The University of Iowa opened Hancher Auditorium for the performing arts in 1972. Designed by the renowned architect Max Abramovitz, the auditorium quickly became one of Iowa’s premier arts venues and one of the leading university arts centers in the nation, attracting audiences from throughout the region with high-caliber performances. But in 2008 Hancher’s stage went permanently dark when a 500-year flood struck Iowa City, causing irreparable damage to the arts center and other buildings. Now construction of a sleek new Hancher Auditorium, featuring multiple cantilevers and structural components designed for optimal acoustic performance, is under way.

Located west of the Iowa River on the University of Iowa’s arts campus, the original Hancher Auditorium offered seating for 2,500 in an orchestra section and around the world, including a single sweeping balcony. The only problem was that the original Hancher Auditorium was sited on low ground, and when the flood hit, the stage and much of the main seating were quickly submerged. Unable to salvage the beloved theater, which is now slated for demolition, the university re-located its Hancher performances to other venues throughout Iowa City and made constructing a new auditorium a top priority. After the federal government declared portions of Iowa major disaster areas as a result of the flooding and other weather phenomena that year, the university was able to qualify for funding that helped it begin rebuilding the theater and other buildings destroyed by the high water. The university selected OPN Architects, a design firm based in Cedar Rapids, Iowa, as the architect of record on the auditorium project and then held an international competition for the building’s architectural design.

The performing arts center will rise to much higher ground,” Pelli explains. "The site is a large, beautiful green area that is very visible across the river from the university’s main campus.” The approximately 185,000 sq ft auditorium will have a partial basement topped by three above-grade public and back-of-house levels, along with a series of mezzanines, galleries, and intermediate levels. Located at the center’s core, the main theater will have an orchestra section and two balconies and will seat 1,800. “This is quite different from the old Hancher, which was a very spread out theater with only one huge balcony. This is much, much tighter,” Pelli says. “In this theater, everybody’s going to be much closer to the stage, and even in the furthest away seat, you will be able to hear perfectly and the sight lines will also be perfect.”

Floodings being a significant concern, the auditorium’s foundation and partial basement are designed to withstand the pressure of rising water. The center will be founded on more than 1,100 14 in. steel H-piles, which will act as tension piles to resist uplift during a flood. Descending approximately 50 ft below the basement level to bedrock, the piles will support a 40 in. thick hydrostatic concrete slab that will act like an inverted floor to resist the pressure of rising water. “There’s actually pressure from below that has become fairly common in Iowa City, the auditorium’s main floor and stage will be 2 ft above the 500-year flood level. “We had to move the theater to much higher ground,“ Pelli explains. “The site is a large, beautiful green area low during a flood event, and so we use the 40-inch slab to both weigh down and counteract the force of the water and also to help span as a structural element between the groups of tension piles,” explains Nate Sosin, P.E., S.E., LEED AP BD+C, a senior project engineer for Thornton Tomasetti. The watertight enclosure will make it possible to place the mechanical systems, a food service preparation area, and a plenum within the auditorium’s partial basement with a reduced risk of flooding, he says.

The performing arts center will rise from the foundation to comprise three connected yet distinct structures. The first will offer a spacious lobby, circulation corridors, and back-of-house classrooms and workshops, whereas the second will take the form of a square box roughly 40 ft on a side and three and a half stories tall that will house a rehearsal room for both university and traveling performances at the back of the auditorium. These two structures are referred to as out-of-box spaces, meaning that they are outside of the main theater hall. The third structure will house the theater itself and is referred to as an in-box space. Both of the out-of-box spaces will feature composite steel decks and support a 40 in. thick hydrostatic concrete slab that will act like an inverted floor to resist the pressure of rising water. “There’s actually pressure from below...
Hancher Auditorium’s orchestra section and two cantilevered balconies will provide seating for 1,800.

Composite steel framing to accommodate the long spans and large cantilevers that will be located throughout these spaces. The theater, on the other hand, will be framed by 24 in. thick walls of concrete, a material selected for its acoustic properties as well as its ability to carry the vertical loads of the theater’s upper and lower balconies, which will cantilever respectively 28 and 24 ft, Sosin says.

The three structures will all be accessible from within the auditorium, but each will be separated from one another by a 2 in. wide structural isolation joint. The isolation joint between the rehearsal space and the circulation corridor will serve a strictly structural purpose, whereas the one around the theater will have an acoustic function. “The joint around the main hall is for acoustic isolation so that activity outside the hall—footfalls, mechanical activity, and so forth—doesn’t transmit into the theater itself,” Sosin says. “Once you’re inside the theater, you’re acoustically isolated, and whatever is going on in the theater is your main focus.”

A series of trusses 100 to 120 ft long will support the theater’s overhead rigging and catwalk systems as well as its double-layer roof. “We have an acoustic lid on the theater that keeps noise out, and then we have a lighter, more standard composite steel roof structure over the top of that to support the building’s architectural form,” Sosin says.

Dozens of plate girders will be used throughout the building to support its long, clear interior spans and numerous cantilevers, especially the one at the building’s southern tip. There the third level will feature a 65 ft cantilever, and the second level will feature one of 35 ft. “There’s a single column at the southern tip, and [the overhangs at the second and third levels] actually cantilever in two directions from that column, both to the southeast and to the southwest, almost like a prow of a ship,” Sosin says. Other cantilevers will grace the auditorium’s eastern edge for approximately half of the length of the 300 ft long building. Another significant cantilever will be located at the back of the building and will extend over the service entrance for traveling shows and deliveries. That overhang will cantilever 45 ft, a two-story truss supporting it on each side.

The cantilevers will be accentuated by the auditorium’s lustrous facade of stainless steel shingles. Measuring roughly 5 ft wide and approximately 18 in. tall, the shingles will be grouped together to form “ribbons” around the building. “This kind of stainless steel sheet is a fairly new product,” Pelli says. “It looks very light—almost weightless. So the building will sit there, as if it was a bird that has come and lightly sat on the ground.” Cyprus wood planks will cover the auditorium’s soffit and lobby ceiling, offsetting the coolness of the stainless steel facade. Large windows between the auditorium’s stainless steel ribbons will allow natural light to flood the lobby and circulation corridors and will provide engaging views across the Iowa River. “The idea is that in the evenings, when there are performances in the theater, you will see all of these windows glowing, and it will be a lovely sight across the river,” Pelli says. “And also for the people in the theater, the views will also be very beautiful. You have the foreground of the Iowa River, which is very wide, and then across the river you see all of the buildings on the main campus of the University of Iowa. It’s very charming.”

The auditorium is being delivered on a fast-track schedule so that the renowned theater can be reopened as quickly as possible. Completion of the auditorium is anticipated in the spring of 2016. At that time the university will once again have a theater worthy of worldwide recognition, Pelli says. “I hope that very quickly Hancher Auditorium will regain its position as a major destination in the Midwest,” he said. “I think it’s going to be extremely successful, and it’s going to attract the best performances anywhere in the world. I cannot wait until it is finished.”

—JENNY JONES

Jenny Jones is a writer based in Centreville, Virginia, and a former senior writer for Civil Engineering.