Getting Back to Nature ...in Las Vegas

BY BENJAMIN M. CORNELIUS, P.E.

WHEN YOU THINK OF LAS VEGAS, THE FIRST THING THAT PROBABLY COMES TO MIND IS, OF COURSE, THE STRIP, IN ALL ITS FLASHY, OVER-THE-TOP GLORY. But a trip to the Las Vegas Springs Preserve will give you a whole new perspective on, and appreciation for, this geographically magnificent area.

Listed on the National Register of Historic Places since 1978, the preserve is sited on a 180-acre tract of land three miles west of the city's downtown core. A life-sustaining water source in historic times, the springs were integral to the growth and urbanization of the region. Now owned and managed by the Las Vegas Valley Water District, the site represents one of the richest natural resources in southern Nevada. In developing a plan for a visitor center and related museum facilities, the Water District intended to create a community gathering place celebrating this significant cultural heritage.

The resulting Las Vegas Springs Visitor Center (a 2008 IDEAS^2 Award winner—see our May issue) is comprised entirely of exposed steel, concrete, and masonry structural systems, and the contributions of the structural engineer were key in achieving the project's sustainability goals, which were intended to achieve LEED Platinum status (this is pending). These high environmental standards are paired with high architectural standards, as nearly all of the elevated floor and roof framing in both buildings is architecturally exposed, requiring a level of detailing so high as to be sculptural in quality. The result is a framing system that appears light and neat and works in tandem with the space; the roof system takes into account suspended architectural elements and their interaction with the exhibit space below.

Providing Shade

The Center's structures consist of a 53,000-sq.-ft exhibit building, a 24,500-sq.-ft retail/restaurant building, and a 560-sq.-ft restroom building. Shade structures, with a total area of approximately 20,000 sq. ft, surround various portions of the buildings, controlling solar radiation and providing a dramatic architectural feature. The screens are variously supported from the building structure, the ground, or both. The screen panels consist of perforated gauge metal and expanded metal, and are set into a light steel framework of layered plates. The metal panels themselves are both architectural and structural, affording the screens great stiffness over spans of as much as 30 ft between supports. Details for the layered plates and their connections to one another, to the building, and to the foundation were sculptural, in keeping with the architect's vision. All

Vegas provides a high-tech sensory overload, but there's a serene, natural side to the city as well—and no, it's not a tropical-themed casino.

Tate Snyder Kimsey Architects

components were treated with an oxidizing finish compound, which yielded a handsome weathered appearance and texture, with color ranging from chocolate brown to orange. A similar shade structure is supported from the inside face of the circular rotunda wall.

Entering Under the Sun

Visitors approaching through the main entrance are introduced to the exhibit building by an elliptical steel awning, 33 ft from front to back, that cantilevers more than 27 ft past its forward supports. The awning uses three elliptical plates and a circular plate—each with a different center point along the front-to-back axis of symmetry—and a series of radial plates. The design invokes a rising sun, an homage to the area's bright, desert climate. Glass panels were cut to match the shapes formed by the intersecting elliptical, circular, and radial plates. The awning tapers from back to front and connections were designed with partial penetration welds to minimize deformations due to welding operations.

A Place of Convergence

The rotunda consists of a 72-ft-diameter circular area and column-free zone. A stream of water below the walking surface, together with

Photos: Tate Snyder Kimsey Architects, top and middle; Leslie E. Robertson Associates, bottom

Opposite page: An elliptical steel awning, measuring 33 ft from front to back and cantilevering more than 27 ft past its forward supports, forms the centerpiece of the main entry to the exhibit building.

This page, above: The Visitor Center features totally exposed steel and concrete structural systems. Structural steel required details that were sculptural in quality.

Middle: Many of the exposed systems also function as shade structures, with a total area of approximately 20,000 sq ft.

Below: The rotunda roof framing converges at the center of the rotunda at the crown node. This seven-sided, prefabricated intersection was erected onto a central shoring tower.

the linear organization of materials, directs the visitor to the center of the rotunda. A shade structure, suspended from the inside face of the rotunda wall and adorned with weathered, perforated steel panels, serves as an internal solar control device, punctuated with colored glass panels that introduce a unique spectrum of light into the interior. The rotunda roof framing converges at the center of the rotunda at the "crown node." This seven-sided, prefabricated intersection was erected onto a central shoring tower, and then framing beams spanning between the perimeter and the node were installed with relatively simple connections.

Complex Geometry

The unusual geometry of the Visitor Center presented challenges to the goal of creating an efficient and constructable design. One example is the effort by the structural engineer to facilitate simpler coordination between steel, concrete, and masonry. Although steel erection columns embedded in concrete were considered early in the design phase, the concept was abandoned in response to longer steel lead times. In search of ways to simplify the coordination required between the concrete, steel, and masonry trades, the structural engineer organized the steel framing to minimize the number of connections between it and the concrete and masonry walls.

In addition, steps were taken by the design team to make more efficient use of structural framing and simplify fabrication and erection. Girders were designed to pass continuously over the tops of columns, taking advantage of the negative bending capacity and stiffness of the girders. Girders were also set up from the tops of roof beams by an amount equal to the thickness of the metal roof deck, to allow for a shallower ceiling package and far fewer beam copes. MSC

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