structurally sound

BLURRED LINES

THE COMMONGROUND at Eskenazi Health plaza is defined by a unique trellis system that blurs the lines between architecture, structure and nature.

Located outside the main entrance of the Sidney and Lois Eskenazi Hospital and the Eskenazi Health Outpatient Care Center in Indianapolis, the plaza features a large lawn, a one-story café and garden community spaces and represents the health system's commitment to creating sustainable facilities and outdoor green spaces. The steel framework was specially designed to achieve column-free spans up to 70 ft to provide a canopy that will be covered with an assortment of plants; the entire assembly is roughly 150 ft by 115 ft. The geometric configuration of the structural trellis system elements has a specific hierarchy and codependency designed to be fine-tuned to minimize structure and create an illusion of weightlessness.

Designed by architect Diller Scofidio + Renfro and structural engineer Thornton Tomasetti—and fabricated by Stone Sity Ironworks, Inc., and Synergy Steel Structures, Inc. (both AISC members)—the hybrid structure is optimized to use a minimal amount of materials that were designed to be integrated with the trellis and facilitate plant growth. The canopy is a system of perimeter beams forming four sections. In two sections, the perimeter beams are supported by cables (½-in. and ¼-in.) connected to tripod columns, both of which reach over 30 ft high. The perimeter beams in the two other sections are supported by a system of rod elements that anchor to the foundation.

All elements of the pavilion canopy—rod elements, perimeter beams and cables—provide a basis for climbing plants. Because very small rods (1½-in.-diameter) were required to ensure plant growth, a Vierendeel truss and braced frame system was used, which provides lateral stability and maintains the design intent of the project. The steel tubes around the perimeter, called the ring beam, were comprised of HSS6×4 welded together in a ladder fashion, with 3-in. round HSS at 4-ft spacing to create the truss.

To ensure stability and achieve a fractal-like cable pattern, Thornton Tomasetti used a form-finding "precalculation" of cable geometry to speed up finite element modeling, potentially saving several weeks in calculation time. ■