



The flood that devastated an Iowa city brought a second flood—of challenges for architects and civic leaders

By Lara Brown

At its crest, the water that spilled over the Cedar River's banks in Cedar Rapids, Iowa, on June 11, 2008, rose over 31 feet high—more than 11 feet higher than the city's last record flood in 1993. Spreading for more than 10 miles, the floodwater affected over 7,000 parcels of land, including more than 300 government buildings.

Amazingly, no lives were lost in the flood. Losses of another kind, however, were enormous.

"The devastation in dollars cost to the community is \$5 billion to \$8 billion," says Tom Podzimek, a native of Cedar Rapids and a member of the City Council. "It's the fifth worst natural disaster as far as dollars in U.S. history."

While it may not seem as catastrophic as fire or earthquakes, "flood is the worst disaster there is," says Charles Harper, FAIA, a nationally recognized expert in disaster recovery and former mayor of Wichita Falls, Texas. "It really messes up everything. The debris



All images courtesy of the City of Cedar Rapids unless otherwise noted

gets washed up into the cavities. Brick is tough because it soaks up all that water. It soaks up petroleum. It won't look like anything [is wrong], but it's there."

After such devastation, how does a city pick up—and dry off—the pieces? For Cedar Rapids, like other cities hit by disaster, a fundamental part of the process was hiring architects to lead the recovery efforts. Within eight weeks of the flood, after a remediation team had enough time to clean up the city's remains, the city of Cedar Rapids hired the Chicago office of CDM, an environmental and water resources engineering firm.

"Downtown was a ghost town. Everybody was directly affected or knew someone directly affected by the flood. [The residents] were still kind of in shock," says Eric Davis, AIA, group leader of architecture for the North Central region at CDM.

Davis was assigned the task of assembling a team to assess and document the damage from the flood on six of the more crucial public buildings: Veterans' Memorial/City Hall; a complex of structures known together as the Public Works Building; Building #16, a recycling facility; Mays Island Parking Garage; Central Fire Station; and another complex called General Transportation Building/Montessori School.

About a month into the assignment, when the enormity of the job was sinking in, Davis needed to beef up his team so it could cover more ground. He brought in Paul Alt, AIA, of Alt Architecture + Research Associates in Chicago, as his project/field team leader. The two knew each other from a period when they both worked at AECOM in Chicago, although in different divisions of the firm.



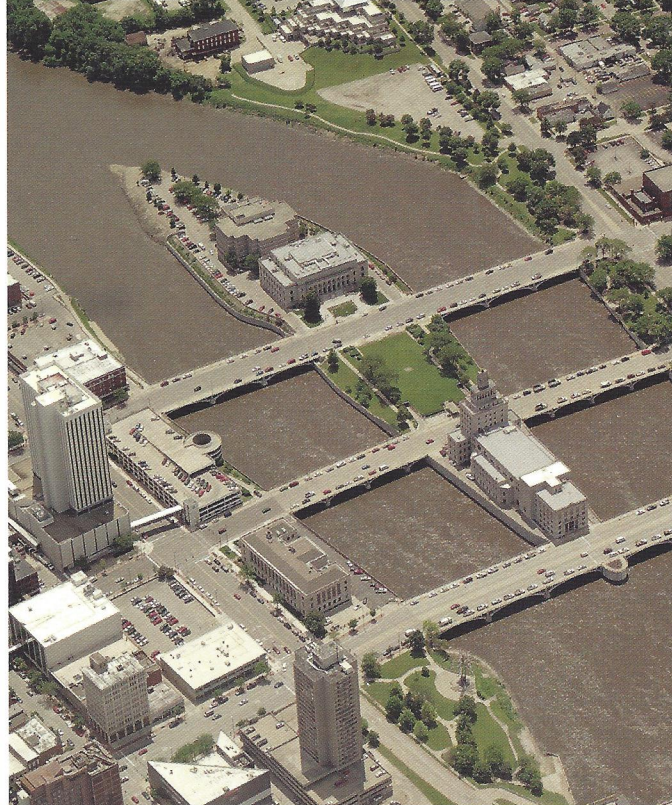
Eric Davis (left) of CDM and Paul L. Alt of Alt Architecture + Research Associates oversaw the documentation of more than 488,000 square feet of government buildings damaged by the flood.

For seven months, Alt regularly made a weekly trip from Chicago to Cedar Rapids, spending most of the workweek there. Working 10- to 12-hour days, he led a team of mechanical and structural engineers and an architectural cost estimator through the flood-ravaged buildings, documenting more than 488,000 square feet.

The team's charge was to complete technical assessment reports that the city will submit to FEMA. The reports include: a technical memo describing the "as was" condition of the building prior to the flood, a hazard mitigation report listing recommendations on how to prepare the building to withstand future flooding, and a code upgrade assessment report detailing changes required to make the building ADA compliant. All of these reports will be submitted by the city to FEMA in hopes that the documentation is thorough enough that the city receives the maximum reimbursement possible. In addition to these reports, CDM is also completing reports on sustainability upgrades for the city's largest facilities.

The reports involved extensive and precise documentation, a process Alt describes as "room by room, down to every little hinge." Some buildings, like the Public Works Building, lacked architectural drawings. In such cases, "we had to rely on users in the buildings and field measures," Alt explains.

Gathering information on the effects of flood damage was cumbersome, too. "I am calling US Steel and asking what are the effects of floodwater on steel anchors of a 1927 building," Alt says. He adds that access to a database with this type of information



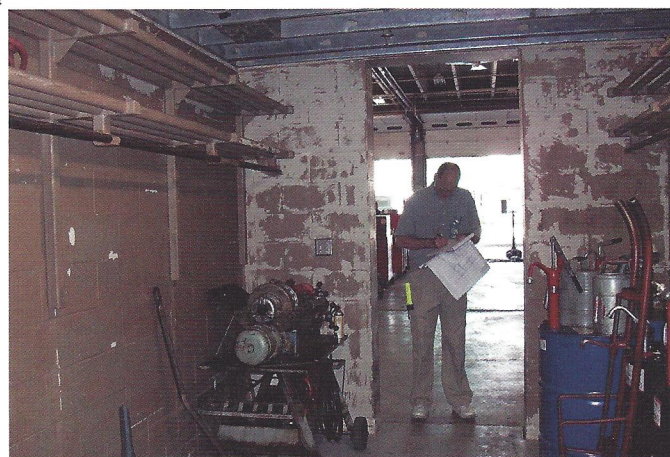
Uniquely sited for a municipal building, Cedar Rapids' Veterans Memorial/City Hall sits on May's Island (in photo, at lower end of island).

would have greatly accelerated the research process.

And the effects of flooding weren't always immediately apparent. "Damage wouldn't appear instantly," Alt recalls. "At first [the materials] seemed okay, like subfloors and doors and concrete, but after three to four months, the concrete would expand, contract and then crack, like it did in the subfloor of the auditorium. The wood sill, jam and header that surrounded the stained glass window [by artist Grant Wood] swelled three months after the flood and burst the copper sheathing and cracked the window."

In March 2009, the city submitted the technical assessment reports to FEMA. The CDM field team and its subconsultants completed tours of the buildings with FEMA representatives in the same month.

"The interface in the field with FEMA was excellent because everyone had the same mission: to help Cedar Rapids," Alt says. While the review and approval of the reports by FEMA can take up to four years, according to Alt, "This has been a fast-track



Drying tube ducts ran non-stop for months in the inside of Veterans Memorial/City Hall to dry out the interior.

evaluation. There's no possible way that the mitigation and rehab efforts could have taken less time."

For those working on rebuilding Cedar Rapids, the impact of the flood—and the opportunity it presents to implement sustainable initiatives—is clear. Podzimek points out that before the flood, Cedar Rapids officials already had been investigating sustainable upgrades. This meant that in the wake of the flood, architects and engineers "came in with fertile ground," he says. "The council had already addressed those issues."

City Council member Brian Fagan, also a Cedar Rapids native, concurs. He says the city was already considering sustainable upgrades for the city's larger facilities, like the Cedar Rapids Public Library and the May's Island Parking Garage. "With the public library, we were looking at geothermal heating, different types of lighting, the possibility of incorporating different energy sources," Fagan says. "Then the flood hit. Now we are looking at sustainability with every public works facility."

Historic preservation will also come into play as the city works to save its Veterans Memorial/City Hall and the 24-by-20-foot, Grant Wood-designed stained glass window that adorns it. The city hired Chicago's Botti Studio to complete the stained glass restoration work. Even though the building sits on the "wet side," a part of town that is always hardest hit by flooding, the decision was made that the building will remain sited there. "That building is a treasure. I think of courthouses and libraries as civic anchors. This building, the memorial, is a civic anchor and historic treasure," Fagan says.

Fagan is familiar with the history of Greensburg, Kan., a small town that was destroyed by a tornado in 2007 and was rebuilt totally green. But he notes that "the scale is a little different. The magnitude of this disaster—so many of our public facilities were devastated and displaced," Fagan says.

The city initiated a public engagement process beginning in July 2008 with a series on flood protection and, in May 2009, they



Detail of the Grant Wood-designed stained glass window that adorns Veterans Memorial/City Hall. Chicago-based Botti Studio will restore the 24-by-20-foot window.

concluded meetings with residents on rebuilding their neighborhoods. The next topic to go before the public will be the city's plans for public facilities replacement and rehabilitation.

"We've done open houses," Fagan explains. "They are interactive and participatory. It's also an opportunity for the citizens to educate the policymakers and the experts." He reports that well over 5,000 people have filled hotel ballrooms, schools, colleges and malls to participate in these informational meetings.

"The City Council and mayor are very progressive and looking out for the community," Davis says. "They challenged us from the beginning to create something better than before. It might take a little bit longer. There is a political cost. But they are very courageous in this way."

Alongside the focus on building sustainably is attention to hazard mitigation. "The water got that high once, so it is definitely

possible and probable that it would be present in our community again," Podzimek says. "There is the potential—using some of the strategies outlined in the hazard mitigation plan—to protect from that size of event." He said that the typical hazard mitigation plan prepares for the amount of the last record event plus three feet. But in this case, he says, FEMA will determine if three feet is sufficient: "They may say 'three feet is not enough; we want five or 10 feet.'"

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The city has contracted CDM to complete additional work, including development of the Buildings Master Plan for flood recovery for the city's public facilities and to manage the implementation phase for the larger public facilities.

Alt acknowledges that because of the city's risk of flood, architects and engineers need to design differently for the area: "Main electrical systems can't be in basements. And certain kinds of materials you shouldn't be using. You wouldn't use organic wood studs. You would use metal studs."

It seems the decision-makers have a clear and balanced view of the challenge and opportunity ahead. "To say no to something before you have all the information—environmental, social and economic impacts—is irresponsible. We are working on getting that information," Fagan says.

"I understand that people want to return rapidly to the status quo, but these decisions are 100-year decisions." **CA**



Davis (center) and Alt (right) tour the Cedar Rapids Public Library. Cedar Rapids plans to build a new central library since FEMA declared the building unsalvageable.