



Superstorm Sandy Recovery

by Angus W. Stocking, LS

When Superstorm Sandy hit the East Coast in October 2012, it left a wide swath of damage and destruction in its wake. Gayron de Bruin (GdB), a 14-person land surveying and engineering firm based in Bethpage, N.Y., a Long Island hamlet, was among the businesses severely affected. The firm, which has been standardized on Leica Geosystems instruments for several years, specializes in applying progressive technology to traditional survey tasks. They were an ear-

ly adopter of GNSS, robotic total stations and other progressive instrumentation, and one of the first providers of GIS expertise and consulting in the Long Island area. The combination of modern technology, high standards and excellent service allowed the firm to thrive despite challenges.

"I was actually at work during the day as the storm got going," says GdB President Christine Gayron, LS. "I went home at 4:00pm as it got more intense. We lost power of course – everyone did – and had



some IT issues. A bigger problem was gas; In the days after the storm just getting to work was hard for our employees. Filling up trucks meant waiting in line at the filling station for hours.”

GdB felt more pressure than most businesses to get up and running quickly. The firm has a Term Agreement for Survey Services (TASS) with the New York State Department of Transportation (NYSDOT) and knew that preliminary survey work would be needed prior to important storm recovery projects. “Sandy hit on Monday, and we didn’t have power at the office until Thursday,” says Gayron. “I called our NYSDOT contact that very day, to let them know we were available.” NYSDOT wasted no time. GdB had an assignment the next day and early Saturday morning two crews were on their way to Ocean Parkway, a state road that runs along one of the barrier beach islands on the south side of Long Island.

In fact, Ocean Parkway is the only connection between several islands, communities, other park-

ways, and major state parks, such as Jones Beach and Robert Moses. “Sandy washed water over the entire island and parkway in some spots, completely wiping out the dunes that normally protect the road,” Gayron says. “So we didn’t know what to expect; we weren’t even sure we’d be able to get to the site.”

Fortunately, NYSDOT had already made progress clearing the road, using snowplows and other methods to push away sand. When GdB trucks arrived, state troopers were onsite to restrict access but, in the cooperative spirit that prevailed after Sandy, waved the surveyors through to do their work.

GdB had been asked to complete an emergency control survey to support photogrammetric and aerial LIDAR mapping being performed to assess parkway damage. NYSDOT was concerned about the parkway being buckled or undermined by storm surges. “NYSDOT set targets before the storm and didn’t know if they would still be there,” says Gayron, “And if they were in place, would they still be visible or would





■ A GdB field crew uses a Leica Viva GS15 to survey post-Sandy beach erosion for the town of Oyster Bay.

they be covered with sand? We found that most were there; many had to be swept off, and a handful had to be reset." The job involved "only" a hundred points or so but, like the rest of Long Island, crews would be dealing with Sandy's aftermath. And GdB's practice of collecting GNSS data twice for each point, at different times of day, compounded the challenges. "Really," says Gayron, "We were collecting about 200 points, in difficult conditions."

Because of uncertainty about cell phone use and the state of NYSNET, the NYSDOT continuously operated reference station (CORS) system, GdB brought every receiver in its shop out to Ocean Parkway. "We were prepared to set up a base station, if needed," Gayron explains. "But during the project, we were able to use a combination of cell phones and radios to get NYSNET data, and we were able to do this work as accurately as we could have pre-Sandy. Getting around was hard sometimes, but getting the precision we needed wasn't." An added complication was that midway through the project, the NYSNET station coordinates were updated. But even that went smoothly; GdB is an all Leica Geosystems office and used Leica Geo Office to update the GNSS data from

the Leica GS15 and System 500 receivers with the changed coordinates. Surveyors were able to make the mid-project conversion without a hitch.

Crews worked east and west from Gilgo Beach, near the center of the most damaged area. Working 10-hour days, the crews made good progress. "We were able to survey 92 out of the 100 control points we were assigned," says Gayron. "The eight we didn't get to were on marsh islands that were inaccessible due to Sandy. We also helped out NYSDOT by uncovering or resetting a lot of the targets they'd been setting."

In two long weekend shifts and some office time on Monday, data was collected, post-processed, checked for quality and delivered to NYSDOT less than 72 hours after the initial call. In addition to assessing damage and planning repairs, the data is also being used to calculate the volume of sediment moved by Sandy.

Several smaller, but still urgent, projects kept GdB busy in the weeks following. For example, the village of Saltaire's surveyor John Mayer, LS, wanted GdB to



■ A Leica Viva TS15 is used to survey Udalls Pond in Nassau County to determine the sedimentation effects of Sandy.

find the village's missing sand. Saltaire is a village on Fire Island, another of Long Island's barrier islands, and it's one of the few Long Island communities that can only be reached by boat or on foot. Sandy wiped out dunes that the village depends on to protect residential areas from tides and erosion, so a beach section survey was needed to find areas where sand could be removed for dune reconstruction. By law, sand can only be repositioned if it's above a defined elevation. Sand is so important to Saltaire that the mayor got involved and even made a site visit. But the mayor didn't like what the survey said. "We had to tell him, 'No sand'," says Gayron. "Sandy washed it all away."

Nassau County also called, worried about their mud. "We've been doing pre-dredge and post-dredge surveying for the county since 2008," Gayron explains, "monitoring sediment buildup in the pond and near a bridge. Basically, they were wondering if four years of work had been undone."

The "pond" is Udall's Pond, a 230-acre, tidally influenced wetland area. It's muddy, but most of the hydrographic work can be done with a boat or from

the bridge. In some areas, GdB was forced to use a "custom pond-crossing gadget," which is essentially a sled with a Leica Geosystems prism attached; crews towed the sled across areas of thick mud to capture profiles of surfaces that defied walking and boating. Using these methods, GdB was able to show that sediment hadn't returned to dredged areas, and around the bridge (desirable) sediment buildup had actually increased. "It was nice to deliver some good news for a change," says Gayron. ■

This article is adapted from the original issue published in POB Magazine March 2013.

About the author:

Angus W. Stocking, L.S., is a licensed land surveyor who now writes full time on infrastructure topics. angusstocking@gmail.com.