BANNER ESTRELLA MEDICAL CENTER

PHOENIX, ARIZONA

nbbj

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DESIGNING FOR CHANGING CARE

To support the healthcare needs of Phoenix's booming population, NBBJ helped Banner Health design a new hospital that would double as a testing ground for rolling out their new standard of care delivery.

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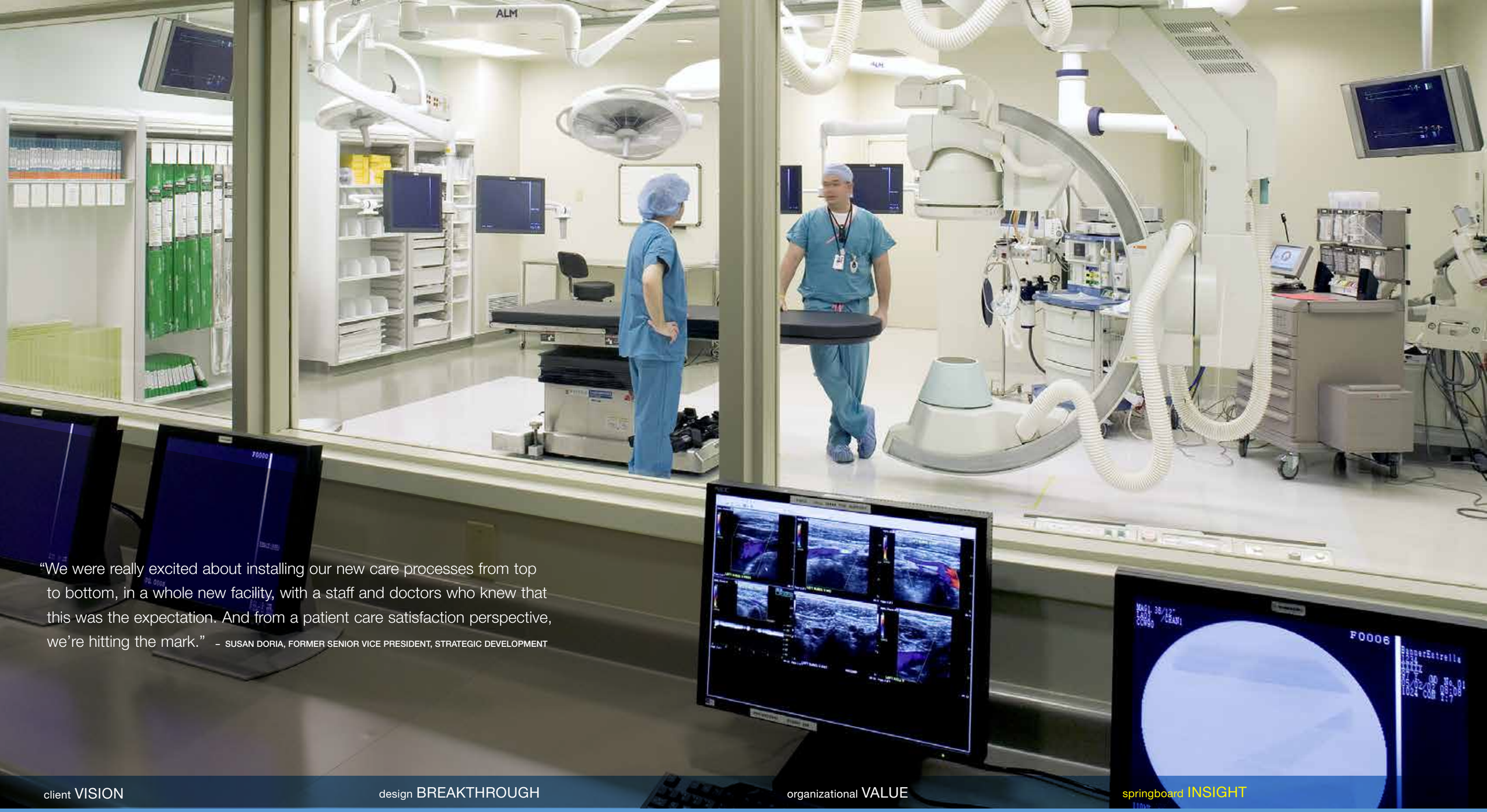


"We were really excited about installing our new care processes from top to bottom, in a whole new facility, with a staff and doctors who knew that this was the expectation. And from a patient care satisfaction perspective, we're hitting the mark." – SUSAN DORIA, FORMER SENIOR VICE PRESIDENT, STRATEGIC DEVELOPMENT

client VISION

Banner Estrella was designed as a prototype for the Banner Health franchise that would carry best practices forward to future campuses, expand over time and flex with changes in the industry, come online in record time and adapt to the specific needs of a local community.

design BREAKTHROUGH

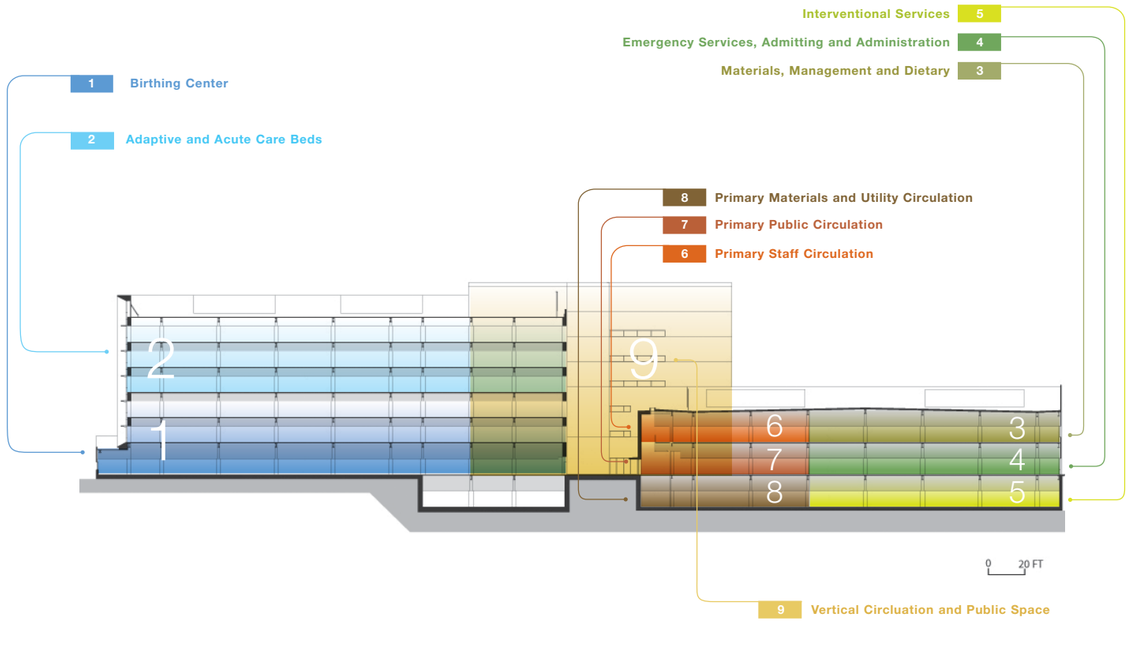
NBBJ created a modular design of temporary zones organized around a permanent infrastructure/circulation spine. The building was planned backwards, starting with the final planned expansion — to decide exactly how everything would plug in and interact — then backtracked to the first phase of construction by simply subtracting elements. This expansion strategy became a key component in Banner's franchise model.

organizational VALUE

The project was designed and built in 36 months—8 months shorter than the typical schedule for a similar facility. The prototype concept was then used for its sister hospital, Banner Gateway, bringing that community hospital online in 28 months.

springboard INSIGHT

When facilities are designed to accommodate change, they can be faster to build initially. Future growth and adaptability can be provided at minimal cost through thoughtful design.



A PROTOTYPE FOR TRANSFORMING CARE

Banner Health is one of the largest nonprofit health systems in the U.S., with over 20 hospitals in seven western states. Serving some of the fastest growing populations in the country, Banner had to devise a way to keep pace with the immediate healthcare needs of its constituents while looking ahead to what the future of care might bring. At the same time, Banner was undertaking a major transformation in the way care is delivered across all of their facilities, streamlining their operations and standardizing their support systems, including everything from IT to architecture.

The 450,000-square-foot Banner Estrella was conceived as the "Hospital for the Future" — the model upon which all future Banner hospitals would be built. To ensure clarity of vision from initial concept, Banner identified six key factors that would drive their franchise model: electronic medical records (EMRs) and computerized physician order entry (CPOE); operational quality, efficiency, and safety; excellence in service; connected ambulatory campuses and outpatient surgery centers; flexible and adaptable environments; and healing environments.

The design and planning of Estrella provided Banner Health with a "living laboratory" of how people can work smarter, better and faster to achieve clinical excellence. Within seven months of opening, Estrella was hitting the 99th percentile in Press Ganey patient satisfaction scores for inpatient hospitals.

Performance studies by Cerner Corporation in 2007 showed a 7.1% reduction in average length of stay, a 15.8% reduction in nursing staff turnover and a 17.8% reduction in pharmacy costs, contributing to an annual savings of $2.6 million.

"It's a brilliant design in the way you can grow something over time without disrupting current operations."

– SUSAN DORIA, FORMER SENIOR VICE PRESIDENT, STRATEGIC DEVELOPMENT

INFRASTRUCTURE

The building is organized along a central spine with all the special mechanical, electrical and plumbing needed for patient care and support spaces.

PHASE ONE

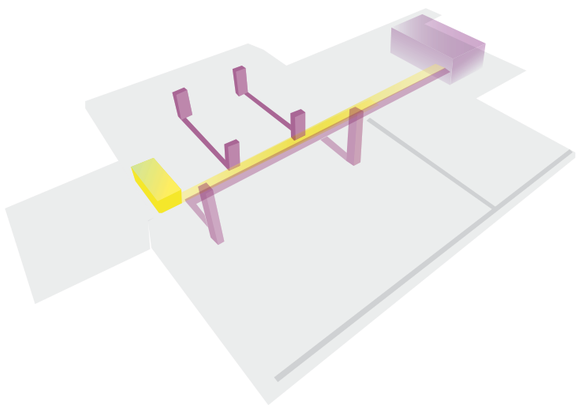
Phase One was completed in 2005 and houses one patient tower with 172 beds and one diagnostic and treatment wing.

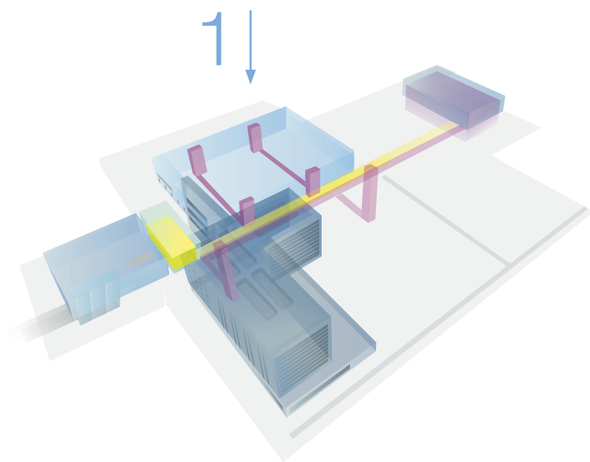
PHASE TWO

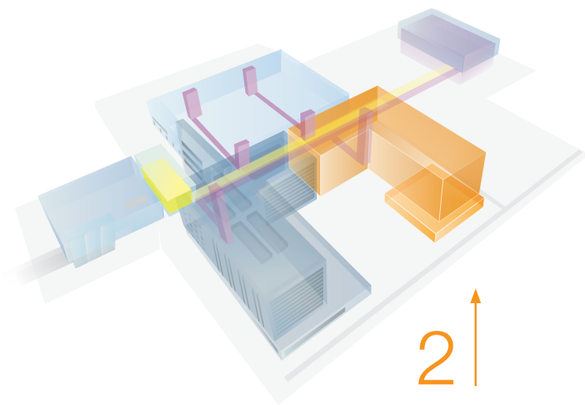
Phase Two will add a second patient tower, for a total of approximately 400 beds. The new addition can be constructed without disruption to current hospital operations or the operation of the first tower.

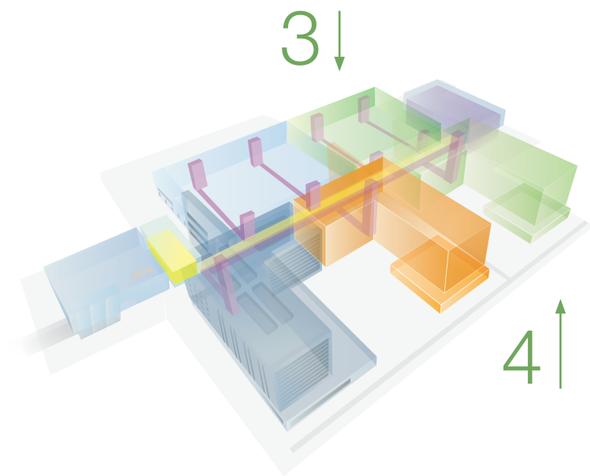
PHASES THREE AND FOUR

Phase Three expands diagnostic and treatment services. In Phase Four, the fully expanded hospital has three patient towers, 600 beds and a total of 1.2 million SF.









SPINE / INFRASTUCTURE CIRCULATION PHASE ONE PHASE TWO PHASES 3 AND 4

DESIGNING FOR THE NEEDS OF TODAY AND TOMORROW

Few industries encounter as much continuous change as the healthcare industry, and yet healthcare facilities have typically been optimized for first use, rather than future use. Many healthcare campuses are a series of building additions, each built for a specific use, unable to adapt to future challenges in flow and efficiency. Banner Estrella is designed to adapt to unknown futures, such as the inevitable shifts in patient care, business plan and emerging technologies.

The design team's challenge was to move beyond traditional "first use" master planning principles, which are typically based on the premise that the master plan is a succession of building projects, with each incremental project designed around an initial set of programmatic needs. Programmatic needs actually change every 7 to 12 years—the second and subsequent *functional* lives—and hospitals have life spans of 50+ years—*economic* lives. By planning for the future without building all the infrastructure now, the design team was able to synchronize the functional *and* economic life of the hospital at a minimal cost.

When fully built out, the 50-acre Banner Estrella campus will be able to support a 1.2 million square foot hospital with three patient towers and a total of 600 beds. In the planning phase, NBBJ laid out the expanded three-tower hospital with all the infrastructure in place (3 and 4 above) with the vertical and horizontal circulation routes, major mechanical and electrical systems, etc. The team then worked backwards, subtracting elements until arriving at the 450,000-square-foot, single tower hospital (1, above). This strategy ensured that everything was in place and poised for growth when needed, without interrupting current operations.

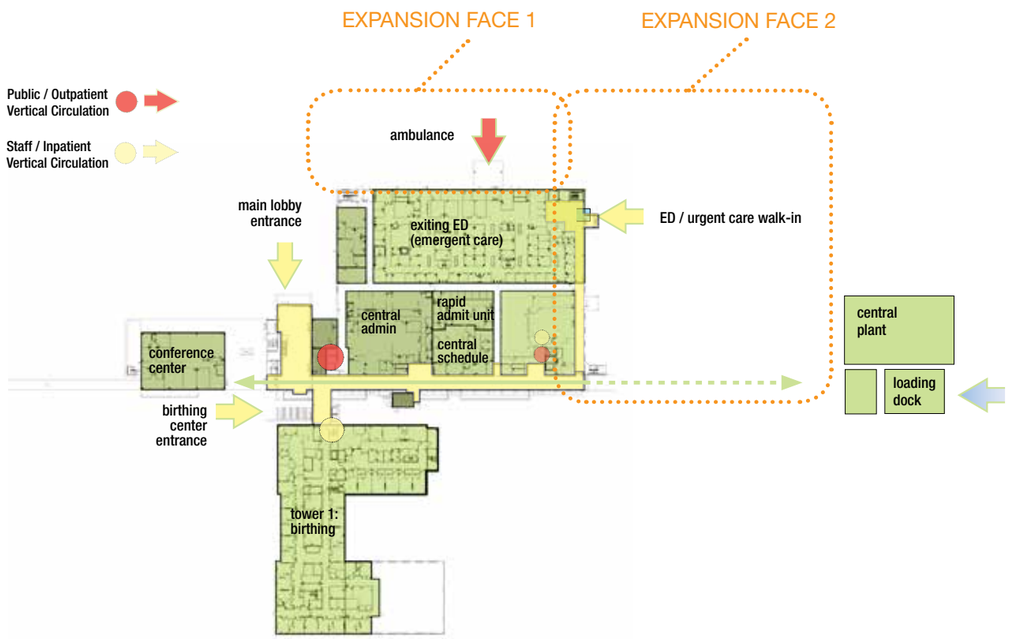
NBBJ's modular concept developed a practical and achievable approach based on a simple set of principles: the needs that are constantly changing require short-term, flexible planning responses and are accommodated within "program containers" since they are temporal and essentially "plug and play." The needs that change very little over time require a long-term, systematic response and are accommodated within zones that serve as a permanent spine for program containers to plug into.

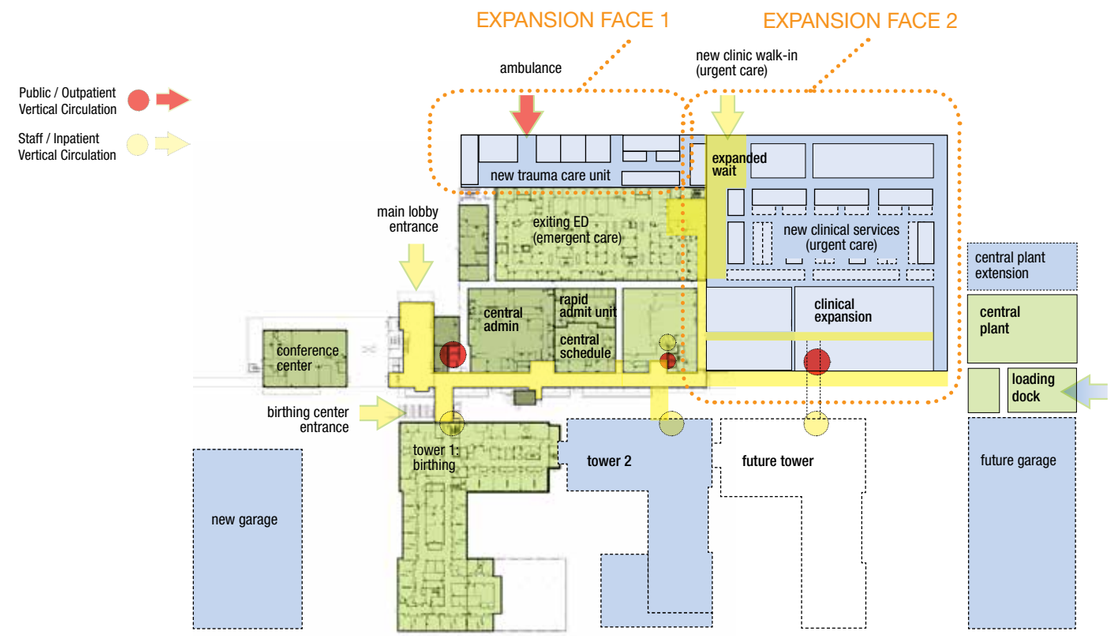
GROWTH AND EXPANSION PROGRAMMING

The master plan organizes services into two building types: inpatient care and D&T (diagnostics, treatment and ancillaries), and program containers, organized around the initial build-out of the spine. The spine (infrastructure) accommodates major entries, vertical and horizontal circulation, links the central utility plant and loading dock, provides energy distribution and material movement and sets the “plug-in-points” for initial and future program containers.

In Phase One, major entrances, user circulation pathways and parking zones are set, not for just the initial phase, but for the ultimate growth of the campus. As additional program components are added (inpatient care, diagnostics and treatment, ancillary space), the spine is extruded to create new “plug in” points for the new construction. The central plant and loading dock have been strategically located (linked via a sub-level) to accommodate all future growth and never need to be relocated. The spine creates three distinct user flows: material, public/operations and staff/IP.

In Phase Two and subsequent phasing, this subtractive approach to master planning has many advantages. It is a disciplined process for determining the most efficient use of the available site for construction, parking, green space and other uses. It allows for an empirical approach to real estate utilization and business planning by zoning and assigning value to site resources for the optimum sizing and placement of floor plate configurations (beds, diagnostics and treatment, medical office buildings).





PHASE ONE

Built Concept Level One

Phase One includes the initial program components required for economic viability. Level One includes the birthing center and emergency services bundled within two containers, inpatient care and D&T. On this level, the spine acts as a de facto public gallery, integrating main lobbies and entries with public circulation to services. On Level Two, the spine serves as staff and IP circulation between clinical and inpatient care units. On the lower level, it houses material circulation and building systems distribution between the loading dock/central utility plant and all hospital services.

The design of horizontal and vertical circulation separates certain flows—inpatient and outpatient, patients and materials, for example. Two unencumbered expansion faces are available for diagnostics, treatment and ancillaries. The spine can grow to accommodate incremental expansions to D&T and inpatient care services.

PHASE TWO

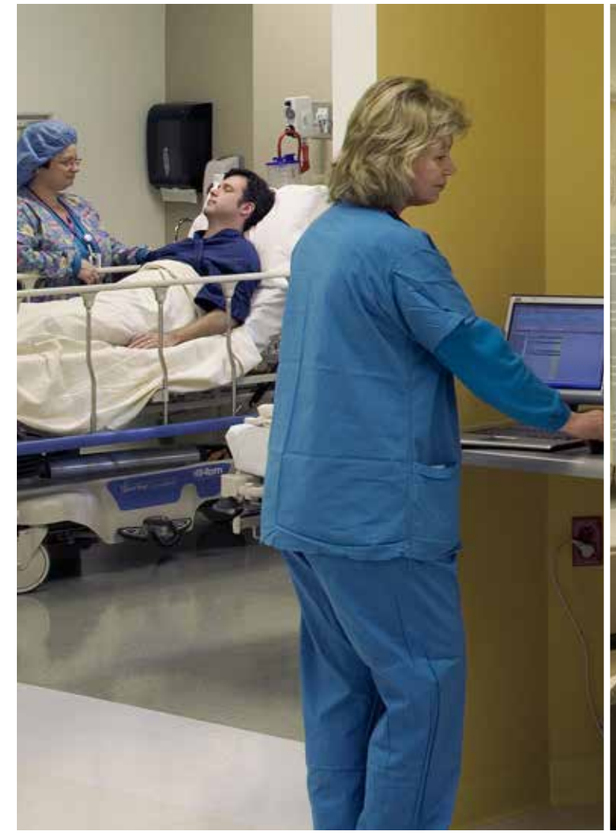
Full Build-out Concept Level One

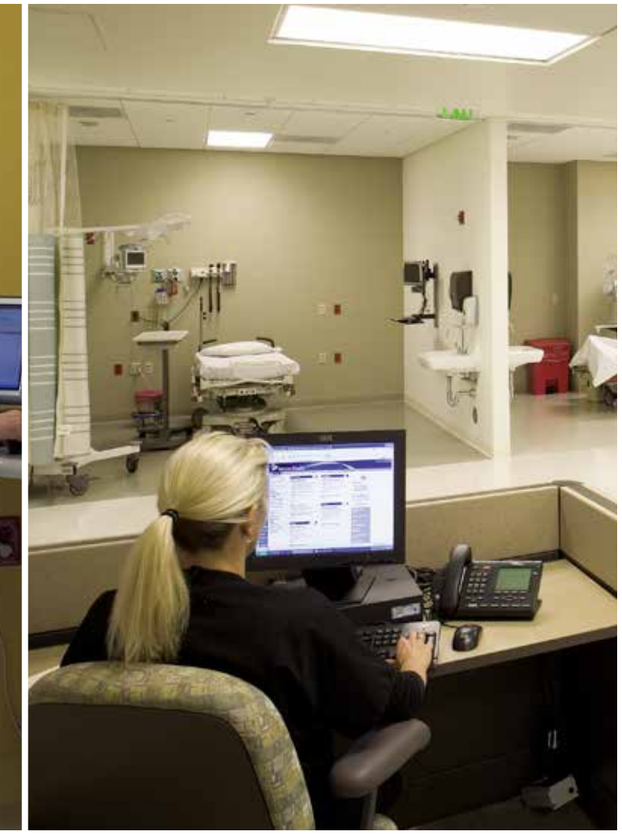
Full build-out plans can accommodate the ultimate growth of the campus, whether in a single phase (as shown), or in many phases. In this plan, the spine has been extruded to expand the central plant and loading dock, two additional inpatient care units have been plugged in, the Phase One D&T has expanded along Expansion Face One and a second major D&T expansion has occurred along Expansion Face Two.

Growth scenarios may include the expansion of existing services or the addition of totally new centers of excellence (OP and IP) with autonomous interior and exterior entries. The doubling of program area has been accommodated without changing wayfinding on the site, requiring new entries and lobbies, or compromising established user circulation concepts. Exterior wall panels can be removed and reused on the new face during construction. Similarly, the design of the spine’s plug-and-play circulation and M/E/P and IT infrastructure eliminates disruption of learned and critical user flows and minimizes service interruptions during construction.

40%

Spaces are designed so staff can easily access patient records in the new “paper-light” facility, enabling a 40% reduction in forms costs.





PAPER-LIGHT BUT CARE-INTENSIVE

Considered a “paper-light” facility, nearly all documents at Banner Estrella are electronic, eliminating the need for storing patients’ charts at centralized nurses’ stations. This led to a 96% reduction in document storage costs and a 40% reduction in forms costs. Ease of sharing records and standardized methods of data entry also reduced medical errors, leading to an 84% reduction in adverse drug events.

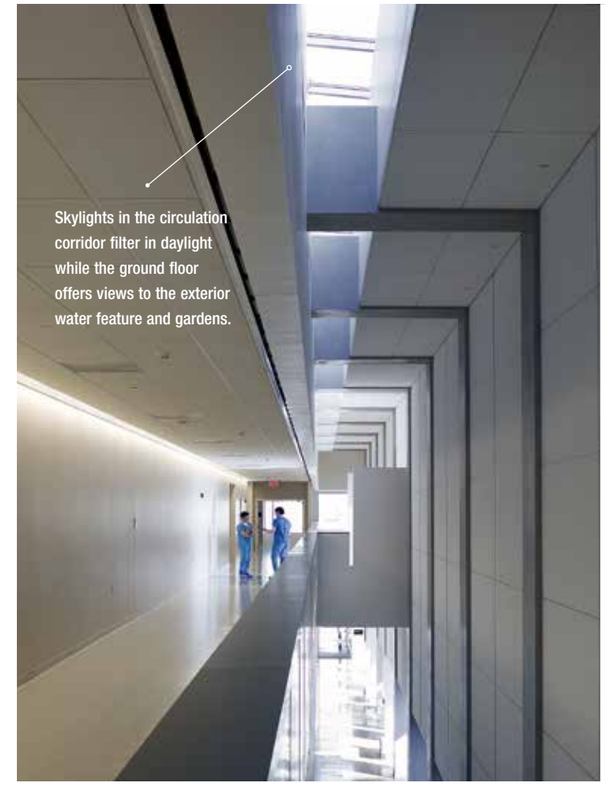
The interiors were designed to accommodate changes in workflow resulting from digital documentation. NBBJ designed nurses’ alcoves outside each patient room where clinicians can pull up and update patient records. Centralized nurses’ stations were replaced with clinical integration suites made up of computing stations and small conference rooms for greater clinical collaboration.

Advances in technology also allowed the traditionally separate services of cardiology, radiology, diagnostic imaging and surgery to be brought together into one department called Interventional Services.

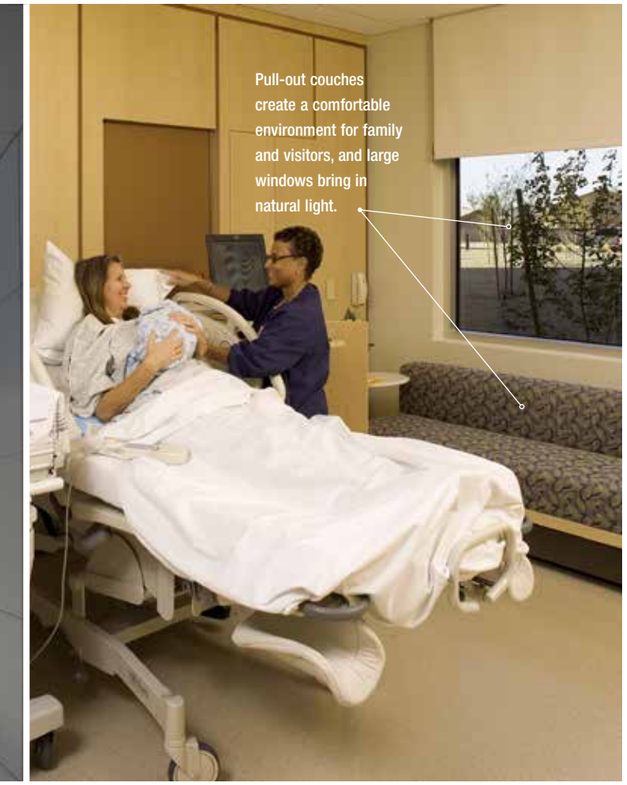
The space is designed to eliminate redundancies. There is a single waiting room for all services, one point of reception and admitting, one patient prep and recovery area, shared materials support and shared administrative staff. Merging these services saved 5,000 square feet of built area, in addition to improving communication between departments, streamlining operations and enhancing the patient experience.

A PLACE TO HEAL

Privacy, natural light and places of respite are known to speed up the healing process. Single-bed patient rooms feature big windows and pull-out couches for visitors. Soothing colors, light-filled corridors and a meditation chapel add to Estrella's healing environment.



Skylights in the circulation corridor filter in daylight while the ground floor offers views to the exterior water feature and gardens.



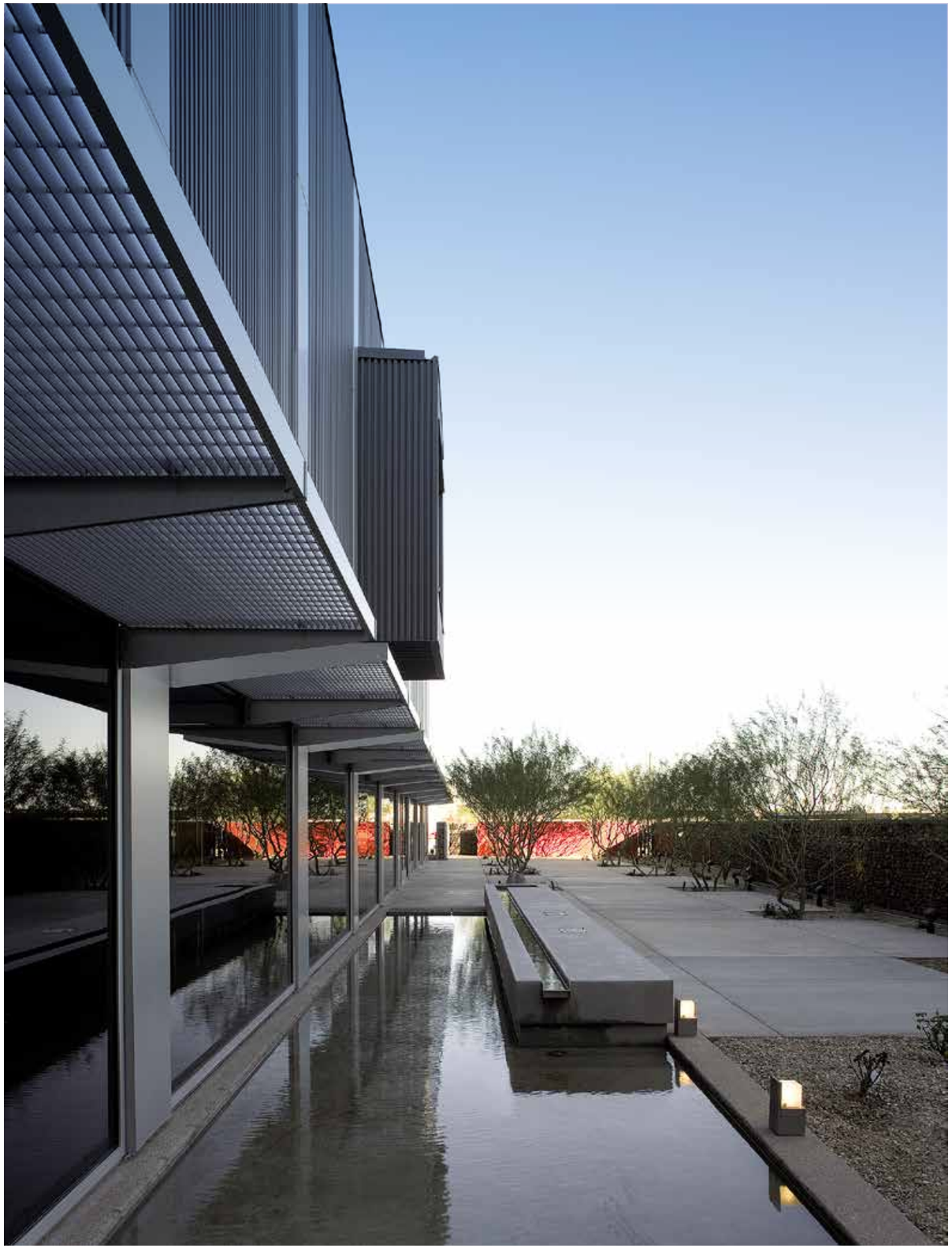
Pull-out couches create a comfortable environment for family and visitors, and large windows bring in natural light.

Access to outdoors through a unique chapel door creates an uplifing connection to nature.

circulation spine and lobby

garden and chapel

The circulation corridor's water feature and garden separate the patient tower and treatment areas, forming a canyon-like oasis between the two structures.



DESERT REFLECTIONS

The design team tested their observations of the natural desert environment on a 12' x 12' conceptual model constructed on the actual building site. As a result, simple tectonic forms rendered in concrete, copper and glass reflect the tone and textures of the Sonoran desert.

KEEPING IT COOL IN THE DESERT

The building design incorporates key energy and material strategies to keep building and energy costs down. To offset heat gain, a series of three different architectural shading devices were carefully incorporated into the building's exterior to mitigate the sun's harshest rays, while still letting daylight enter deep into the interior spaces.

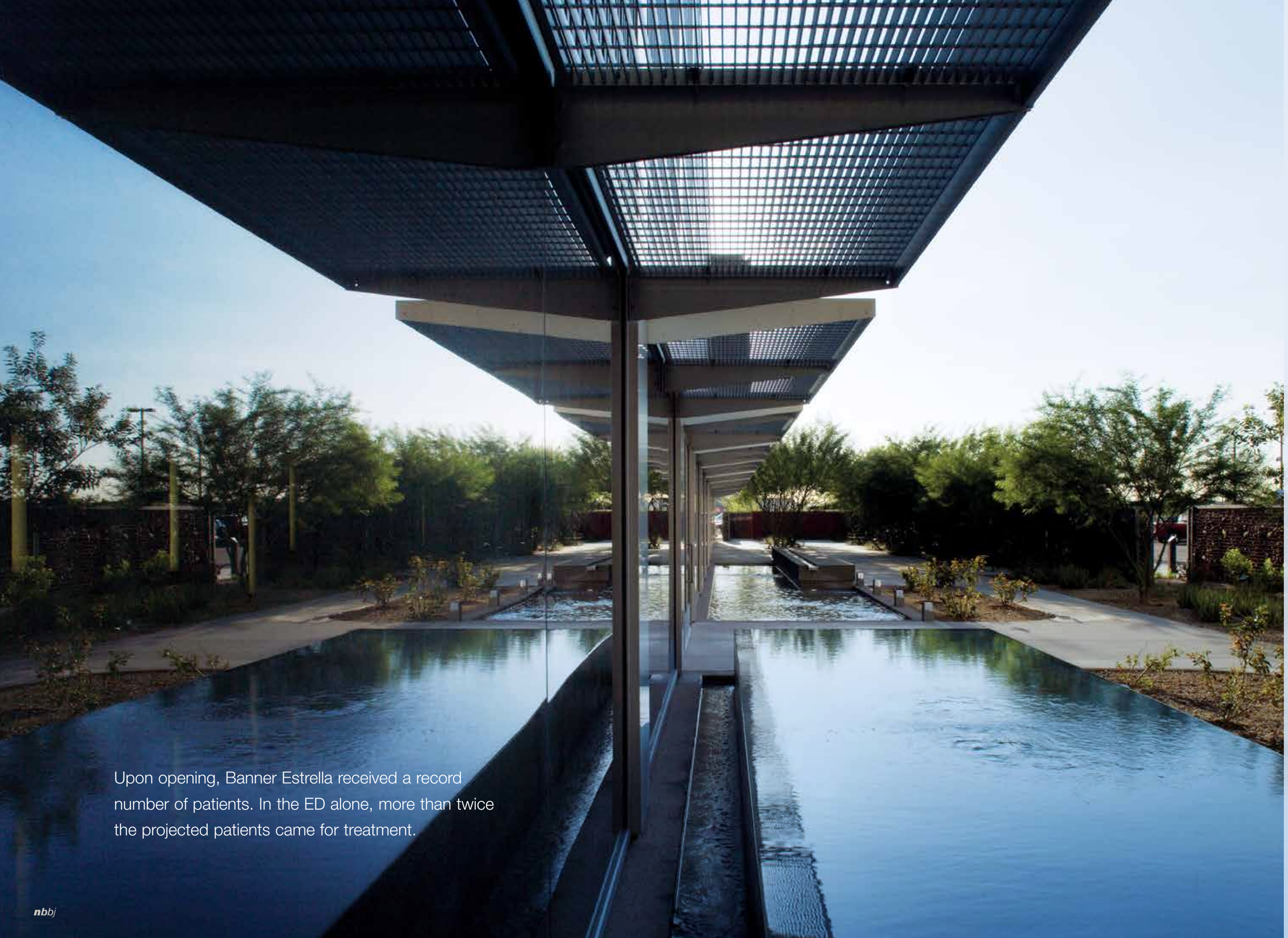
1. CURTAINWALL
Enormous exterior apertures, including the six-story curtain wall on the south side of the patient tower, maximize natural light throughout the facility.

2. OVERHANGING ROOF
The building is designed to shade itself and its surrounding outdoor rooms, ensuring that there are always opportunities for interaction with the outdoor environment. Xeriscaping enhances the site without creating a large water burden.

3. WINDOW SHADING
Sunlight coming into the building is controlled with vertical "eyebrow" shading windows on the west side of the patient tower. Horizontal hoods shade windows on the south and north sides (image above).

4./5. SUSTAINABLE LANDSCAPE
Gardens are designed with indigenous desert plantings, and rock walls enhance the edges of the property.

6. COST EFFICIENT
The buildings are composed of only a few materials—tilt-up concrete, copper, glass, curtain walls and galvanized aluminum siding.



Upon opening, Banner Estrella received a record number of patients. In the ED alone, more than twice the projected patients came for treatment.

CLIENT
Banner Health System

SIZE
440,800 SF
213 beds

COMPLETION DATE
2005

NBBJ SERVICES
Programming, master planning, full architectural services, interior design and lighting design

COMPONENTS
Surgery, cancer care, cardiac, emergency and comprehensive women/infants program

AWARDS
Contract Magazine, Interiors Award, 2006

AIA Phoenix, Honor Award, 2005

IIDA, INAwards, 2005

Modern Healthcare Design Awards, Award of Excellence, 2005

Westmarc Best of the West Award, Service to Communities, Health and Wellness, 2005

PUBLICATIONS
Newsweek, "Case Study: Design for a Healing Space," October 15, 2007

Health Facilities Management, "The Future is Now," October 5, 2006

Architectural Record, "Banner Estrella Medical Center," October 1, 2006

BusinessWeek, "On the Mend," July 19, 2007

ABOUT NBBJ

NBBJ is an award-winning global design and architecture firm focused on helping clients capitalize on the relationship between people and the design of physical space to enhance organizational performance.

The world's leading healthcare providers trust NBBJ to deliver measurable and sustainable improvement in performance and care. Our teams have partnered with some of the leading healthcare institutions worldwide, including nine of the top 14 *U.S. News and World Report* Honor Roll hospitals. Within the architecture industry, NBBJ has been hailed as "Most Admired" by peers in *Interior Design*'s annual Healthcare Giants survey, and ranked as the second largest healthcare design practice in the world by BD World Architecture.

NBBJ's network of offices enables us to deliver quality projects that are regionally and locally appropriate. It allows us to act as a single creative force, leveraging the latest thinking from our NBBJ colleagues in other locations, bringing a rich blend of expertise to each project.

NBBJ SERVICES

Healthcare Consulting
Master Planning
Architecture
Interior Design
Financial Analysis
Project and Cost Management
Graphic Design and Signage
Space Planning
Programming
Land-Use Planning
Construction Administration
Retail Planning and Design
Facility Planning
Change Management
Workplace Consulting