



Photo: Gage Brothers.

GOVERNMENT AND PUBLIC BUILDING HONORABLE MENTION

Minnesota Senate Building, St. Paul, Minn.

Designing a government building to house a state's elected officials requires a delicate balance of creating something sophisticated and stately while making prudent use of taxpayer dollars. The new \$90-million, four-story Minnesota Senate Building in St. Paul achieved that balance with an elegant precast concrete and glass design with a massing that gently curves to maximize views back to the neighboring capitol.

The precast concrete façade was specifically chosen to help keep costs under control while delivering a durable structure on an inflexible deadline. Even with the design-build method and accelerated schedule, construction did not start until August 2014, but the precast concrete was completed in ample time to host the 2016 legislative term.

The designers made extensive use of models and mock-ups to hone the design and ensure they made the most effective use of stone and color, as well as avoiding problems during construction.

The final iteration of the design made use of native, locally sourced stone embedded in precast concrete panels across the entire south façade, which faces the capitol. A complementary architectural precast concrete panel with light sandblast was used on the other three sides. Strong horizontal reveals in the precast concrete panels create additional shadow lines and reliefs around the building. Given the radial shape of the building, there were many L-shaped precast concrete panels, often with articulation, resulting in fairly complex forms. The mock-up allowed the design team to study the atypical panel shapes and end conditions to eliminate any potential breaking on-site.

As part of the project, extensive measures were taken to reduce long-term energy consumption. An energy model created to validate the energy measures showed the building actually exceeded energy consumption goals by 37%. The structure is expected to achieve B3 benchmarking standards, which is the state's equivalent of LEED.

Key Project Attributes

- Use of precast concrete façade supported on-time delivery for 2016 legislative session.
- Ample energy efficiency features meet B3 benchmark standards, comparable to LEED.
- Mock-ups and modeling were used to hone design and prevent breaking.

Project and Precast Concrete Scope

- Build a three-story, nearly 300,000-ft² government building for Minnesota legislators.
- Precast concrete components include architectural precast concrete panels, landscape precast concrete walls, and stone-clad precast concrete pieces.
- Precast concrete erection occurred from May through July 2015.

Owner:

Office of the Governor and Lt Governor,
St. Paul, Minn.

PCI-Certified Precast Concrete Producer:
Gage Brothers, Sioux Falls, S.Dak.

Architect:

BWBR, St. Paul, Minn.

Engineer of Record:

Ericksen Roed & Associates,
St. Paul, Minn.

General Contractor:

Mortenson Construction,
Minneapolis, Minn.

Project Cost:

\$89.6 million

Total Size:

293,000 ft²



Photo: Wells Concrete.

STADIUM AND AREA STRUCTURE HONORABLE MENTION

U.S. Bank Stadium, Minneapolis, Minn.

As the fourth most expensive National Football League venue ever built, the U.S. Bank Stadium in Minneapolis stadium is considered an architectural landmark for the State of Minnesota. The construction of the stadium, which seats up to 70,000 people, set a new standard for sports facilities. It was built in just two and a half years, thanks to the dedication of 8,000+ workers who committed more than four million hours to bringing this project in six weeks early and on budget.

The extensive use of precast concrete and the innovative solutions achieved by the design team played an important role in the successful delivery of this iconic stadium.

The final design features more than 5000 precast concrete elements that would stretch 27 miles laid end to end. All of these pieces were cast at a local Minnesota plant and shipped to the jobsite in more than 1500 truckloads. Long precast concrete beams were used to minimize the need for columns and beam lines, ensuring great sight lines from all seats. Risers were created to meet a high natural frequency, eliminating the risk of bouncing even with the largest crowds. Because the suites and platforms on top of the precast concrete risers were designed to be pulled out to make room for additional seating, the precast concrete producer had to factor increased load requirements into the design.

During construction, the sequence of precast concrete erection was adapted to accommodate multiple trades on-site. The precast concrete producer erected the upper bowl first, then followed with the lower bowl due to the crane location, reaching the last/highest piece of precast concrete. A night shift crew was used to better coordinate with steel erection during the day.

The designers note that stadium projects require versatility, resiliency, and speed to meet tight deadlines. The high-performance precast concrete used on this project met these challenges and provided superb value to all stakeholders.

Key Project Attributes

- Designing stadium sections at a length of 65 ft with a 4.6-Hz natural frequency/bounce requirement.
- Signal risers were cast upside-down, allowing the walking surface to have a more durable form finish.
- The upper bowl was erected first, followed by the lower bowl, to accommodate crane location.

Project and Precast Concrete Scope

- Provide 1,752,000 ft.² of precast concrete pieces for the U.S. Bank Stadium in Minneapolis.
- Project included 5096 precast concrete elements.
- Construction was completed in two and a half years.

Owner:

Minnesota Vikings Football LLC
Minnesota Sports Facilities Authority,
Minneapolis, Minn.

PCI-Certified Precast Concrete Producer
and PCI-Certified Erector:
Wells Concrete, Maple Grove, Minn.

Precast Concrete Specialty Engineer:
The Consulting Engineers Group Inc.,
Mt. Prospect, Ill.

Architect:
HKS Inc., Dallas, Tex.

Engineer of Record:
Thornton Tomasetti,
Kansas City, Mo.

General Contractor:
Mortenson Construction,
Minneapolis, Minn.

Project Cost:
\$1.1 billion

Project Size:
1,752,000 ft.²



Photo: Wells Concrete.

ALL-PRECAST CONCRETE SOLUTION HONORABLE MENTION

Higher Ground Saint Paul, St. Paul, Minn.

Higher Ground Saint Paul is an emergency shelter and supportive living space in St. Paul, Minn., that provides people in need with a dignified, safe place to call home. It was the first phase of the Dorothy Day Place project to prevent homelessness in the community, and is the largest public-private partnership in state history. The facility is meant to be an architectural representation of the path from homelessness to hope and permanent stability, and precast concrete enabled that goal.

This all-precast concrete residential facility was designed to be extremely durable, able to withstand decades of abuse by a challenging resident population, while also providing cutting-edge sustainability features, including reduced energy consumption, recycled content, and indoor environmental quality.

Kirk Davis, Minnesota partner for Mattson Macdonald Young Inc., points to several benefits that led his team to choose an all-precast concrete solution. "The desire for integrated finishes, the winter construction schedule, avoiding interior columns on the upper floors by using a 40-ft slab span, the need for a durable and robust construction, and the familiarity with the team and their capabilities, made precast the obvious choice," he says.

In the design, the precast concrete panels provide architectural finish while meeting load-bearing structural requirements and serving as a truss elements to efficiencies to the project. The wall panels are load-bearing, but also provide an exterior acid-etched, colored architectural finish, and one of the vertical sections features deep returns with windows surrounded by thin-brick-covered precast concrete panels and spandrels supported off the returns. Hollow-core floors are covered with a sound mat and polished concrete topping.

One of the most innovative design features is on the second-floor roof area, where horizontal, architectural-finished precast concrete panels covering the third-floor work as trusses spanning 40 ft and resting on columns below. At their bottoms, the panels support hollow-core slabs to one side that form a second-level roof deck and support the interior slabs of the third floor. At the top of the panels, a bearing angle picks up the hollow-core slabs forming the fourth-floor level.

The designers worked in close collaboration with the precast concrete fabricator during the design phase to find efficiencies in span lengths, piece complexity, and piece to drive down cost, while delivering a durable and dependable solution.

Key Project Attributes

- Long-span truss spandrels keep floors below open for programming.
- Precast concrete panels designed for future skyway accommodation.
- Project met B3 guideline sustainability requirements for site, water, energy, indoor environment, materials, and waste.

Project and Precast Concrete Scope

- Build a five-story emergency shelter and residential facility in downtown St. Paul, Minn.
- Precast concrete pieces include 38 beams, 34 columns, 54 solid slabs, 824 hollow-core slabs, and 341 wall panels.
- Erection was completed in just two months.

Owner:
Catholic Charities of St. Paul and Minneapolis,
Minneapolis, Minn.

PCI-Certified Precast Concrete Producer
and PCI-Certified Erector:
Wells Concrete, Maple Grove, Minn.

Precast Concrete Specialty Engineer:
Erickson Roed & Associates,
St. Paul, Minn.

Engineer of Record:
Mattson Macdonald Young,
Minneapolis, Minn.

Architect:
Cermak Rhoades Architects,
St. Paul, Minn.

General Contractor:
Watson-Forsberg Co.,
Minneapolis, Minn.

Cost:
\$40 million

Total Size:
111,261 ft²