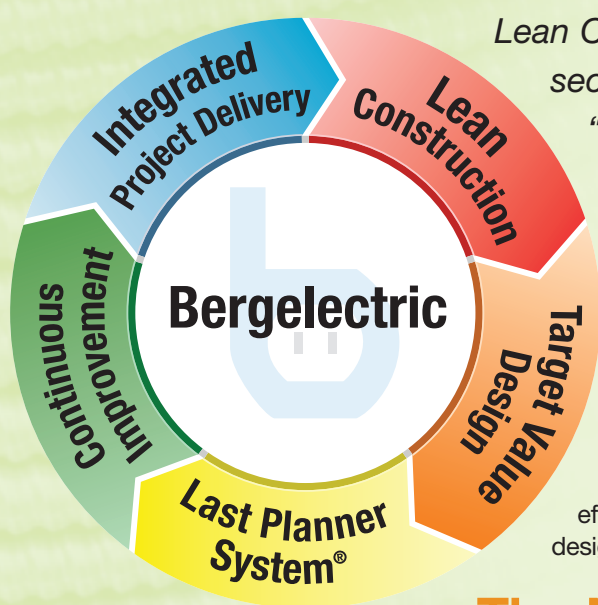


# The **B**Bergelectric<sup>®</sup> NATIONAL *Report*

## The Economics of Building Lean: Maximizing Value and Minimizing Waste with Lean Construction

Third in a series of productivity-enhancing articles about how Berg is reducing costs and improving project delivery



*Lean Construction traces its beginnings to the manufacturing sector in companies like Toyota, whose directive was:*

*“Give customers what they want, deliver it instantly, with no waste.” Known as Integrated Project Delivery (IPD), this revolutionary process that transcends business boundaries is now being applied to other industries—including construction and healthcare.*

The synergistic effects of Lean Construction—which includes cornerstones such as Target Value Design and the Last Planner System®—have resulted in improved overall project performance rather than singularly measuring cost reduction or speed by individual contributors. It is a collaborative effort in every sense of the word, where true partnerships among Owner and design, construction and materials providers drive this team-based approach.

### The Next Generation of Partnering: IPD

If there is a secret to success of Lean Construction, it is that management of the project starts well in advance of design or construction efforts with an integrated team that buys into a shared process at the outset and is unified in its objectives. “With the IPD approach, Berg is fully vested in the agreements, processes and collaborative problem-solving required to develop large, complex buildings such as hospitals and research facilities,” explained Eddie Billig, Bergelectric’s senior vice president of construction in Los Angeles.

With a focus on the ultimate in partnering, the result is a collection of companies with a mutual responsibility to help one another meet the Owner’s goals. In its purest form, IPD “seeks to align interests, objectives and practices” that can encompass shared risk as well as rewards. “In multi-party agreements, such as the Consensus Document that will be formulated for one of Berg’s latest projects—Corona Regional Medical Center—everyone shares in the risk and the profit pool, so it is in everyone’s best interest to work cooperatively and efficiently, with the goal of eliminating waste and redundancies,” noted Berg’s L.A. Preconstruction Manager Scott Dater.

### Play it Forward: Target Value Design

Designing and constructing toward a predetermined amount, where the contract documents are based on a final target estimate—rather than re-working or performing post-design value engineering—is the basis of Target Value Design. A paradigm shift in lean thinking from quality control (monitoring results) to “making things happen”—drives the entire process.

Ultimately, the Lean Construction team will develop a better way to deliver the job by supporting positive iterations in the process uniquely tailored to the project at hand, which will result in sharing the project’s production success among team members. To enhance the lean practices that are being implemented on the \$880-million Palomar Medical Center (PMC) West in Escondido, CA, Bergelectric tapped into its in-house resources to lower costs and streamline installations through a unique bar-coded materials-handling system that eliminates the need for on-site inventorying and redundant handling and saves through bulk-purchase negotiations.

### Maintaining Momentum: Last Planner System<sup>®</sup>

PMC West also includes a work force of hundreds of “last planners.” The team’s adoption of this lean-building practice goes well beyond the use of a standard critical-path-method (CPM) schedule.

Planning sessions at regular intervals allow the project team to work collaboratively with field forces that will be performing the work to fine-tune details and make appropriate adjustments closer to the actual time that the work will be executed, rather than relying on outdated forecasts—keeping the project on a perpetual forward motion.

### Coming Full Circle: Continuous Improvement

Lean Construction is ideally suited to contractors who operate in a corporate culture of innovation and teamwork, and those who are trailblazers in the marketplace are seeking out like-minded partners in order to minimize risk, maximize reward and deliver the best building possible. “Berg’s commitment to continuous improvement, advancing technologies and rewarding creative solutions is a perfect match to Lean Construction’s goal of increasing value and eliminating waste,” Billig added.

## INSIDE CONNECTIONS

### National

Berg implements lean construction practices to improve performance, productivity and collaboration.

### San Diego

San Diego justice embarks on a new era with 463,733-sf federal courthouse.

### Los Angeles

Medical Center epitomizes best practices of lean design and construction.

### Ventura

A vision is fulfilled with new recreation center on **Cal Poly San Luis Obispo** campus.

### Orange County

Smooth landing on the radar for delivery of new air-traffic control tower.

### Sacramento

**McCarthy** and Berg join forces on model VA hospital.

### Colorado

Berg contributes to innovations at New Mexico medical center’s vision for the future.

### Austin

Berg reports for duty on Texas-sized parking structure at **Fort Sam Houston’s San Antonio Military Medial Center**.

### Las Vegas

Phase IV of largest contract in history underway with **Clark/Hunt** for **VA** hospital.

### Orlando

Berg teams with top wastewater contractor on plant upgrade.

### Arizona

Design-assist efforts are big payoff at **Casino Del Sol Hotel & Convention Center**.

### Raleigh-Durham

Bergelectric in design-assist role on new **Western State Hospital**.

### Portland

Unique Washington correctional facility focuses on cooperation and practicality.

*“Lean Construction is ideally suited for companies like Bergelectric that operate in a corporate culture of innovation and teamwork, and are trailblazers in the marketplace.”*



## NO. 6

Among electrical contractors nationwide

# ORDER IN THE COURT

## Federal Courthouse Provides Much-needed Space

Nearly a century after the first courthouse was completed in what is now known as Old Town, America's Finest City—San Diego—is about to embark on a new era of “justice for all.” Under the direction of the **General Services Administration** (GSA), world-renowned architects **Richard Meier & Partners LLP** are providing design of the new **United States Federal Courthouse** whose “slender and elegant” tower will rise majestically into the San Diego skyline. The 16 stories above ground will accommodate the U.S. Marshals Service, as well as government offices, courtrooms and judges' conference rooms. With room to expand, the new complex will be a welcome respite from the existing facility, which the judicial system has outgrown.

### Marshalling Resources

Bergelectric has provided services on five federal courthouses from coast to coast, including the U.S. Federal Courthouse in Orlando under general contractor **Hensel Phelps Construction Co.** “Our Berg 3-D modeling, detailing and prefabrication experts—many of whom have worked with **Hensel Phelps**—are a perfect match for the complexities on this San Diego assignment, which calls for over 8,000 light fixtures, six 4,000-amp switchboards, mechanical and electrical rooms on each floor and a stand-alone Central Plant,” noted Bergelectric Superintendent Steve Sanders.

### Model Example—Paving a Clear Way for Future Expansion

In preparation for construction, Berg's 3-D modeling team identified several concerns related to installation requirements for bus ways in the lower level, as well as spatial conflicts with mechanical equipment and clearances. After presenting its case to the design team, Bergelectric received approval to take the lead on a redesign that resulted in the decision to install over four miles of raceway underground rather than being exposed within the building.

“By hiring a third party engineer to perform calculations and a coordination study, we are able to assure electrical designer **Arup** that equipment and conductors will be built and sized according to the contract intent,” stated Bergelectric Project Manager David Edmondson. “Despite extensive design enhancements made to the electrical backbone of the federal courthouse facility, construction was green-lighted to kick off without delay and the way is now clear for any future expansion,” Edmondson added.

### Berg U.S. Courthouse Expertise Enhances Security

In addition to responsibility for complete electrical installation of power and lighting for the 463,733-sf federal courthouse complex, Berg is providing a design-build fire-alarm system, as well as the backbone infrastructure for tel/data, AV and security. Armed with the lessons learned on other federal courthouse projects around the country, Bergelectric is offering enhancements to San Diego's security system based on input from the end-users themselves—the U.S. Marshal Service.

“We are able to isolate the requirements of each element of the security system—from the intercom and cameras to door contacts and entry devices—into a stand-alone structure that already takes into consideration location and coordination issues,” shared Bergelectric Detailer Collin Austreng. By reviewing elevation drawings for every security device on the project with Marshal's Service representatives, Berg detailers were able to receive valuable feedback regarding the device's exact location and potential conflicts with multiple devices co-located on wall systems.

By the time a national security contractor begins the installation, the location of the devices will have been reviewed and approved by the end-user. The result will be time saved by coordinating modifications and eliminating field conflicts. Ultimately, once the **U.S. Federal Courthouse** is completed in 2012, the new complex will provide the latest in security and judicial facilities for the San Diego community.

Designed by world-renowned architects **Richard Meier & Partners LLP**, this 463,733-sf **U.S. Federal Courthouse** complex will provide the latest in security and judicial facilities for the San Diego community when it is completed in 2012.

“Bergelectric has provided services on five federal courthouses from coast to coast, creating a perfect match for the **U.S. Federal Courthouse** in San Diego with general contractor **Hensel Phelps**. ”

## SCORE + Cooperation Practicality = a Winning Solution

With a stagnant economy and lingering recession, municipalities are on the lookout for ways to cut costs and stretch budgets. In the Pacific Northwest, seven cities have joined forces under the banner of the **South Correctional Entity** (SCORE) to develop what could become a prototype for fiscally-responsible jails nationwide. At approximately half the per-bed cost of similar construction, the unique design of the \$49.3-million jail's two pie-shaped housing units conserves space while reducing operational costs. Creative solutions developed in an atmosphere of cooperation between public-development authority members, designers from the **DLR Group**, and general contractor **Lydig Construction**'s team resulted in considerable savings for this 850-bed detention center.



In the Pacific Northwest, seven cities have joined forces under the banner of the **South Correctional Entity** (SCORE) to develop what could become a prototype for fiscally-responsible jails nationwide.

### Construction Team Maintains Momentum with Local Jurisdictions

“Rather than pouring massive concrete walls in place, the 156,248-sf facility calls for special steel detention panels filled with concrete grout to be fabricated off-site, which required us to provide detailing for conduit, boxes, and blockouts very early in the process,” stated Bergelectric Project Manager Bob Brown. Berg met with other members of the mechanical, electrical and plumbing (MEP) team in weekly coordination meetings where Building Information Modeling (BIM) for each trade was fully integrated. “Our team used a clash-detection program to flush out any potential issues in the model to eliminate conflicts in the field that served double duty by also providing an MEP-coordinated shop drawing,” added **Lydig Construction** Project Manager Hans Hansen.

In addition to installing all electrical for site power and low-voltage systems that will serve as the backbone of the jail's communications—tel/data, fire alarm and security/access control—Bergelectric is also providing temporary power during construction. “Despite the holiday season and vacation schedules, Berg and **Lydig** worked in tandem to keep the momentum going with local jurisdictions and the utility company to get critical temporary power in place and maintain the June 2011 completion date,” Hansen noted.

“In a collaborative effort, Bergelectric and **Lydig Construction** did an outstanding job in getting both the temporary electrical service and the primary power for the project in place during a busy holiday season.”

Hans Hansen, Project Manager, Lydig Construction, Inc.

# Upfront Planning Enhances LEAN BUILDING



## Medical Center Project Epitomizes Berg's Best Practices

The success of **Universal Health Services, Inc. (UHS)**, one of the largest healthcare management teams in the nation, is made possible through its service philosophy and foresight, which is the perfect complement to the project-delivery approach on the multi-million dollar upgrade of the **Corona Regional Medical Center**. Utilizing Integrated Project Delivery (IPD) and Lean Design and Construction Processes—guided by the design-builder **DPR Construction**—this project features the following practices in the preconstruction phase for the development of preliminary designs and budgets:

- 1. LEAN TRAINING:** Representatives from the designers, contractors and trade partners participated in Lean training sessions and formed a fully-collaborative core group to complete the validation studies for **UHS**.
- 2. SET-BASED DESIGN:** Berg is assisting the design team in honing a core set of the most useful alternatives for consideration, which are based on building requirements.
- 3. A3 DOCUMENTATION:** Utilizing the scientific PDCA (plan-do-check-adjust) cycle, Berg is systematically organizing, analyzing and distilling a plethora of information down to a "future desired state"—all on a single sheet of paper.

- 4. TARGET VALUE DESIGN:** **UHS** has provided the IPD team with a set of required upgrades for the medical center—as well as the budget available for design and construction. As an electrical subcontractor with established design-build and OSHPD experience, Bergelectric is working with the team to develop the most efficient and cost-effective design, all the while eliminating rework and waste. The process of Target Value Design is to design to the owner's set of values and a detailed estimate, rather than redesign after the project goes over budget.
- 5. CONDITIONS OF SATISFACTION:** Berg, other members of the IPD team and **UHS** are working cooperatively in the design-build effort so that any performer of work is able to receive immediate feedback on how well they match the pre-determined conditions of satisfaction.

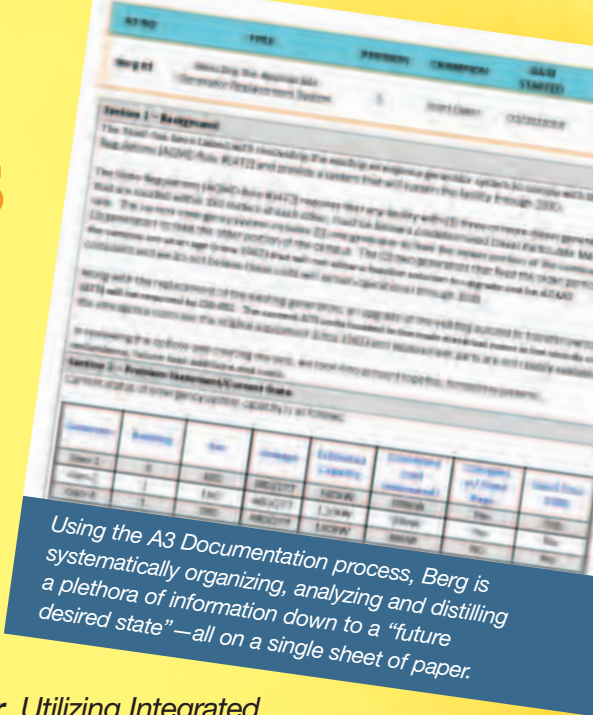
### Corona Regional Medical Center: Beyond Compliance

Founded at the height of the Southern California citrus boom more than a century ago, the City of Corona derived its nickname of "The Circle City" from the unusual layout of its streets—a standard grid within the circular Grand Boulevard. In recent years Corona has developed into a commercial/industrial leader that serves a population of nearly 150,000 with such first-class institutions as the **Corona Regional Medical Center**.

"In a systematic and cooperative effort, the core team members—comprised of **DPR**, Bergelectric, structural engineer **Make It Right** and mechanical firm **Southland Industries**—have joined forces to complete a five-month validation study, through which the IPD team is meticulously matching **UHS** requirements to a prescribed budget," explained Bergelectric Preconstruction Manager Scott Dater. The result is a tailored approach to design and construction that meets the **Corona Regional Medical Center** Target Value Design for upgrades, addresses the newly-adopted South Coast Air Quality Management District (SCAQMD) requirements and fulfills the acute-care facility's needs for the next 20 years.

### LEAN FACTS

- Design-Builder:** DPR Construction
- Facility:** Upgrades to 160-bed Hospital
- Completion:** March 2012
- Project Delivery Method:** Design-Build, Integrated Project Delivery (IPD), Lean Building Practices
- Agency Oversight:** Office of Statewide Health Planning and Development (OSHPD), SCAQMD
- Berg Scope:** Design and Construction Services for New Emergency Power System, Electrical Infrastructure for Mechanical Upgrades
- Unique Features:** Collaborative Effort Which Allows Scope to be Adjusted Without Increasing the Budget
- Goals:** Utilize an Integrated Lean Approach to Maximize Value to the Client, Assure Predictable Outcomes, Upgrade Existing Facility to Meet Criteria for Compliance to 2030, Stay Committed to Lean Learning and Value Education.



Using the A3 Documentation process, Berg is systematically organizing, analyzing and distilling a plethora of information down to a "future desired state"—all on a single sheet of paper.

# The New Face of Veteran's Healthcare

## Berg Joins Forces with McCarthy on Model VA Facility

The tranquil peninsula community of Palo Alto, CA, will soon boast a model of patient care that is taking shape in the form of a 76,000-sf psychiatric acute-care nursing center for our nation's veterans. Consisting of four in-patient care wings with access to landscaped gardens and an abundance of natural light, the 80-bed **Veterans Administration (VA)** facility will offer a healing environment and a chance to recover for those who so faithfully served our country.

As general contractor for the \$33-million project, **McCarthy** has put together an experienced construction team to tackle the project's unique challenges, such as the extremely tight overhead space allocated to the critical trades—mechanical, electrical and plumbing (MEP). "Through web-based meetings, conference calls and real-time 3-D coordination performed on AutoCAD files uploaded to a secure file transfer protocol site, our team is developing electrical system solutions that are also increasing productivity and reducing costs," stated Bergelectric Project Manager Peter Casazza.

### Experience Pays

Berg's dedicated prefabrication department is producing assemblies for slab-on-grade, wall rough and roof penetrations that will significantly enhance field productivity and schedule flexibility by improving task durations. "By tapping into the specialty skills of Berg's high-voltage electricians, we are overcoming tie-in challenges involving an existing 12,470v system," noted Berg Superintendent Chris Nelson. "Berg's experts were able to conduct extensive in-house research into the existing system to identify older high-voltage cable and circuits that were not shown on as-built drawings—which minimized this expense," Nelson added.

### Berg Team Efficiently Accommodates Change for the Better

Although the original design called for a completely single-story structure to facilitate patient care, a mid-project decision to add a second floor to the administration unit sent Bergelectric detailing and ground crews into creative overdrive. The on-site team efficiently made the necessary changes to work already installed, while Berg detailers quickly provided additional drawings for both underground and slab-on-grade applications, which has assisted **McCarthy** in

beating an already aggressive pour schedule and keeping the project on track. Once completed in 2011, the **Palo Alto Health Care System's** newest facility will put into action the therapeutic design elements that enable veterans to "recover from mental duress and live productive lives" in their community.



A mid-project decision to add a second floor to the **Palo Alto Healthcare System's** VA facility had the Berg on-site team efficiently making changes to work already installed, while Berg detailers quickly provided additional drawings for both underground and slab-on-grade applications.

# VICTORY FOR THE VA

## Phase IV of Largest Contract in History Underway with Clark/Hunt



*Berg’s 3-D modeling experts are playing a critical role on the state-of-the-art **VA Medical Center** project—particularly with the volume of overhead feeder conduit installation over three different elevations—through enhanced coordination and potential clash detection with other systems.*

As the largest contract ever awarded by the **Department of Veterans Affairs (VA)**, the **Southern Nevada Healthcare System’s** 150-acre medical campus is truly a victorious achievement that will supplement existing facilities in Nevada currently serving nearly a quarter million veterans. Phase IV of the \$365-million project, which involves construction of the main hospital, as well as installation of mechanical and electrical equipment in the separate 47,000-sf central energy plant, is well underway through the efforts of a joint venture of **Clark Construction Group/Hunt Construction Group**.

Rising seven stories into the surrounding North Las Vegas skyline, the 790,000-sf full-service facility will provide the latest in medical technology to support 90 inpatient beds as well as 20 beds dedicated to mental health care. “Connecting the ‘brains’ of the medical center’s central energy plant to the hospital will be a 640-foot-long utility tunnel, which will also feed a four-day-supply of electricity from five emergency generators to the hospital in the event of an emergency,” noted Bergelectric Senior Project Manager Conrad Catibayan.

### Berg Experts in the Lead on BIM

Berg’s 3-D modeling experts are playing a critical role on this state-of-the-art healthcare project—through enhanced coordination and potential clash detection with other systems. In fact, Berg is taking the lead in coordinating this technology with the entire **Clark/Hunt** team, which is a primary contributing factor in maintaining the expedited schedule. “By utilizing our Trimble Layout Solution, we are able to identify advanced positioning of electrical components for field layout and provide precision measurement technologies that enable field crews to work more productively and efficiently,” explained Berg Detailing Manager Peter Merello.

Keeping a finger on the pulse of a complex project like the **VA Medical Center** has been made easier with the use of Constructware—another addition to Berg’s arsenal of technology. Every team member can access up-to-date information impacting the project and participate in on-line group collaboration with the click of a mouse that connects them to this web-based project-management software.

### Intricate and Innovative Materials Management Provides Quantifiable Results

The use of Building Information Modeling (BIM) has not only proven to accurately support the flow of information between building phases, it also has the added benefit of identifying opportunities for Berg’s prefabrication department to produce duplicative materials in each of the more than 100 patient rooms. “By fabricating thousands of subassemblies before we enter the field and delivering them to special wire basket prefabrication bins on site, our crews always have the materials they need, when they need them,” said Bergelectric Superintendent Dave Franke.

Berg’s innovative and intricate materials-logistics plan for the \$100-million+ hospital being constructed in Phase IV has also been made more manageable through the use of recently implemented “worm carts” and conduit carts that can pinpoint the exact location and timing of materials needed throughout the job site. “Offering ‘just-in-time’ materials handling on a project of this magnitude allows our foremen to look ahead well in advance of a specific work effort and arrange for building materials to arrive as crews need them, which has made it possible to capture quantifiable savings,” Franke added. The use of these and other technologies will greatly assist the VA in achieving its goal of providing the “highest level of care for our veterans” once this much-needed, modern medical center is completed in 2011.

# Smooth Landing on the Radar

## Berg on Critical Mission to Deliver New Air-traffic Control Tower



*Palm Springs was known as a trendy winter get-away for the hip and famous back in 1967 when its current six-story air-traffic control tower was constructed. Now the **Palm Springs International Airport (PSP)** is expected to achieve a 50 percent increase in air traffic—to more than 110,000 annual operations—over the next two decades.*

A new air-traffic control tower is underway at **PSP** that will accommodate this increased activity and replace the aging facility. The **Palm Springs tower** is part of a nationwide **FAA** program that has allocated \$1.3 billion in federal stimulus dollars to more than 700 projects. The estimated \$24.5-million price tag of the new tower is being partially funded with this American Recovery and Reinvestment Act money specifically targeting “a safe and efficient national airport system.”

General contractor **Swinerton Builders** was chosen by the **Federal Aviation Administration (FAA)** to construct the 150-foot tower that, at more than twice the height of the existing six-story facility, will enhance the safety of aircraft taxiing, take off, and landing operations. “In addition to installing all electrical systems—including data, fire alarm, and security—our crews are responsible for providing conduit that will house a powerful grounding system that will provide lightning protection for the 8,000-sf tower,” stated Bergelectric General Foreman Craig Plantenga.

### Early Collaboration Facilitates Complex Tower Transition

With 71,000 take-offs and landings last year alone, it is mission critical that the existing control tower remain operational during construction. As the time for

conversion to the new facility approaches, the airport will maintain paralleling operational control towers. The real challenge, according to Bergelectric Project Manager Scott Spiker, will be the actual transfer itself, which involves cutting into the existing fiber optics. “It will be crucial to ensure that both towers are operating simultaneously when this swap-over happens,” Spiker noted.

To facilitate the transition, Berg is involved in an intricately-choreographed coordination effort with the **FAA’s** onsite inspector and electric-utility service provider, Southern California Edison. “In collaboration, we are developing a strategy to get the conduits for the power feed in place early in the construction process in anticipation of the power swap-over,” added Spiker.

With a new satellite-based technology replacing the airport’s radar system, the controllers will be better equipped to both track and guide planes. When Phase 1 is completed in December 2011, the new **PSP** air-traffic control tower will provide safe and smooth landing for thousands of future flights.

# A VISION for the

## Berg Contributing to Innovations at New Mexico Medical Center

*Over the past fifty years, Rio Rancho has evolved from a sleepy retirement community into a dynamic, culturally-diverse mix that includes young families. As the fastest growing city in New Mexico, Rio Rancho is living up to its byline as the “City of Vision” with the construction of a hospital of the future—the **Presbyterian Rio Rancho Medical Center**.*

Under the guidance of general contractor **McCarthy Building Companies**, **Architect Dekker/Perich/Sabatini**’s evidence-based design is coming to life. By incorporating the latest in healthcare innovations, the \$100-million complex will provide a healing environment comprised of three separate buildings—a diagnostic and treatment facility, patient tower and central utility plant.

Bergelectric is responsible for installation of all electrical power distribution, lighting and fire-alarm system for the 305,000-sf complex. To keep the medical center fully operational in the event of a power outage, Berg is also installing an emergency generator, paralleling switchgear, pad-mounted medium-voltage switches and distribution transformers. “For the heart of the hospital’s communication system, our crews will prepare the rough-in for all low-voltage systems—security, nurse call and overhead paging—as well as the cable tray for tel/data distribution,” explained General Foreman Jesse Moots—a Berg veteran who recently completed a successful hospital project in Denver, Colorado.

### Adding Value to the Vision

In support of the new medical center’s evidence-based design, which implements established methods to enhance the healthcare experience, Bergelectric is contributing several proven value-added services of its own, which will help make the 18-month delivery schedule possible:

**PREFABRICATION:** for efficient assembly of commonly-recurring materials, Berg’s prefabrication experts will provide such items as standard rough boxes and unistrut trapeze hangers for conduit, which will be timed for pinpoint-accurate delivery. Providing prefabricated seismically-engineered transformer stands will also allow Berg crews to make the best use of electrical-room space.



*By incorporating the latest in healthcare innovations, the \$100-million **Presbyterian Rio Rancho Medical Center** will provide a healing environment comprised of three separate buildings—a diagnostic and treatment facility, patient tower and central utility plant.*

**WORM CARTS:** newly-implemented “worm carts” and conduit carts will be stocked with materials, inventoried and managed in the field by Berg’s vendor. This latest innovation for staging materials has demonstrated benefits in minimizing time lost in the field caused by locating, moving or ordering materials.

**COLOR CODING:** a completely color-coded conduit system will allow for easy identification of power and low-voltage systems.

**3-D MODELING:** by modeling all three buildings and the site, Berg’s coordination with other trades and installation efficiencies will be maximized.

**NATIONAL RESOURCES:** Berg is capitalizing on its national resources with detailing expertise from Lead Detailer Ken Sticka and prefabrication efforts from both Phoenix and Denver.

“We are also working in collaboration with the electrical design firm of **Bridgers & Paxton Consulting Engineers** on the value engineering of power-distribution equipment and lighting fixtures, which will provide additional cost savings to the Owner,” noted Bergelectric Project Manager Kelly Barlean. With these efforts in the works, when the new **Presbyterian Rio Rancho Medical Center** is completed in September 2011, it will fulfill the needs and vision of the community well into the future.

# + DEDICATED to SERVICE

## at Fort Sam Houston

### Berg Reports for Duty on Texas-sized Parking Structure

*Since 1845, the U.S. Army has played a vital role in military mobilization and medical support at historic Fort Sam Houston, TX. Today, the San Antonio-based installation, which boasts the largest military medical training facility in the world, is experiencing some major changes stemming from the Base Realignment and Closure (BRAC) program. At the Fort’s **San Antonio Military Medical Center-North Campus (SAMMC-N)**, BRAC determinations call for consolidating and expanding inpatient services, which currently include the Army’s only Level 1 Trauma Center, the only Department of Defense Burn Center and care of Wounded Warriors in Transition from the Global War on Terrorism.*



*Bergelectric is part of the **Clark/Hunt** team on this \$62-million consolidated parking structure, which will be centrally located for accessibility to all **SAMMC-N** medical facilities.*



Serving as the Integrated Design-Bid-Build (IDBB)—a project delivery method being utilized by the U.S. Army Corps of Engineers that allows the constructor to interface with the architect-of-record throughout design—is **Clark/Hunt, A Joint Venture**. Bergelectric is part of the **Clark/Hunt** team on the \$62-million consolidated parking structure, which will be centrally located for accessibility to all **SAMMC-N** medical facilities.

### Logistics Leading the Charge

In addition to responsibility for installation of all lighting and power on the six-story structure, Bergelectric crews are providing connections to elevators and mechanical equipment, lightning protection and emergency generation. Berg’s in-house Building Information Modeling (BIM) has been particularly valuable in laying out the conduit system for the emergency call phones, security cameras, tel/data, fire alarm and an automated time/parking system for the 5,000-vehicle garage.

With concrete pours on this mammoth 1.7-million-sf cast-in-place structure often taking place at 4 a.m. and on weekends, coordination is critical to a successful operation. “Although BIM has been essential to layout and red-flagging potential areas of conflict prior to installation, it has not replaced the need for good on-site working relationships and communication with other subcontractors,” observed Bergelectric Project Manager Bobby Gibbs.

### Materials Management with Military Precision

Given the tight confines and a project site that provides very limited storage space, it was necessary to call Berg’s materials management capabilities into active duty. “At **SAMMC-North**, we staged all deliveries for ‘just-in-time’ installation—aimed at receiving materials on site as field crews were ready to put them in place,” noted Foreman Ryan Bates. The use of Berg-designed “worm carts”, which are stocked in advance with the precise type and amount of materials needed in a specified area, is dramatically reducing the labor that would be required using traditional inventorying and delivery methods.

“Material tracking has been essential in keeping costs within budget and maintaining the challenging pour schedule,” Bates added. In addition, Berg’s capacity to prefabricate a large percentage of its work—from assembling light fixtures and building racks, to bending large conduit and device pre-wire—further enhances this electrical subcontractor’s ability to meet materials-delivery commitments and streamline installation.

# COMPLIANCE TO CREATIVITY

## Berg Teams with Top Wastewater Contractor on Plant Upgrade

Virginia's **Hampton Roads Sanitation District (HRSD)** operates seven wastewater treatment plants in the James River watershed that help serve an estimated 1.6 million people. Under new discharge control regulations, the agency must comply with designated effluent concentrations of nitrogen and phosphorus—both nutrients found in wastewater. **HRSD's Army Base Treatment Plant (ABTP)** was selected for an upgrade that will provide biological nutrient removal (BNR) to meet the recently-adopted requirements, as well as contribute to a long-term strategy for improving local water quality.

**Archer Western Contractors**—the nation's sixth largest wastewater treatment plant builder—is leading the construction effort on the **ABTP** upgrades and expansion that include enhanced nutrient removal, a new plant-wide control system and replacement of much of the plant's electrical distribution system. Bergelectric is again joining forces with this industry leader on **HRSD's** \$74-million endeavor that will double plant capacity.

Based on a condition assessment performed by **HDR Engineering**, loads for the additional process facilities will be served by new switchgear, along with a new standby generator and generator/switchgear upgrades—all being installed by Bergelectric. "Our crews are modernizing the three main electrical rooms to provide a seamless system that ties in the various pieces of equipment added over the years and support the new expansion," noted Bergelectric Project Manager Richard Holden.



Berg's applied expertise and proactive thinking will provide substantial savings and reduce the carbon footprint of the **Army Base Treatment Plant** in Norfolk, VA.

### Applied Expertise Generates Ideas for Savings and Environmental Impact

An additional challenge to project delivery is Berg's obligation to supply power for continuous operation at the plant—24/7. According to Bergelectric Superintendent Greg Rothwell, "**Archer Western's** commitment to partnering has been instrumental in providing minimal disruptions to the plant's normal activities, as well as an opportunity for us to recommend significant cost savings."

The temporary power needed to support construction was minimized by Berg devising a plan to improve efficiencies. "Our estimating department discovered significant economies in fuel consumption," added Berg General Foreman Steve Cram. In collaboration with **ABTP's** electrical engineer, Berg re-engineered temporary power designs—digging up and moving power to overhead during demolition, which significantly decreased the number of generators required. This exercise in applied expertise and proactive thinking will provide not only substantial savings in fuel costs, but also a significant reduction in the carbon footprint of the facility over the three-year construction duration.

## V E N T U R A



# RECREATION CENTER Will Enhance Campus Environment at CAL POLY

Situated along the picturesque central coast, **California Polytechnic State University at San Luis Obispo (Cal Poly SLO)** is best known for offering a "hands-on educational experience." The university—which prepares students to compete in today's intensely technical environment through such areas of study as computer science and construction management—has also been consistently ranked in the top public-engineering programs. Several Bergelectric employees are graduates of the **Cal Poly SLO** construction-management program.

One of the ways **Cal Poly SLO** students keep their competitive edge is by enjoying a well-rounded campus life that includes recreation and leisure activities. When the existing campus **Recreation Center** opened its doors in 1993, however, it was soon unable to keep up with the growing campus population. In response, the university put the **Cal Poly** Student Union referendum to a vote, which resulted in an overwhelming 75 percent majority in favor of a quarterly fee increase to fund a much-needed expansion of the **Recreation Center**.

### From Philosophy to Paper: Creative Ways to Save

**Cal Poly SLO's** guiding philosophy—"learn by doing"—was integrated into the planning of the **Recreation Center** expansion in the form of a sustainability workshop that generated ideas for green-building strategies. One item that has been addressed in the electrical design is the students' desire to reduce light pollution in the night sky. This, along with other efforts, will assist the university in obtaining at least LEED Silver Certification. Another green innovation by the construction team is a move toward completely paperless projects. "For the **Recreation Center**, all Requests for Information (RFIs), submittals and record drawings will be completed entirely through electronic documents," noted Berg Project Manager Gary Gee.

"Extreme effort through the BIM coordination process has everyone focused on economy of installation" says Berg Superintendent Ron Crane, "we should be able to save time and material as a result of this process." Bergelectric is providing all electrical and low-voltage systems (including fire alarm and security from our in-house systems division) under direction of general contractor **Sundt Construction** and construction manager **Kitchell Construction**.

### Shared Vision Shapes Construction Process

Architect **Cannon Design** brought its "ideas-based" philosophy to the design of this 165,717-sf facility that focused on seeking out qualities unique to **Cal Poly SLO** campus life. The university's more than 19,000 students provided input to a shared vision, which revealed their desire for the new **Recreation Center** to fulfill a commitment to increasing usable space that will meet the needs of a growing student body, with particular emphasis on providing an inviting atmosphere, all while keeping as much of the facility as possible open throughout construction.

One of the cornerstones of the shared student vision is the pledge to provide accessibility to the **Recreation Center** during construction. "While the project involves demolition of portions of the existing structures and extensive renovation of the current facility, as well as new construction of a substantial addition, the on-going challenge in each is to keep as many portions of the facility open to the public as possible," stated Bergelectric General Foreman John Creighton.

Once construction is completed in 2011, the university envisions the new and improved **Recreation Center** as a "welcoming destination for the entire campus."



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# Modern Facility Will Enhance: QUALITY | EFFICIENCY | ECONOMY

## Bergelectric in Design-Assist Role on New Western State Hospital

From the original circa-1828 building that is registered as a National Historic Landmark, to the sprawling 296-acre 1950s-era campus, the **Western State Hospital** in Staunton, VA, has come a long way in terms of both patient care and facility needs. In its more active years, the hospital served a patient population of 3,300; however, with the availability of improved treatment programs and a trend toward providing patients with the “tools and life skills needed to recover and live independently upon discharge,” that number has dwindled to less than 10 percent of the peak. Today, the two dozen outdated buildings spread out across the large and inefficient campus have become not only unnecessary, but a costly maintenance headache as well.

The prescription: a \$125-million state-of-the-art facility that will accomplish the hospital’s vision of providing “a safe, secure, efficient, sustainable, flexible facility.” Responding to the call, the **Virginia Department of Behavioral Health** selected the design team of **Ballou Justice Upton Architects** and **Cannon Design**, with **Balfour Beatty Construction** as design-builder, for the new 340,000-sf state hospital that is designed to accommodate changing community needs.

### Adding Value and Safety

“Bergelectric has worked closely in a design-assist role with electrical designers **Affiliated Engineers** (AEI) to provide value-engineering input that has served to successfully maintain the budget for items like site lighting, power distribution and its related infrastructure,” noted Bergelectric Project Manager Andrew Hewett. In this type of facility, emergency and critical-system power generation—which Berg professionals are also providing—are equally essential to maintaining a safe and secure facility.

At the heart of the communications systems that will keep the facility running smoothly is the tel/data infrastructure, as well as a host of low-voltage systems—access-control, nurse-call, intrusion-detection, paging, CATV, CCTV, staff emergency-call and public-address. “**Western State Hospital’s** cutting-edge card-key security system will provide flexibility for caregivers by being fully scalable, which will ultimately enhance both patient care and safety,” added General Foreman Kelly Moose.

### Integrating Design with Construction

“With Berg’s in-house Fire-Alarm Division completely responsible for the design-build of this system, design can be easily integrated with the detailing efforts to minimize complications in the field during construction,” said Moose.

Enhanced value is also being provided by Bergelectric on the state hospital replacement project through the extensive use of prefabrication. “The repetitive nature of the patient-care units, in particular, lends itself to substantial cost savings by being able to detail 80 to 90 percent of that portion of the project prior to in-slab installation,” Hewett observed.

Scheduled to open in 2013, the 246-bed **Western State Hospital** replacement will complete the owner’s project vision by providing the flexibility to be responsive to changing community, staff and patient needs.



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## A R I Z O N A

# The Big Payoff

## Design-Assist Efforts Enhance Bottom Line at New Hotel & Convention Center

Although the **Pascua Yaqui Tribe** now makes its home around metropolitan Tucson, AZ, the tribe’s roots in North America date back as far as 552 A.D., with its first encounter with Jesuit priests in neighboring Sonora, Mexico documented in the 1500s.



*In a collaborative effort, Bergelectric worked with the **Pascua Yaqui Tribe**, as well as the architect and lighting designer to provide a dynamic cost model for the **Casino Del Sol Hotel & Convention Center** that identifies lower-cost options and can be continually updated to reflect changes.*

The modern **Pascua Yaqui Tribe**—which contributes significantly to the local economy—operates two casinos in Tucson and recently began constructing an expansion of the **Casino Del Sol** that features a 161,000-sf hotel and convention center. After previous attempts to begin building the project over the last decade were thwarted due to economic downturns, the tribe is getting construction back on track with an emphasis on maintaining budgets and reducing costs whenever possible.

### Winning Combination Enhances Guest Experience

Bergelectric is part of a team featuring **Architect Leo A. Daly** and general contractor **McCarthy**, who were selected by the tribe to make the \$98-million project a cost-effective reality by preparing updated budgets in line with owner’s expectations. As the 10-story hotel and conference center’s construction was getting underway, the **Tribe** revisited the project and requested several substantial changes that will ultimately enhance the quality of the guest experience.



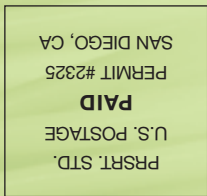
In a collaborative effort, Bergelectric worked with the **Tribe**, as well as the architect and electrical engineer/lighting designer **Taylor/RyMar** to provide a dynamic cost model that can be continually updated to reflect changes, as well as identify lower-cost options. “Our value-engineering experts targeted such items as MC feeder and aluminum feeder conductor options that are more cost effective. The lighting-design options that we presented not only maintain the original design intent and quality, but we were able to offer appealing alternatives at a reduced cost that are also attractive to the owner’s bottom line,” explained Berg Project Manager David LeClair.

### Bang for the Buck and BIM Boost Productivity

In addition to specifying LED lighting fixtures that offer energy savings and reduced maintenance costs, Berg met with vendors to obtain the best pricing for bulk-purchase items and equipment for the new facility. “The relationship Berg has with our vendors allows us to get the best possible pricing available and enables us to schedule the staging of materials to arrive on site as our crews need them, ultimately improving our productivity in the field,” noted Berg General Foreman Scott Gregory.

Ideally suited to the repetitive nature of hotel rooms and suites, Berg was able to offer additional economies of scale with the use of Building Information Modeling (BIM) and prefabrication, which further enhances coordination in the field by preparing the wiring for power and lighting in advance for each of the 215 hotel rooms. “Keeping the existing gaming facility fully operational so it can continue to contribute to the **Tribe’s** bottom line while we complete the adjacent expansion is our ultimate goal,” added Bergelectric General Foreman Scott Gregory.

# REPORT



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## BERG'S NEXT-GENERATION OF PRECONSTRUCTION SETS THE STAGE FOR BUILDING LEAN



Carrie Dragman, Preconstruction Design Manager, San Diego and National

“Analyzing the design at its earliest stages and providing multiple options give distinct advantages to Berg’s teaming alliances.”

*Bergelectric’s forward-thinking approach to electrical contracting includes an enhanced preconstruction services design team. Its in-house team of experienced electrical and low-voltage engineers and designers have been providing general contractors with a leg up over their competition for years.*

Under the leadership of Preconstruction Design Manager Carrie Dragman, Bergelectric tackles the electrical design in the early conceptual stage of the project which is married to a quantified, pinpoint-accurate estimate. The result is a reliable, cost-effective, strategic advantage for its customers.

“Whether she is creating a design from scratch for a design-builder or working in collaboration with an electrical engineer in a design-assist role, Carrie has operated under the tenets of Integrated Project Delivery (IPD) long before the term was coined,” observed Berg Executive Vice President Tom Anderson.

In addition to overseeing the San Diego preconstruction design team, Dragman also offers her more than two decades of electrical-design industry experience in the form of input to the design efforts of other Berg regional offices as the company has expanded nationally. Berg’s multi-faceted preconstruction team provides geographic coverage from coast to coast with experts like Portland’s Leanne LeGare, Denver’s John Clouse, Austin’s Louis Wyler and Orlando’s Zach Frye.

### Sophisticated Approach Begins with Up-front Involvement

With the increasing requirements of requests for proposals (RFPs) for complex building systems, many strategic alliances are being strengthened by Berg’s sophisticated preconstruction design approach. Berg teaming partners are reaping positive results—“Berg’s design team really gets into the guidelines and details of a project to offer suggestions and options that we may not have considered when designing strictly on paper. Their thorough understanding of field installations as well as aesthetics uniquely gives them both a contractor’s and a designer’s point of view.”

### Early Guidance Yields Positive Results and Competitive Advantage

“As an integrated part of the design team, we’re able to drive decisions that benefit the project in terms of providing options and cost-effective solutions—allowing the design to progress while maintaining budgets and schedules,” said Dragman. Analyzing the design in its earliest stages and providing multiple options give distinct advantages to Berg’s teaming alliances by tying design decisions to real dollars and real costs that are matched in real time to the project budget.