolph and Sletten has helped shape the West, one building at a time. Building on California's strong innovative spirit, Rudolph and Sletten uses technology, collaboration and sustainable construction to build trust and dependable results in all that they do.

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COVER STORY

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A Preconstruction Success Story



photo by Michael O'Callahan

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LEARNING BY EXAMPLE

Construction Tech Academy Tours Rudolph and Sletten's NOAA Construction Project

In collaboration with the San Diego chapter of The National Association of Women in Construction (NAWIC), Rudolph and Sletten hosted a construction site tour for students from the Construction Tech Academy. The group of approximately 40 female students, from freshmen to seniors, toured the National Oceanic and Atmospheric Administration (NOAA) Southwest Fisheries Science Center (SWFSC) project, currently under construction in La Jolla, California.

The Stanley E. Foster Construction Tech Academy at the Kearny High School Complex is geared toward students interested in building and design, allowing them to explore careers in construction, architecture and engineering. The academy provides students with an opportunity to explore these fields through contextual, hands-on, rigorous curriculum that prepares students, upon graduation, for direct entry into colleges, apprenticeships or careers. The project tour by Rudolph and Sletten supplements the curriculum by providing real-world examples of in-classroom studies.

Mike Samudio, senior project manager of the

"I was impressed with all of the minute details involved in construction, from the coordination of disciplines with one another to the responsibility of considering the neighboring community."

— Erika Hernandez, junior at Construction Tech Academy



240,000-square-foot facility, led the tour for the students, which began with a walk up to the top of the hill overlooking the entire project site. The SWFSC is funded by the American Recovery and Reinvestment economic stimulus package and replaces a 50-year-old facility across the street that is sitting on a cliff that has eroded to the point where half of the building is no longer safe to inhabit. Key components of the project include a 1-million-liter seawater ocean technology development tank which will contain marine animals for studying and monitoring fishery resources, several research laboratories, office spaces for scientists and support staff and under-facility parking for up to 202 vehicles.

To protect the views of neighboring La Jolla

residences, the building is set low enough to not impede views. A green roof will not only add a pleasant view for neighboring residents, but will also contribute to the facility's USGBC LEED Gold targeted status.

Continuing the tour into the basement, Mike Samudio pointed out challenges Rudolph and Sletten met with creative solutions. For example, the team had to creatively coordinate the air handler's placement with the pouring of concrete since the walls had to be essentially built around the air handler due to the air handler's location and limited space. The basement also contains large storage tanks embedded beneath the lab, storing chemicals for research in an explosion-safe, H-occupancy room.

Concluding the tour on the upper level with a panoramic view of the La Jolla Shores, the students expressed awe at the ability to see, in person, details that they had studied only in AutoCAD. Erika Hernandez, a junior, was impressed with all of the minute details involved in construction, from the coordination of disciplines with one another to the responsibility of considering the neighboring community. Commenting on the permanence of construction, Jessica Lopez, a junior, said, "Imagine 20 years from now this building will still be here."

Construction began in July 2010 and is scheduled for occupancy in 2012.



Renderings by Gould Evans, Kansas City

Preconstruction Achievements:

*Planning and Setting up
a Successful Healthcare Project*



BIM and Preconstruction Efforts generate a proactive plan for John Muir Medical Center

Through an extensive preconstruction effort, Rudolph and Sletten utilized comprehensive in-house resources, including the estimating team, mechanical and electrical estimators, as well as the actual field personnel, to ensure success. By working collaboratively, the preconstruction team was able to work effectively with the entire design team and the Owner to ensure that constructibility issues were resolved. A well planned, detailed procurement and construction schedule was developed along with early subcontractor bid packages.

At the onset of the six-level, 172,000-square-foot John Muir Tower project, Rudolph and Sletten developed

a plan to implement different aspects of the project into the Building Information Model. As the plan developed, a number of trades were identified, beyond the MEP systems, whose incorporation would be beneficial. The first modeled aspects of the project were the building structural systems, consisting of concrete foundations, basement walls and structural steel, inclusive of steel details for weld tabs and gusset plates. The incorporation of structural detail components allowed the team to identify hundreds of conflicts that could have held up the schedule if found during construction.

As the model was further developed, as part of the MEP coordination process,

*Owner: John Muir Medical Center
Architect: Kaplan McLaughlin Diaz
Size: 172,000 sq ft
Completion date: 2011*



photos by Michael O'Callahan



a number of additional building components were incorporated. These included metal stud framed walls, soffits and ceilings, king studs, as well as head-of-wall details.

On a congested hospital construction project conflicts with MEP components could be a sizable challenge. However, the extensive BIM allowed the team to complete the MEP rough in phase with no conflicts between components.

To develop the BIM to the next level, acoustical ceilings were incorporated into the model, including coordinated ceiling heights and compression posts. The team was able to develop a number of alternate ceiling support details to use in these conditions so as to avoid field conflicts. These details were then developed as Post Approval Documents and submitted to OSHPD and approved prior to the beginning of ceiling installations.

To avoid costly impacts due to last minute Fire and Life Safety Officer (FLSO) reviews of the fire alarm system the team incorporated fire alarm devices into the model so that a virtual fly through the space with the fire marshal ensured proper coverage of devices.

Prior to the start of construction, there were several underground utilities which required relocation to allow for mass excavation to begin. The utilities to be relocated, which served the existing hospital tower, were the sanitary sewer system and main power service. The third system requiring relocation was the existing fuel oil storage system, which served the emergency generators at the central utility plant.

The sanitary sewer system relocation included installing a new drainage system around the new tower, which incorporated a new 26' deep lift

station to pump the effluent to the nearest sanitary sewer manhole. The work included potholing throughout the operational parking lot, without impacting patient parking capacity, so as to ensure no existing utilities were impacted, damaged or interrupted during our work activities.

The main hospital tower electrical service was rerouted through the existing tower and required extensive coordination with the hospital facilities staff to ensure a detailed and safe plan were developed for the final tie-ins and switch-over.

Work associated with the tie-ins was performed during off hours and weekends to ensure minimal impacts to the operational facility in the event of a failure. Due to our extensive planning, no such issues were encountered, all work was completed on time and without hospital interruption.



Our project team brought a wealth of OSHPD experience which assisted in proactively developing a successful inspection program. Our team understood that a successful inspection process is based on quality workmanship, trust and continuous collaboration. We accomplished this through several processes. First, prior to ground breaking, the entire project team (owner, contractor, IOR, architect and engineers) scheduled meetings with OSHPD to set forth expectations and processes for the ensuing construction. These initial meetings allowed the project teams as a whole, to work together to understand schedule constraints, share lessons learned from other projects and communicate expectations.

In addition, the team conducts weekly quality walks to review details, craftsmanship, and progress of field conditions. These walks allowed the team to communicate project challenges in an effort to continually move forward, while reducing re-inspections.

Other contributing successes stem from the use of mock-ups and first-in-place installations. The mock-ups utilized integration of systems, quality of work, understanding of typical details and end user acceptance. Installing these reviewed systems helped develop trust, and set expectations for the IOR and OSHPD field staff regarding the final product installation.

"Planning makes all the difference, said Marcus Staniford, Senior Project Executive at Rudolph and Sletten. "It is through extensive planning and collaboration that we can chart a path for success on complex hospital projects like this one for John Muir."



The Annual American Heart Association **Orange County Heart Walk**

In 2010, Rudolph and Sletten's Irvine Office became actively involved with the American Heart Association. Heart Disease and other cardiovascular illnesses have affected so many of our lives—family members and friend—that finding the passion to support this cause came with great ease for many of us. In 2011, we continue to join the fight!

More than 40 Rudolph and Sletten employees and family members took on the 5K challenge along with almost ten thousand others committed participants of The Annual American Heart Association Orange County Heart Walk at the Great Park in Irvine. It was a day to rejoice in those who have survived cardiovascular disease and to remember, with great fondness, those who have lost the fight.



For more information visit:
<http://ocheartwalk.kintera.org>

Rudolph and Sletten's goal to successfully support the AHA encompassed finding fun and creative ways to raise funding and also educating ourselves, as well as advocating to those around us of a healthier life style. The classic selling of the AHA paper hearts and displaying them on our lobby walls is always a great way to allow our visitors at our Rudolph and Sletten Irvine Office a peek at just one of the many ways we raise much needed funds.

We introduced Fitness Fridays, a weekly Friday lunchtime mile-long walk for any and everyone in the office to do as a group. Anywhere from 6-15 people would participate each week, the buddy system was very effective with this. This motivated several employees in the office to join/return to their gym and get more active outdoors with their families and make more conscientious decision with our meals. It also motivated one employee to quit smoking.



SHARP HEALTHCARE GROUNDBREAKING

San Diego's First LEED Gold-Certified Medical Office Building

In April, Rudolph and Sletten participated in the groundbreaking for Sharp HealthCare's new downtown Sharp Rees-Stealy medical office building. The facility will replace the existing 85-year-old Sharp Rees-Stealy downtown building and be the first Leadership in Energy and Environmental Design (LEED) gold-certified "green" medical office building in San Diego.

The 3-story, 66,365-square-foot medical office building and 300-space parking structure will be located across from the existing downtown medical building. The building will house primary and specialty care, laboratory, physical therapy, radiology, pharmacy and urgent care services. The new Sharp Rees-Stealy Downtown medical office building will provide a unique healing environment, including soft light filtering through windows and glass features, and a décor of blues and soft greens, to sooth the patients and their loved ones.

The new building is designed specifically around the historic Florence Hotel Moreton Bay Fig Tree located on the site and a board-certified master arborist will ensure the tree is well cared for during and after construction.

Construction is expected to be completed by summer 2012.

Owner: Sharp HealthCare
Design-Build Team:
Rudolph and Sletten and
AVRP Studios
Size: 66,000 sq ft
Completion date: 2012

Breaking Ground

State's Largest Courthouse Construction Project



rendering: SOM

Rudolph and Sletten recently broke ground on the State's largest courthouse construction project on Friday, March 18, 2011, at a ceremony marking the start of construction for the new San Bernardino Justice Center. The Chief Justice, the keynote speaker at the event, spoke of the cooperation of public agencies on the project, which has an estimated cost of \$339.8 million and will create about 2,500 construction-related jobs all without having one penny come out of the state's General Fund.

"This is really a modern-day miracle in the state of California."

Chief Justice Tani Cantil-Sakauye

Land was donated by the city of San Bernardino. The County of San Bernardino and the State Judicial Branch also collaborated on this project.

Designed by SOM, construction for the new San Bernardino Justice Center is expected to take over two years. This project is expected to improve public access and security, increase efficiency of court operations, and relieve the court's current space shortfall by replacing seven facilities and consolidating operations into a courthouse with 35 courtrooms and two hearing rooms.

The 11-story building will occupy about seven acres of land at the corner of West 3rd and N. Arrowhead streets, directly across from the recently restored historic courthouse. The site plans include 385 surface parking spaces for court visitors and staff as well as 40-secure parking spaces.

"The design emphasizes openness to symbolize a direct connection to the public," said San Bernardino Mayor Pat Morris. It incorporates several innovative features, including ways to draw daylight into the building without heat and to collect and reuse rooftop rainwater. The building's sustainability features will qualify it to receive LEED Silver certification by the U.S. Green Building Council.

Chief Justice Cantil-Sakauye said this project should be a template for others. "When you think of all that is wrong with the state, you can look at the San Bernardino Justice Center and see this is the way it should be done," she said.





100%

filtering of storm water to
reduce impact on San Diego's
sewer system.



55%

reduction in potable water
usage from state-of-the-art
plumbing fixtures.





photos by: 22222222

Owner: San Diego Community College District
Architect: Carrier Johnson
Size: 88,000 sq ft
Completion date: 2011

Green Education

San Diego Community College District project honored for sustainability and design

San Diego City College's latest 'green' building, the Career Technology Center, has been honored with a Best Practice for Sustainable Design by the California Higher Education Sustainability Conference. This is the third year in a row a San Diego Community College District project has been honored by the conference, highlighting best practices and innovations in sustainability in higher education campus operations, planning, design, curriculum, and research within the California State University (CSU), California Community College (CCC) and University of California (UC) systems.

"Sustainability is one of the top priorities of the San Diego Community College District," said Chancellor Constance Carroll. "This award recognizes our success in carrying out this priority in a major construction project that also provides a phenomenal learning environment for students. We are really pleased by this honor."

The Career Technology Center (CTC) is a new five-story, 88,000-square-foot instructional facility, housing the expanded Nursing, Cosmetology and Photography and Digital Arts departments. The state-of-the-art facility was awarded a Leadership in Energy and Environmental Design (LEED) Gold certification by the United States Green Building Council (USGBC) in January 2011.

There is extensive use of recycled materials, such as terrazzo flooring that contains 100% post-consumer glass. Steel remnants

leftover from the exterior finishes are used as interior design elements. The building is designed to achieve significant daylighting of the public areas, and controlled daylighting of the work and study areas. This is shown to provide healthier lighting for students while reducing the building's energy consumption.

Solar panels are installed on the roof and parking structure's south façade. The solar energy generated will provide approximately 8% of the building's total energy needs, contributing to an energy efficiency that is approximately 25% better than what the state requires. The vertical solar panel façade is the largest of its kind in the country.

Rudolph and Sletten has been utilizing sustainable building practices for approximately 16 years. Its first green project was constructed in the 1990s for Rudolph and Sletten client, Shaklee, in Pleasanton, California.

"That project utilized what are now commonplace means and methods to create a very sustainable environment, including under-floor ventilation, sustainable wood products, low VOC paints, a lot of interior day-lighting, reduced lighting capacity, energy-efficient equipment and many more innovations," said Martin Sisemore, CEO of Rudolph and Sletten.

"From that initial experience, we have worked closely with various agencies

Sustainable features:

- *Embraces alternative transportation with close connections to trolley and bus routes, bike storage, and preferred parking for fuel efficient cars*
- *Development remediated 8,000 cubic yards of contaminated soil left from previous industrial uses*
- *Use of water-efficient landscaping and synthetic turf created a 57% reduction in irrigation water demand*
- *Energy conservation approach allows the project to use 21.4% less energy than comparable code-complying buildings*
- *Products used within the facility have high recycled content (31.7%)*
- *27.7% of the materials used are regional*
- *63% of construction waste (558 tons) diverted from local landfills*
- *Low volatile organic compounds (VOC) materials used throughout, reducing off-gassing pollutants*

including the U.S. Green Building Council (USGBC) to help not only implement standards, but devise and refine them over time. When the USGBC rolled out an accreditation program for construction professionals, we were one of the first to take advantage of that. We now have over 180 LEED accredited professionals on staff. We are working toward 100 percent participation from all of our management personnel, and we're well over 80 percent at the moment."

The company's tradition of building green continues with the recent LEED Gold certification of the new Career Technology Center at San Diego City College. The Center is City College's first facility to obtain the prestigious Gold certification. The \$63.1 million Career Technology Center, designed by San Diego-based Carrier Johnson + CULTURE, is a new five-story, 88,000-square-foot instructional and career training facility, housing the expanded and in demand Nursing, Cosmetology and Photography and Digital Arts departments.



The new College Career Center at San San Diego City College is the first of three projects that Rudolph and Sletten has managed for the San Diego Community College District. The company is currently working on the construction of the City College's new Science Building and the Cesar Chavez Campus.



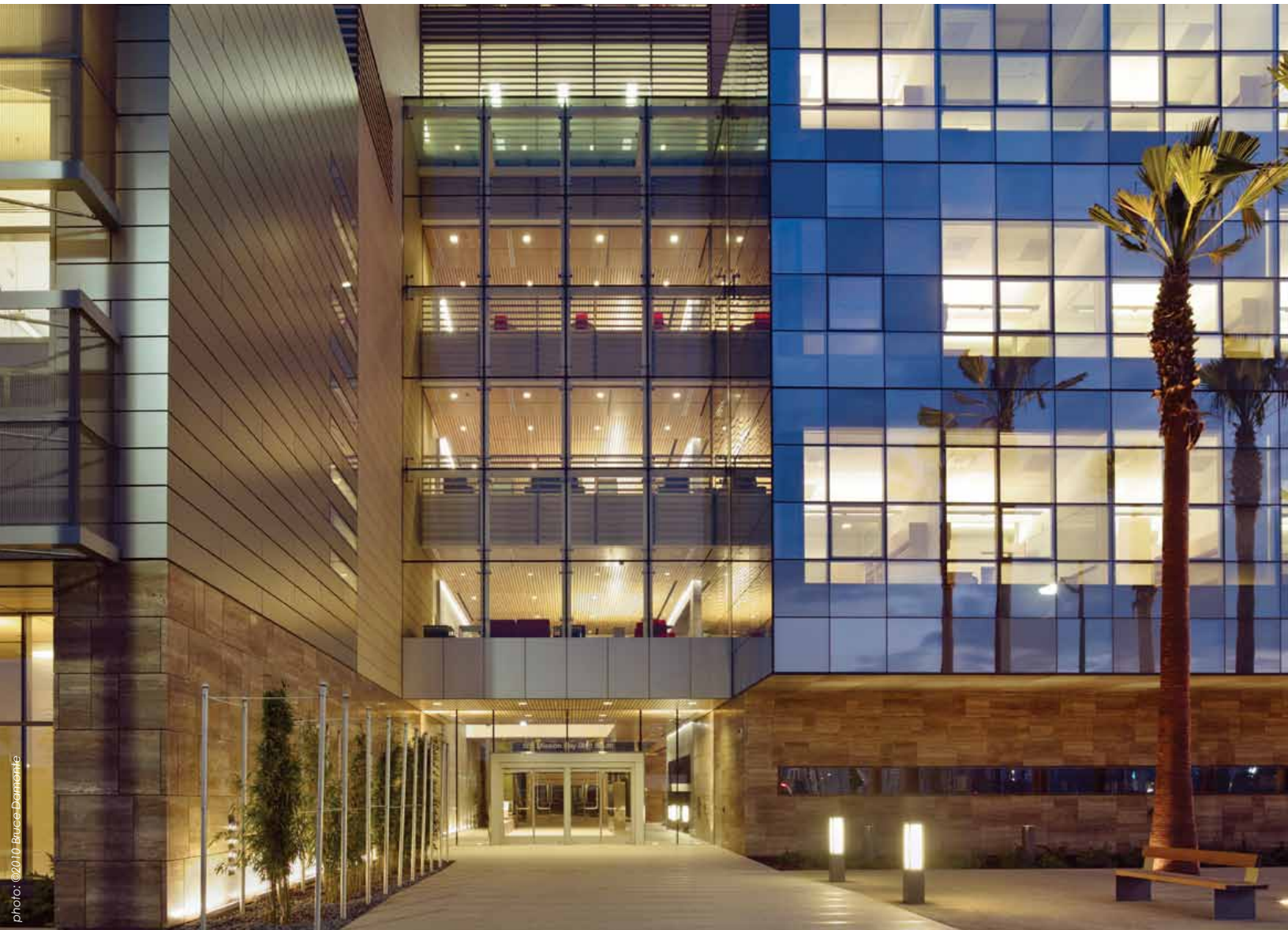
rendering: Martinez + Cultr Corporation



rendering: Harley Ellis Devereaux

One **BIG ROOM**

Helps Construct Cardiovascular Research Center



Owner: University of California, San Francisco • Architect: SmithGroup; Jim Jennings Architecture • Size: 236,000 sq ft • Completion date: 2010

The Big Room provided significant benefits that include:

- *Rapid communication and problem solving*
- *Shared project knowledge base*
- *Streamlined organization of collaborative scheduling sessions*
- *Tight control of schedule and achievement of milestones*
- *An atmosphere of collaboration with owner, architect, CM and contractors*
- *Early identification of critical issues*
- *Facilitated the Last Planner™ pull schedule sessions*
- *Developed good relationships among field crew leadership*



Lean construction techniques helped Rudolph and Sletten deliver a cardiovascular research facility 10 weeks early.

Sometimes the hardest aspect of building is getting everyone together in the same space to review, discuss and make decisions. Wouldn't it be nice to have everyone together all the time?

That is exactly the technique that Rudolph and Sletten used in its construction of the \$190 million, Jim Jennings Architecture and SmithGroup-designed, Smith Cardiovascular Research Building at the University of California, San Francisco (UCSF). The collaborative construction environment echoed the buildings function—bring research scientists and clinicians together under one roof in an effort to better understand and treat cardiovascular diseases, the leading cause of death and disability in the U.S.

Rudolph and Sletten constructed a “big room” for representatives from all disciplines to work together in a collaborative setting. The 10,000-square-foot construction trailer, constructed from 14 trailer modules, was only steps from the construction site allowing for easy access. This provided space for the more than 50 engineers, architects, contractors, and consultants primarily responsible for design and coordination to be housed in one building during both the preconstruction and construction phases of the project. The freedom of access created a streamlined workflow process and important questions did not linger and hinder construction.

“We had mechanical, electrical, plumbing, exterior skin, fire sprinkler, laboratory case work, drywall, the owner, the architect, the construction management, the general contractor and the inspector of records – all shared one large space,” Senior Project Manager, Danielle Douthett explains.

"It was one of the key pieces to having such a successful project."

Douthett concedes there was a bit of a learning curve for the participants because of the closeness of their quarters. "Everyone quickly learned the value to being in one trailer. Our ability to easily keep everyone in the loop and gain quick responses helped overcome any apprehension to sharing space," More often than not, an RFI was generated to confirm a response that had already been developed through a conversation between the various members of the group

in the trailer. 25 percent of the project's RFI's were answered the same day they were written, and 95 percent were answered in less than 15 days.

The team response rate was just one of the project efficiencies that took place in the big room. The use of the Last Planner™ scheduling technique aided by sophisticated new software simplified communication among project participants. "Rudolph and Sletten is always looking for ways to use technology for efficiency. The software allowed everyone on the team the ability to login



to the system and review or edit their schedule items to create an accurate schedule with promised delivery directly from the installers of each individual task," Douthett explains. "The ability to commit in a transparent environment allowed everyone to be accountable for each task. Any issues with delivery of promised activities were brought to attention quickly and addressed with a very fast response time."

Rudolph and Sletten began construction of the lab in May 2008 and achieved substantial completion on Aug. 13, 2010—10 weeks ahead of schedule. In addition to the big room, the online scheduling software and Lean construction techniques, Douthett attributes the speed of the project to the company's integrated project delivery method which also included the use of 3D Building Information Modeling (BIM) and financial incentives for the whole team.

"The big room and SmartBoard technology proved to be an invaluable tool for the pull schedule meetings that were implemented as part of the Last Planner methods," said Douthett. "The SmartBoard itself consists of a projector and a touch screen monitor user interface that allowed

drawings, photographs, sketches, and other files to be developed and altered in a collaborative setting and then saved as part of the meeting minutes for distribution."

By using the SmartBoard, the construction team displayed schedules, snapshots taken from the subcontractors' coordinated 3D model, and also contract drawings so that the field crews responsible for installing the work could highlight areas where there appeared to be physical access limitations or where some re-ordering of the schedule was needed.

"On the UCSF job, it was a perfect mix. 3D modeling for coordination drawings then using that information during the fabrication of mechanical ductwork and piping add to that improved communication" she says. The team also focused on 13 milestones set at the beginning of the job. Each milestone was tracked and assessed throughout the process. Being able to track the progress with fixed goal markers helped immensely. Douthett estimates the team reached approximately 80 percent of its weekly goals, a five percent improvement over the typical rate for a successful project.

“ We had mechanical, electrical, plumbing, exterior skin, fire sprinkler, laboratory case work, drywall, the owner, the architect, the construction management, the general contractor and the inspector of records – all shared one large space. It was one of the key pieces to having such a successful project. ”

**Danielle Douthett,
Senior Project Manager**



photo: ©2010 Bruce Damonte



Two-thirds of the second, third and fourth floors are wet labs and the fourth floor houses a chemistry lab. With the large number of laboratories within the facility, efficient coordination of gas, water and compressed air piping was necessary to keep the project on schedule. "That's where BIM comes in handy—for all the overhead coordination," Douthett emphasizes. Additionally, the mechanical and plumbing contractor used BIM for deck inserts. "They downloaded the deck insert locations into a piece of equipment similar to a theodolite (Total Station)," Douthett reports. "When you are onsite you set up the total station as you would surveying equipment and

the locating rod would indicate where each insert is to be placed. The work time is dramatically reduced. Without the technology, you would have to manually measure each point."

Rudolph and Sletten functioned as the general contractor on the project and coordinated with approximately 27 subcontractors. "Without our collaborative process and the strong camaraderie in the big room, this project would not have been as successful," Douthett stresses. "I was very lucky to have such a strong and devoted team. Not only did it help us finish ahead of schedule, but it made for an enjoyable place to work."

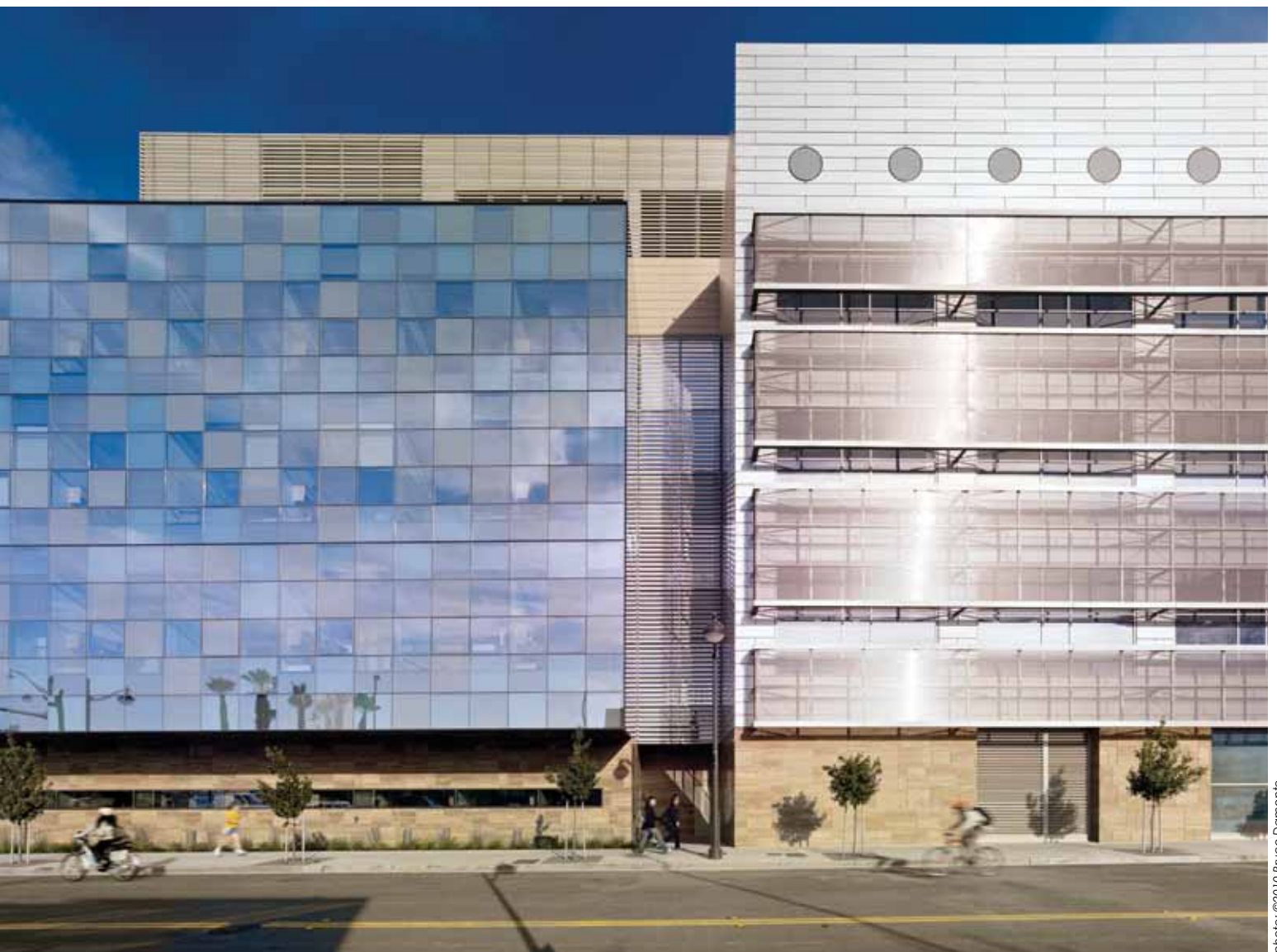


photo: ©2010 Bruce Damonte

WINNING MOVE

OCEANSIDE HIGH SCHOOL ATHLETIC FIELD IMPROVEMENT

Athletic field improvements is just another winning move for the Pirates, who have won a record 7 consecutive San Diego Section CIF Championships between 2004-2010. Oceanside High School's stadium received major upgrades, including a new synthetic turf athletic field and 9-lane track and new home grandstand seating for approximately 2,650 guests.

Improvements to the facilities included a new 10,000-square-foot multi-purpose structure constructed below the grandstands to house locker rooms, showers, a weight room and team rooms. Additional features included a new lighting system relocation of all existing temporary buildings in the field and track area and reconstruction of adjacent natural grass sports fields. A new plaza totaling 60,000 square feet will be developed to organize and accommodate approximately 4,000 guests.

On the homeside, over 1,000 bleacher seats were relocated, in addition to a restroom building, a new fitness center with restrooms and locker room, a new ticket booth, and field lighting.



EFFICIENT CONSTRUCTION

*DELIVERS A FAMILY-CENTERED
CARE CHILDREN'S HOSPITAL*



photos by Nick Merrick

The team worked together to develop a series of strategies that improved workflow throughout the design and construction process. Strategies that played the largest role in improving efficiency included full-scale mock-ups, customized prefabrication and detailed crew leveling. By implementing these key changes, the team saw significant results in their ability to maintain the schedule, costs and quality.

Over ten years ago it was determined that to meet the State's new seismic standards a new hospital building would be required at Childrens Hospital Los Angeles (CHLA). This necessitated unpacking the hospital's highly constricted urban site to make room for a new 480,000-square-foot, 317-bed hospital building at CHLA.

A master plan and series of precisely phased improvements, including new research facilities, a below grade parking structure, and a new entry lobby also needed to be accomplished without impacting the operations of the existing hospital. Communication and a uniquely collaborative approach enabled the team to meet difficult challenges, while maintaining long-term focus on the project's vision of providing an improved environment and resources to support family-centered care.

Using family-centered care as the guiding principle, the team worked with staff, parent focus groups and patients to discover and document suggestions and observations to guide the development of a vision. Critical design issues that emerged focused on such topics as sleeping areas, living rooms inside and outside the care units, age-appropriate diversions within patient rooms and playrooms, access to familiar foods, adequate privacy, and outdoor spaces.

The team developed and built full-scale mock-ups of the PICU, NICU and acute patient rooms. These mock-ups were built using a variety of proposed finishes, such as floors, paneling, counters, and bathrooms. Medical equipment and furniture options were placed for evaluation. CHLA's Family-Centered Care Committee, a group of patients, parents and CHLA staff was consulted as the rooms were being constructed and upon completion, allowing experience and critique the execution of the design they helped envision. Because parents were able to walk into the room mock-ups and physically experience them, the feedback was frank and constructive. Their suggestions improved functionality, increased privacy, and eliminated cost on the order of 5 to 1 when compared to the cost of the mock-up construction.



Childrens Hospital Los Angeles New Hospital Tower
Owner: Childrens Hospital Los Angeles
CM: CLEO CM
Architect: Zimmer Gunsul Frasca Architects LLP
Size: 480,000 sq ft
Completion date: 2010



The decision to construct full-scale mock-ups translated the initial vision into reality. Once approved, the mock-ups became the “benchmark” for quality on the project and the basis of the multiple “first install” rooms throughout the building.

The mock-ups allowed for the creation of customized prefabricated elements such as headwalls. The new hospital building required the development of a high-quality, client specific, custom headwall unit that would be cost effective and easy to replicate. The location of the headwall unit was mocked up utilizing exact gas, electrical, telecom and data outlets as well as equipment supports and lighting affixed to the surface for easy review, evaluation and reconfiguration.

“Breaking with tradition, we are prefabricating multiple systems before we bring them to the field for installation. This reduces on-site wastes and helps create an environment for higher productivity in the field as you’re basically putting parts and pieces together as opposed to taking the raw material and making them yourself on the site. That reduces our on-site work force head count and allows for more open spaces on the site,” said Abel Gonzalez, project executive with Rudolph and Sletten.

He adds that this modular approach increases productivity, decreases the potential for damage to existing work and finishes and increases the quality of the work overall. Not to mention it also speeds the construction



project up, allowing for faster delivery. Previously limited to catalog choices, these mock-ups allowed for customized prefabricated elements. The team's innovative approach also allowed for the customized headwalls to be mass-produced at an offsite location, where they were fully tested and inspected, bundled and prepared for onsite installation as a unitized component. The "plug and play" method of assembly and installation reduced cost and schedule, while providing the client with the exact headwall they required. The benefit to the project was a reduction in change orders or delays; the ability to mass produce customized elements; improved efficiencies and greater client satisfaction; and the ability to provide clearer direction for 800+ workers their first day on the job. In addition, these customized headwalls create a more home-type feel in patient rooms, strengthening the hospital's move to patient-centered care.

After completing the nearly 17,000-activity schedule in Primavera, the contractor collaborated with the trades to carefully review the activities and timelines. Labor curves were examined for significant variations. The team was able to use the power of software to create a smoother "bell curve" of tradespersons, by trade. Unconventional

schedule methods were discussed and collaboratively agreed upon. The revised labor schedule assisted the team in managing the workflow so that there were fewer labor spikes, which can make work less efficient and increase the risk of accidents.

"The crews were able to work at a much steadier pace, and the owners saw the project progress with fewer problems," said Gonzalez. "Hospitals are highly technical and require large quantities of skilled craftspeople onsite simultaneously. If the schedule only contains trade constraints, large variances in crew sizes will exist resulting in disruption to the crew/team, as well as loss of continuity and quality."

The project was successful by engaging the contractor and subcontractors into the decision making process early. Conceived as an Integrated Project Delivery project, without an Integrated Form of Agreement, the team constructed a collaborative environment where innovative solutions could thrive and provide the most cost effective, productive, and best quality lifecycle products and procedures to help facilitate CHLA's family-centered care goals.



Rudolph and Sletten

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HOOKED ON CONSTRUCTION

50 years *of* BUILDING trust, innovation and technology

From a humble beginning in Rudy's garage, Rudolph and Sletten has grown into a leader in California construction. Over the past 50 years, we have expanded along with our neighbors in Silicon Valley, brought technology and innovation to construction and led the state in "green" construction. Our accomplishments are due to our forward-thinking and sometimes demanding clients, as well as our talented, well-trained staff. The combination has made for a very successful 50 years and a great reason to celebrate.



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