GPI

How GPI & Its Partners Are Strengthening Urban Resilience Through Cupix's Construction Technology

Climate resiliency projects play a vital role in protecting communities, infrastructure, and ecosystems from the increasing impacts of climate change. By strengthening shorelines with flood barriers and sustainable design measures, these projects will protect vulnerable communities from storm surges and weather events, ensuring long-term stability.

Greenman-Pedersen, Inc. (GPI) and its partners are collaborating on a climate resiliency project that enhances protection for at-risk areas in the northeastern United States with new steel floodgates, concrete walls, and upgraded utility infrastructure to better withstand storm surges.

These countermeasures will reduce flooding risk for thousands of residents, while continuing to preserve views of and access to the waterfront. Protecting the coastline will also help protect iconic landmarks further inland.

"Such climate resiliency projects exemplify visionary engineering, fortifying the city's waterfront against climate threats while elevating public spaces for generations ahead, says William Ferdinandsen, Director Construction Services at GPI.

Cupix, along with other digital platforms like Autodesk BIM 360 and Bentley SYNCHRO, has been instrumental in capturing site progress, addressing issues, and making data-driven decisions to prepare for the future.

Bringing BIM to the real world

While it's common for vertical construction projects to document progress with 360° cameras, it's less common for linear infrastructure projects like rail transportation or climate resiliency, explains Ameya Talekar, Lead for Project Controls and Digital Technology at GPI.

"There are set perimeters and easy boundaries for vertical projects," says Ameya Talekar. "Projects such as rail transportation or climate resiliency initiatives often span several miles, incorporating thousands of linear feet of concrete and steel structures within busy urban areas."

Although GPI had used other reality capture applications in the past, those platforms required rigid capture procedures and manual date selection when exporting data. Such limitations were impractical for projects spanning nearly half a decade.

After evaluating various similar platforms providing 360° capture services, GPI decided to pilot Cupix. If the public agency client liked what they saw, GPI would recommend it on other projects.

"The agency found Cupix really useful," says Ameya Talekar. "They wanted to start using more innovative technologies and go beyond standard use of BIM in public infrastructure."

On the climate resiliency initiative, Cupix provided spatial context that BIM models alone couldn't. For example, the BIM model generated for the project showed concrete walls and steel structures, but not the elevated highway passing overhead, leading to concerns from the agency team.

"It's challenging to show exactly where the structure or new object will be built only by using BIM models alone," says Ameya Talekar. "The project team was wondering if we could use the digital technology to identify clashes between objects, or check the clearance between the bottom of the bridge and a future gate when in deployed mode."

While you can clash two BIM models, you "cannot really detect clashes with existing structures or features which are not modelled in BIM," says Ameya Talekar. But Cupix solved that.

"With Cupix, you can identify if the upcoming structure is going to clash with the existing structure or facilities and also take required measurements", adds Ameya Talekar. "You can superimpose BIM onto the site capture and show the team exactly where the structure will be and what it will look like."

Working on a busy waterfront

The climate resiliency project runs through a busy urban corridor that includes bicycle paths, pedestrian walkways, school zones, parking areas, and an active fire station. As part of the Project Management and Construction Management team, GPI and its partners are responsible for ensuring that students, cyclists, and commuters can continue to move safely and efficiently during construction, an effort that, if not managed properly, could lead to significant schedule and cost impacts.

“We will walk the field twice a week and cover the entire project,” says Ameya Talekar. “But it wouldn’t be productive for all of us to walk the field to attend to every single issue, since this is one of the busiest areas in the city.”

Cupix helps GPI and the agency manage and plan the operations on the Bicycle path, pedestrian traffic without needing everyone to attend the field walk.

“I can open up Cupix, transport the future project elements [onto the 360° captures], and measure if there is a clear distance for pedestrians or bicycles to pass through,” explains Ameya Talekar. “And if there is a certain area which has to be closed for the contractor, I don’t have to walk on the field just to look at it.”

And for those on-site taking the captures, Cupix was “super-easy” to use and share data from.

“Everyone actually received it well,” says Ameya Talekar of adopting Cupix. “The people who are capturing the data are using it themselves and sharing it with everyone who is on the project team.”

Having a detailed record of what happened on site or a “project directory,” as Ameya Talekar calls it, has been a boon for the project stakeholders who can’t visit the site every day. Images are location-tagged and date-stamped and can be exported on their own or in a detailed timeline report.

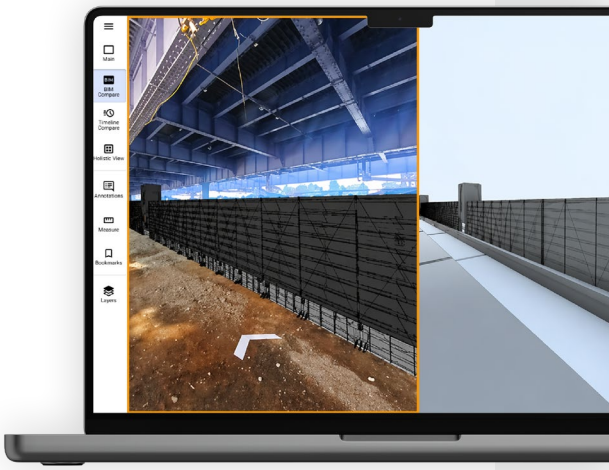
“Having a project directory ready with all the historical records builds confidence with your stakeholders, showing them what the project is going to look like,” says Ameya Talekar. “It’s not necessarily something you can quantify, but it is really useful.”

And that's not the only way GPI and the agency have benefited from using Cupix on the project:

- **4–5 hours saved on progress monitoring per week**
  Two office engineers walk the jobsite with hard-hat-mounted cameras approximately twice a week, with each walk lasting about two hours. But since virtual walkthroughs are now available in Cupix, every team member of this project doesn't need to go to the jobsite to review every single site conditions. "It's really timesaving for our team," says Ameya Talekar. "And saving four to five hours a week for a three-year project is a big deal."

- **Capturing the complexity of horizontal projects**
  Vertical building projects have visible changes every day, from new ducts going into wires being installed to concrete being poured. These changes are less apparent on complex infrastructure projects, but using Cupix with 360° cameras allows the project team to document hard-to-reach areas. "Cupix is doing really good when it comes to horizontal projects," adds Ameya Talekar.

- **Faster scheduling decisions without field visits**
  For routine planning checks–verifying site dimensions, confirming pedestrian clearances, reviewing staging areas, the project team can access historical captures in seconds rather than making a site visit. In one scenario, the engineer of record proposed a bike path that would pass over a manhole cover, but that area wasn't slated to be worked on until later in the project. With Cupix, the project team had immediate insight into what the site looked like now to flag issues that might happen later.



- **Dispute avoidance with accurate, location-based data**
  Even though contractors take their own captures, the agency wanted their own captures to refer to as an owner's rep. If a contractor comes to them with a notice of disruption and claims they couldn't access an area, the project team can pull up time-stamped captures in Cupix to refute that claim.

- **Coordinating across multiple contractors and agencies**
  Multiple public agencies are executing critical, concurrent projects in close proximity, requiring extensive coordination among various teams and stakeholders. This level of integration demands frequent meetings, field walks, and toolbox sessions to align priorities and maintain progress. In the past, a team of about ten people would physically mark work area boundaries, determine task sequencing, and ensure continuous operations. Now, the project controls and resident engineering team, on behalf of the agency they support, can use Cupix to take precise measurements, overlay BIM models onto reality captures to assess construction impact zones, and run what-if scenarios to determine required clearances and reduce risk.

What's next for this critical infrastructure program

The major climate resiliency project currently led by GPI and its partners is nearing completion. Once finished, the new resiliency infrastructure will be capable of withstanding a 10-foot storm surge. While these protective structures will remain hidden from view unless deployed during extreme weather events, the project will also deliver vibrant public spaces featuring open-air seating, fitness equipment, basketball courts, ping pong tables, playgrounds, and performance areas for the community to enjoy.

"The people who were affected by that storm and who are bearing with the construction, they've been following the progress along with us," says Ameya Talekar.

In another joint venture, GPI has also started using Cupix on another heavy civil infrastructure project in New Jersey, with the team uploading daily field reports directly to bookmarked locations within the platform.

"When you go to one single point on Cupix, you can see the entire history of captures from that point," Ameya Talekar says. "These are not just random photos; these are captures based on a specific location with a time stamp."

For Ameya Talekar, who plays a lead role in scheduling, digital tech and delay claims administration, the biggest value of Cupix has been creating a cumulative visual directory of years' worth of work. Without Cupix, they would have needed more resources for the same quality and quantity of captures, says Ameya Talekar.

"It's when you reach the end of the project-that's when you will see the real importance of using Cupix."

CUPIX