Building a Boardwalk

by Darren Tracey

Heavy-duty framing supported by helical piles minimized environmental impact on a sensitive site

Round Lake is located just north of Albany, N.Y., and is connected to the Hudson River by the Anthony Kill. Almost a decade ago, a former hunting camp on the lake's western shore was on the verge of being turned into a residential subdivision when the town of Malta (where the land is located) and local conservation groups stepped in to purchase the 20-acre waterfront parcel and development rights to land surrounding the camp. The Round Lake Preserve—a 90-acre wildlife sanctuary that is the culmination of a 10-year effort by various persons, organizations, and government agencies to preserve recreational open space for current and future generations—finally opened to the public in September 2015.

A key feature in the preserve is its 300-foot-long-by-8-foot-wide boardwalk, which leads through wetlands and terminates in a boat launch. From the launch, one can paddle a canoe or a kayak (no motors allowed) back and forth in the serpentine flow of the Anthony Kill upstream to Round Lake or downstream to the Hudson River, several miles away. Our construction firm, West Branch Inc., was hired as a subcontractor to build this boardwalk.

Helical Pile Foundation

Working from a set of plans prepared by the LA Group, a landscape architecture and engineering firm in nearby Saratoga Springs, we began construction of the boardwalk in the autumn of 2014. Because the boardwalk would be built through sensitive wetlands, we had to take measures to minimize our impact on them during construction. For example, helical piles were specified in the design to serve as the boardwalk foundation (**Figure 1**). They're commonly used on wetland projects because of their minimal environmental impact compared with concrete piers or other foundations. They were installed by Techno Metal Post of Albany (technometalpostny.com).

The R2D machine the company used to drill the piles into the ground on this project is fairly compact, and at first it was possible to use wood mats placed on the wetland to move the auger into place. But as work progressed away from shore and the water became too deep for the crew to use the mats, they built a floating work platform from which to install the piles. Unfortunately, that

Figure 1. A worker from Techno Metal Post of Albany installs one of the helical piles that were used to support the boardwalk framing in the sensitive wetlands.

Figure 2. Conditions became more difficult as the project moved into deeper water (left). Once winter arrived and the wetlands froze over, it was actually easier to position and install the piles (right).

PHOTOS: WILL REAGAN/TECHNO METAL POST OF ALBANY

system proved to be inefficient because the water was not deep enough and the work platform would get stuck in the mud. In addition, when the platform was floating, it was difficult to keep it positioned to accurately locate and drill the helical piles.

Even so, the crew hurried through the shortening days of October and November to beat the oncoming cold weather. But the winter of 2014–15 came early and hard, freezing the water quickly and creating a sheet of ice that effectively locked the platform in place and halted work—but only temporarily.

While the cold never let up, this proved to be beneficial once the ice was strong enough to support the 1,600-pound auger. Now the crew could work on top of the frozen water (**Figures 2, 3**). By the time spring came and the ice melted, we had a nice foundation system on which to build, albeit in high water. While we knew the flood waters would recede as warm weather returned, the brackets that received the header beams were barely above water level when we began framing the boardwalk (**Figure 4**).

Heavy-Duty Framing

When the factory-direct shipment from the pressure treater arrived on site, we staged the lumber for efficient access by sequencing the stacks in the order that they would be needed. Of particular help was the fork lift that our local supplier,

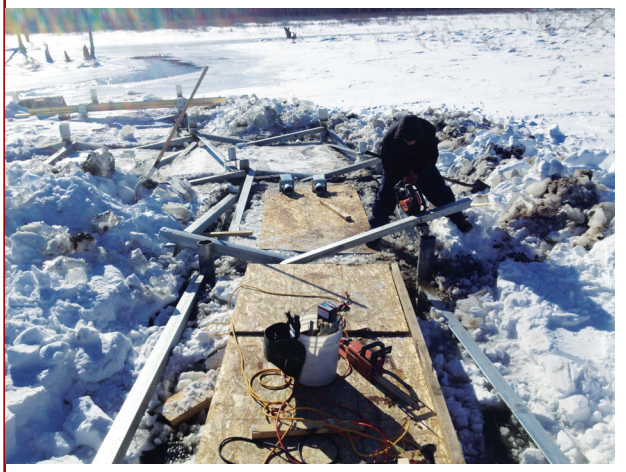

Figure 3. Once the 2-inch-diameter piles were in place, the crew cut them to length and installed the galvanized anchor brackets. The structure was reinforced with L4x4x1/2 steel cross-bracing welded to the piles.

Figure 4. When the snow melted in the spring, the water level in Round Lake and Anthony Kill temporarily rose to the level of the anchor brackets.

Figure 5. Because the four-ply beams were too wide to fit into the 6 1/8-inch-wide U-shaped brackets on top of the helical piles, 1/8-inch-deep mortises needed to be routed at the ends of each beam.

Figure 6. The framing consisted of 2x12s at 12 inches on-center, with bridging between joists every 4 feet on-center. The joists were supported by 6x12 beams located on 12-foot intervals.

Figure 7. The crew installed decking as they framed the boardwalk, enhancing access with aluminum planks.

PHOTOS 3 & 4: WILL REAGAN/TECHNO METAL POST OF ALBANY

Curtis Lumber, provided for unloading the approximately 25,000 board feet of 2x12 framing lumber and 5/4x6 decking, as part of the purchase agreement.

The project specifications called for KDAT (kiln-dried after treatment) ACQ-treated #2 SYP lumber. Because kiln-drying minimizes shrinkage and may even minimize warping, it's probably a good choice for decking and railings—areas with full exposure to the sun. However, I think it might be a waste of money to use KDAT lumber for beams and joists that are shaded by the deck above.

In fact, my local Simpson Strong-Tie representative reminded me that while kiln-dried lumber won't shrink much, it typically swells again when placed in service and exposed to moisture. As it expands, it places stresses on the fasteners, and he noted that he'd seen some cases where deck screws had failed in shear. As an insurance policy against screw failures, we upgraded from the coated #8 screws specified in the plans to #10 deck screws.

When we started framing, we found that the KDAT lumber was slightly wider than its nominal 1 1/2-inch thickness, enough so that the four PT 2-bys used

to build the beams would not fit into the 6 1/8-inch-wide U-shaped brackets on top of the helical piles. So we needed to cut 1/8-inch-deep mortises at the ends of each beam to fit the beam into the hardware. A router made short work of the problem (**Figures 5, 6, 7, 8**).

Challenging Conditions

To provide access as we proceeded into the wetland, we used long aluminum planks and installed decking as we framed. We also used landscape mats and plywood on top of the wood framing as a temporary walkway and set up a picnic tent for sun protection and to keep the saw dry during showers.

We supplied electricity to the remote site using a 6kW gas generator, positioning it in front of our work trailer and away from where we were working to reduce noise levels. We also found that by propping up sheets of plywood around—but not too close to—the unit, we were able to further reduce sound pollution from the generator.

It took our crew of two or three guys (depending on the day) about six weeks to complete the boardwalk and boat launch (**Figures 9, 10, 11**). In the process, we used more than 15,000 deck screws to fasten the decking to the frame. While this upgrade added to our costs, we did not ask to be reimbursed (this was a public bid, fixed-price project). The cost was minimal and an example of the small give-and-take between contractor and design professional that we've learned can help make a difficult project like this successful. And simple measures like providing weather protection and muffling the noisy generator increased production and made the work environment more comfortable—a win-win. ❖

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Figure 8. Simpson Strong-Tie DTT2Z brackets were used to secure the 42-inch-high handrail posts to the framing. The posts are located 4 feet on-center.

Figure 9. The boardwalk terminates in a 24-foot-by-30-foot observation platform, as well as a floating boat launch.

Figure 10. The rail system consists of 2x6s face-nailed to the posts, and a continuous 2x6 top rail. A 7-foot-wide aluminum gangplank leads to the floating boat launch.

Figure 11. This is the view toward the parking area for the Round Lake Preserve boardwalk.