

GOING GREEN»

THE FUTURE OF SUSTAINABLE STADIUMS

The new multipurpose stadium is setting new standards for sustainability.

BY MORGAN HALASKA

“[U.S. Bank Stadium] looked at sustainability beyond a mere checklist. It looked at it in a holistic manner, from its location to climate responsive design to multiuse characteristics,” says Brian Wolfe, associate, sustainable design coordinator at HKS Architects, who provided direction in all sustainability matters from analyzing energy efficiency strategies to helping with material selection. In designing U.S. Bank Stadium based on its climate and location, a truly sustainable stadium was built.

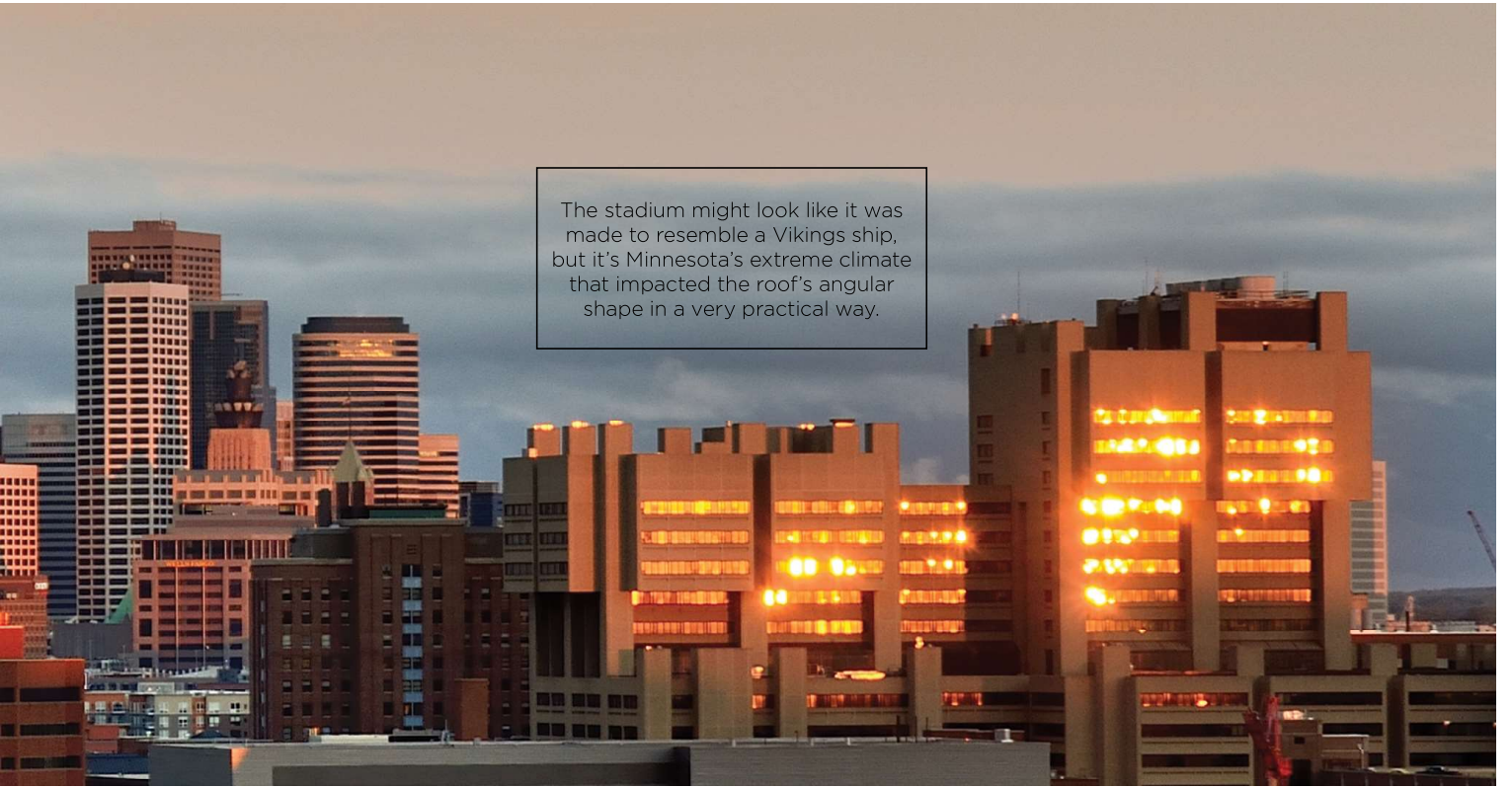
The stadium might look like it was made to resemble a Vikings ship, but it's Minnesota's extreme climate that impacted the roof's angular shape in a very practical way. “The slope of the roof was designed to prevent snow from settling,” explains Wolfe. “The snow sheds into a snow catchment that wraps the brow of the stadium.”

But that doesn't mean you're wrong if you see a ship. “When people say it looks like a Vikings ship or it looks like a shard of ice or

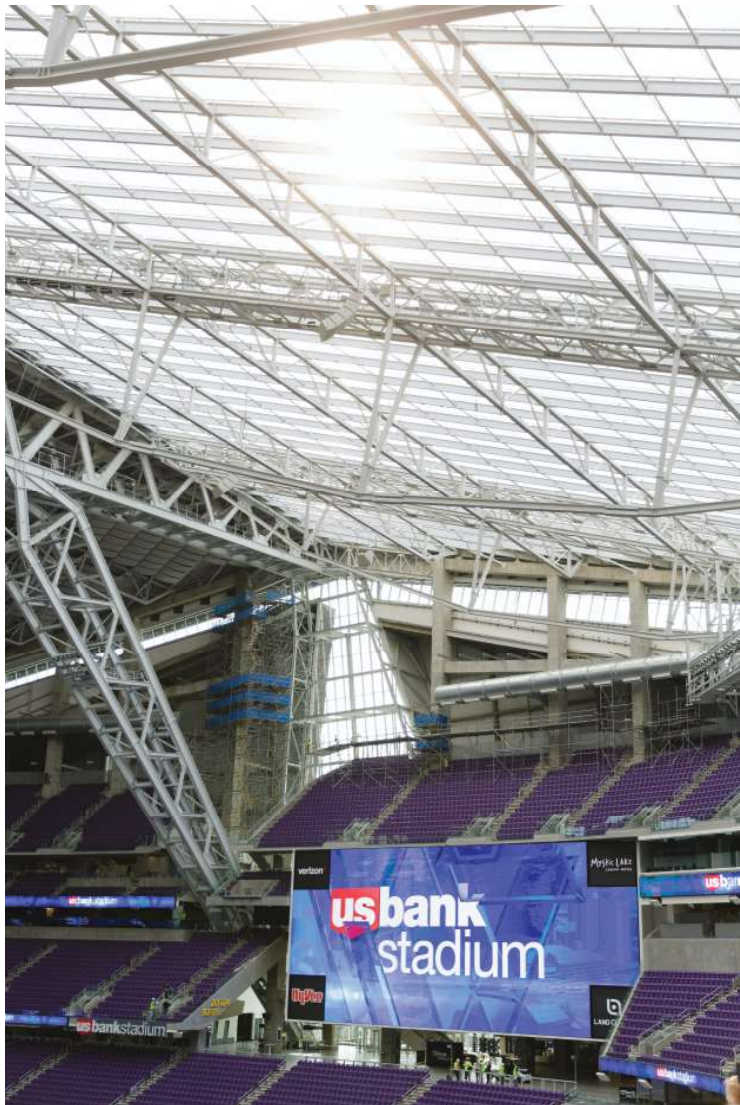
it looks like this or that, those for us all prove that we've developed a form that people liken to other things in that region and in that place. Those things heavily influenced us,” says Bryan Trubey, executive vice president, director of sports and entertainment at HKS Architects.

The stadium's sustainability effort began before construction even started. More than 90 percent of the Metrodome's demolition waste was diverted. Concrete and rebar

were recycled in Shakopee, while “some of the demolished concrete was used as backfill for the surrounding area,” explains Wolfe. Furthermore, the fact U.S. Bank Stadium was built on the same site as the Metrodome was already a step in the right direction. “By utilizing the existing site, economic development was spurred, enhancements were made to the public transit stop and the downtown skyway was extended,” Wolfe says, pointing also to The Commons, the two-block green

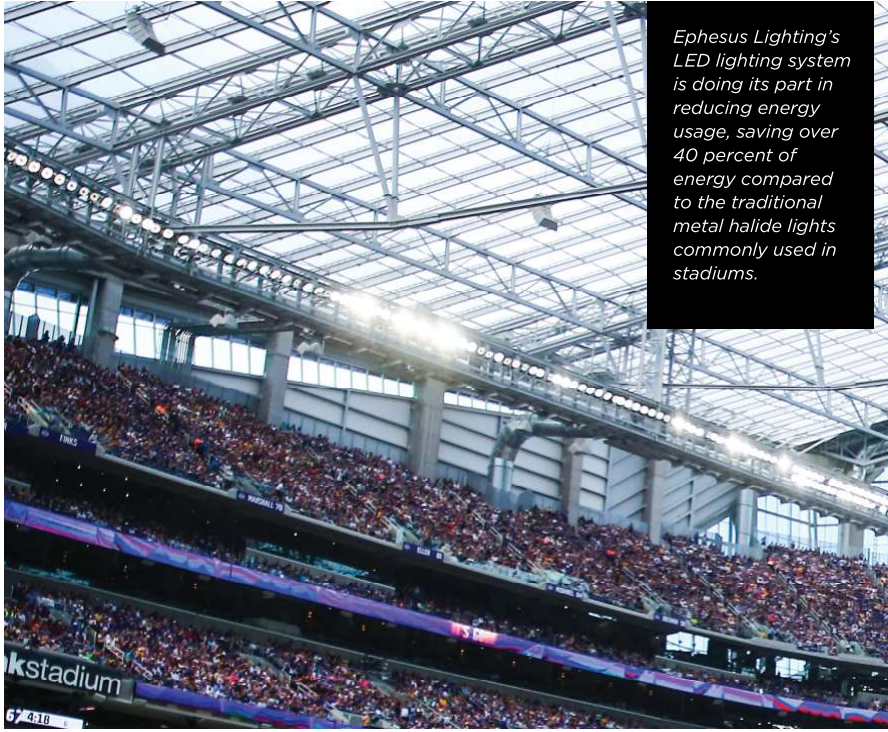


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associate, sustainable design coordinator, HKS Architects



Ephesus Lighting's LED lighting system is doing its part in reducing energy usage, saving over 40 percent of energy compared to the traditional metal halide lights commonly used in stadiums.

space near the stadium. “These all contribute to creating one of the most urban stadiums in the country.”

It may sound like a no-brainer, but the new stadium is more energy efficient than the Metrodome. “If the square footage, technologies and equipment utilized in the Metrodome were applied to the USBS program, energy usage would be 13 percent higher” when compared on the industry standard EUI, says Wolfe. To give that number more punch, take into account the amenities U.S. Bank Stadium has added—two large videoboards, thousands of flat-screen TVs, ribbon boards that wrap around the bowl and twice the amount of concessions—and it still manages to have a lower EUI than the Metrodome.

Ephesus Lighting’s LED lighting system is doing its part in reducing energy usage, saving over 40 percent of energy compared to the traditional metal halide lights commonly used in stadiums, according to Wolfe. “The expected life of the LED sports lights is over 100,000 hours, which would theoretically last more than 50 years,” he says.

U.S. Bank Stadium is setting many new standards and its ventilation system is no exception. “The airflow within the bowl is

controlled to supply and return air from desired locations for efficiency and control,” explains Wolfe. In summer, cool air is moved from the upper level to the lower level and then returned, and vice versa in the winter. “This building is really the only building of this scale that uses the natural physical properties of air buoyancy to actually make the interior of the building more comfortable,” says Trubey. “From an environmental standpoint, that’s a macro issue that we really addressed that hadn’t been addressed in these buildings.”

Especially in Minnesota, where winter temperatures can often be found in the negative range, reducing heating costs is quite the undertaking. But with the usage of the translucent ETFE (see sidebar for more information) and high-performance glass on the roof’s southern side, the stadium’s temperature benefits from solar thermal heating and passage of natural daylight. “The ETFE roof allows for better control of the interior stadium environment,” says Wolfe.

“From an environmental standpoint,” Trubey adds, “this will be one of the most sustainable buildings of this scale anywhere in the world.” ■

10 Things to Know About ETFE

1. ETFE stands for ethylene tetrafluoroethylene and is a co-polymer resin—a translucent plastic-like material that covers about 60 percent of the roof, or 245,000 square feet, the largest application of the material in the northern hemisphere.
2. Lightweight in nature, ETFE doesn’t need as much material (like steel) to support it.
3. ETFE allows for passive solar heating—a nonelectric phenomenon that distributes solar energy in the winter and rejects solar heat in the summer.
4. There’s less of a demand for artificial lighting because of the transparent ETFE that lets daylight into the stadium.
5. “[Passive solar heating and maximized natural daylight] allow patrons the opportunity to feel as if they were in an outdoor stadium while being in a conditioned space,” says Wolfe.
6. As opposed to retractable roofs, ETFE makes for a continuously sealed roof envelope. “This is a major concern in extremely cold climates, where any breaks in the roof envelope lead to drastic stack effect in the building,” explains Wolfe.
7. Even though it’s 1/100 the weight of glass, ETFE is durable and can withstand snow and wind.
8. ETFE does not deteriorate from UV damage, atmospheric pollution or extreme temperatures.
9. Since the surface is nonstick and nonporous, rainfall is sufficient to clean ETFE externally.
10. ETFE is expected to last 30-50 years.

HIDDEN GEMS

A look at the stadium's impressive private layers. **BY BOBBY HART**

U.S. Bank Stadium's clubs and suites are the main attractions when it comes to meetings and events, and for good reason (see page 36). But every space within the facility was carefully planned and crafted with a purpose. Here are some of the interesting behind-the-scenes spaces.

Video Production Room

Size: 2,500 square feet, with room for 40-50 staffers during typical NFL game

Location: Southeast corner, upper concourse

Features: SMG has 11 manned cameras (all 4K resolution) and seven remote controlled cameras.

You Should Know: This room controls 2,000-plus TVs in the stadium, instant replay, graphics, videoboard, ribbon boards and bowl audio system. "Everything is tied together to promote automation and synchronization," says Curtis Schmillen, P.E., the stadium's director of operations. "When a touchdown is scored, an operator will push one button that will simultaneously play graphics on the LED video displays, LED ribbon boards, take over all of the TVs in the stadium, and make the lights on the Vikings ship flash."

Broadcast Booth

Size: 1,100 square feet, with approximately 10 people occupying it during gamedays

Location: South side, main concourse, 50-yard line, behind Vikings bench

Features: Fully retractable glass, special desktops and ceiling grid system to support broadcast operations

You Should Know: This space accesses a private elevator that connects to event level.



Loading Dock

Size: 32,000 square feet

Location: East side, indoors, 55 feet below ground, with access from 4th Street South below the East Entrance

Features: Six trucks can be offloaded at one time and seven broadcast trucks can fit on gameday. Parking is available for NFL visiting team buses and tour buses for concerts and shows.

You Should Know: This will be the main load-in point for any show or event. From here, items can be moved to club spaces via three freight elevators or two service elevators.

Security Command Centers

Size: Approximately 30-35 people will be working between the two rooms on gameday.

-Joint Operations Command (JOC): 1,200 square feet, staffed 24/7/365

-Stadium Operations Command (SOC): 460 square feet, staffed when necessary for events

Location: JOC on event level, SOC on upper concourse

Features: Over 400 security cameras cover the interior and exterior of the building; JOC, 15 display screens; SOC, 11 display screens.

You Should Know: SMG utilizes an incident management system that will time stamp and track all incidents from inception to resolution. There is a direct link between the command centers and staff. The command centers operate in unified command structure under the Incident Command System (ICS) model. █

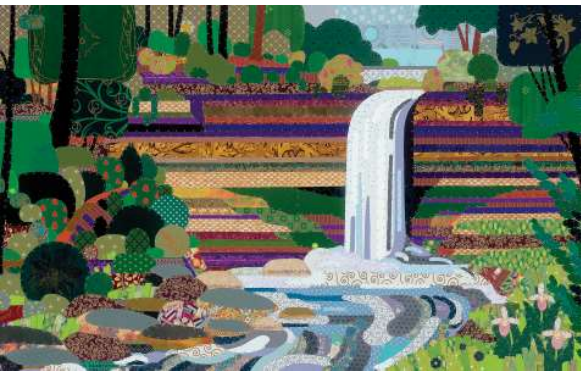


Vikings Locker Room Complex

Size: The entire locker room complex is 21,500 square feet, including training rooms, medical offices, hydro therapy room, etc. The home locker room is 4,600 square feet. There are approximately 160 Vikings personnel in the locker room complex on gameday. During the preseason, there are 92 lockers, including 32 on wheels. During regular season, there are 60 permanent lockers.

Location: Event level, southeast corner
Features: Three 80-inch smart TVs, plus a metal Vikings logo on the ceiling that measures 200 square feet.

You Should Know: One of the nicest locker rooms in the NFL is only used by the team 10 times per year plus playoffs. Some teams have practice facilities adjacent to the stadium so they use their locker room year-round.



collective regional and sports history. “[The selected] artists are the ones that are able to take their thoughts and their impressions of Minnesota and sports and the Vikings and tell their story in a dramatic way through art. We want to make sure we can honor the community that way by having the community on the walls,” explains Dreesen.

Stadium guests can expect an enhanced experience of the stadium through the collection, which is meant to inspire conversation between guests. Says Dreesen, “That’s really what art can do for somebody: bringing together drama and excitement, which is what we do down on the field too.” *sportart.net* █

TRIBUTE TO PRINCE AND HIS LYRICS;
BY NICHOLAS SCHLEIF



Meet the Artists

RETIRED VIKINGS PLAYERS AND AN ARTIST WHO WORKS WITH GUNPOWDER:
A SAMPLE OF U.S. BANK STADIUM'S DIVERSE ROSTER OF CREATIVES.

Vikings fans might remember **Jim Marshall**'s signature Silver Eagle from his days as a player. Drawn on his uniform and around his gloves, it became part of his identity on the field. Now, sketches of his iconic eagle appear in the art collection on the walls of U.S. Bank Stadium.



Carl Eller, Matt Blair and **Bud Grant** join Marshall as alumni who are now occupying the stadium in a different capacity. Eller's sculptures of Minnesota lakes, Blair's private blast-from-the-past photography collection from his time as a Viking, and Grant's wildlife sketches (in collaboration with Les Kouba) from his hunting escapades are displayed throughout the stadium.

But as Tanya Dreesen, vice president of partnership activation and special projects for Minnesota Vikings Football, points out, “Some have stories connected to the Vikings and many do not.”



David Grimsrud's triptych, “Play Ball Minnesota,” contains three 60-inch-by-30-inch canvas panels, each depicting different sports venues throughout Minneapolis, the University of Minnesota and St. Paul. “I’ve always considered art and sports participation to be much the same. It takes courage, talent, hard work, confidence and pride. The end result can be joy and celebration or rejection and disillusionment,” says the Zumbrota resident.

Grimsrud's daughter, **Holly Mujica**, also has her pop art-style piece displayed. Entitled “Potential,” Mujica cut out seven figurines from MDF (medium-density fibreboard)—adolescents playing different sports who are “frozen in different states of potential success, disappointment, glory and heartbreak,” says Mujica. “The cut-outs are inspired by how sports unite races and youths with different upbringing, experiences and abilities beyond societal stereotypes and towards a common

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ART»

THE MURALS

You can't, even if you tried, miss the two hand-painted murals that make 3,500 square feet of the main concourse's wall pop.

BY MORGAN HALASKA



Greg Gossel's 17-foot-tall-by-85-foot-long "The Vikings Are Coming!" pop-inspired mural on the main concourse's south side transports passers-by into a comic book setting with its "SMAAASHH" and "TZiiiiNG" exclamations. Gossel's boldly designed mural is a representation of Minnesota Vikings franchise history, layered with imagery of vintage ticket stubs, game programs and other mementos that one might collect from games. "These elements come to life with a vibrant color palette capturing the energy and excitement of the Vikings as they begin writing a new chapter in U.S. Bank Stadium," says Gossel.

Those familiar with Urban Flower Field

in St. Paul's Pedro Park might recognize a similarity in **Ed Charbonneau** and **Jeremy Szopinski's** latest mural, located on the north side of the stadium. The 17-foot-tall-by-127-foot-long mural uses the same concept of the golden spiral—a logarithmic spiral that opens to a certain height-to-width ratio that creates what's known as the golden ratio. "We're always looking for the crossover between art and the other world, like science and nature," says Charbonneau. "That inspired [Urban Flower Field] and we decided to bring that into the design [of the stadium mural] and complicate it immensely."

The mural was hand painted with supplies donated from Valspar to abstractly replicate

the movement of footballs. "There are 11 spirals that start at different points in the mural and they all follow the same spiral trajectory," says Charbonneau. Coincidentally, Charbonneau discovered after the mural was painted that football spirals have to wobble at 11 percent to be the most accurate: "We like it as a metaphor for perfection and harmony."

The stadium's design also influenced Charbonneau and Szopinski's mural. "We photographed the outside of the building and took those photographs and traced the shapes that we got and placed them into the design," explains Charbonneau. "But we abstracted it so it wouldn't be a literal representation of the building." The team, in preparation for paint-



ing the mural on-site, created four strike offs, which were also acquired for the collection. “They’re in all four corners of the stadium,” he says.

Alumni of the Minneapolis College of Art and Design, the two artists recruited six interns (all BFA or MFA students at MCAD) to help with the project: Hannah Farrell, Elisa Gomez, Jonathan Herrera, Celia Olson, Aimee Strzok and Suyao Tian. █

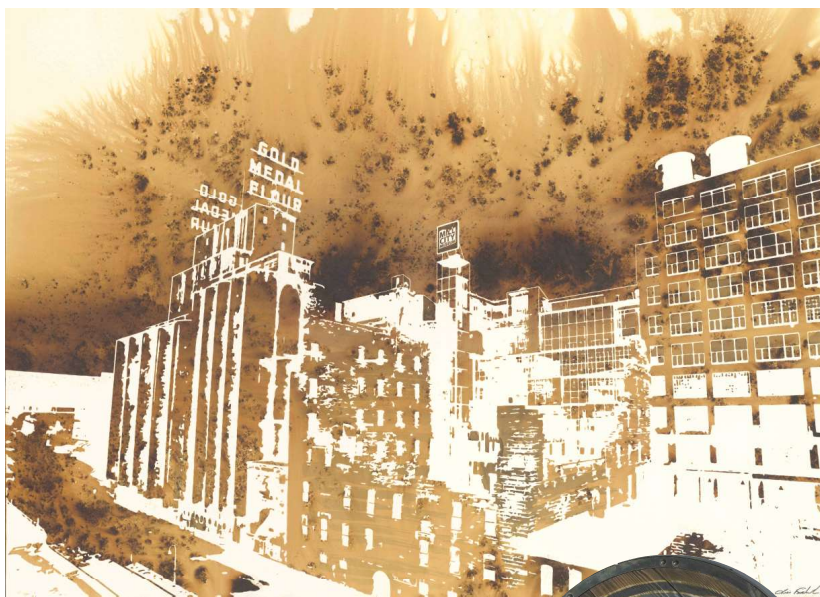
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goal. ... These athletes make up a patchwork of identities, which shape the future of the Minnesota cultural landscape.”

Lisa Friedrich created her six pieces at the stadium—which represent Twin Cities landmarks and locations throughout Minnesota—using smoke, fire and gunpowder. “Each piece is created from a photo, then cut into a masking agent which is then melted and ignited into thick paper, after the flames and smoke have cleared,” explains Friedrich. “The piece is carefully cleaned to create a one-of-a-kind image.” While the medium is a dangerous one, Friedrich admits, its unique product is attention-grabbing. “Trying to control something that can’t be controlled is exciting and challenging,” she says.



James Brenner's hand-forged shields made out of iron is “one particular installation that we’re excited about,” says Dreesen. “The shields are a great symbol of the Viking era and a piece that you’ll see us start to honor more.” **James Lundberg** and **Rebekah Glasmann** worked together to create five custom-designed Vikings shields, as well. █

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