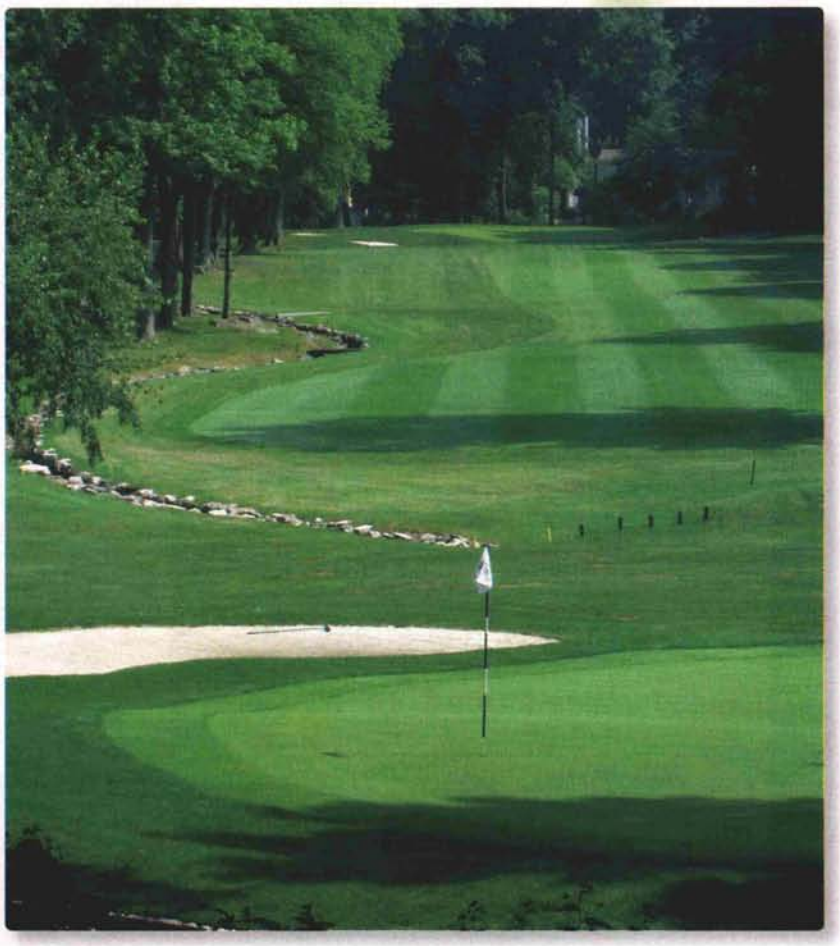
# Thinking outside the pump chamber

## A Connecticut superintendent takes on drainage problems and learns that the field work is the easy part.

Sean P. Monahan



The first green, with the second hole in the background, at the The Millbrook Club in Greenwich, Conn.
**Photos courtesy of Sean Monahan**

**I first became familiar with** the phrase "hydrologically closed basin" in 2001 as a graduate student in the engineering geology department at San Jose State University. At the time I was pursuing a career that had absolutely nothing to do with growing turfgrass or playing golf.

A few years later, after a bold career change and an apprenticeship at Myopia Hunt Club, Winged Foot Golf Club and National Golf Links of America, I found myself revisiting this terminology as a golf course superintendent in Connecticut. Fortunately, I managed to embrace the term "hydrologically closed basin," and I discovered that as a superintendent, understanding things from a geological point of view can be useful.

In addition to an array of applied sciences that superintendents often have to embrace, the tasks of planning, budgeting and personnel management often exceed the boundaries of the maintenance operation. Superintendents can find themselves with just as much of a political agenda as a demanding maintenance schedule.

This is a story of a golf course project that reminds us how far this profession has evolved. Superintendents today wear a lot of hats, the most important being a representative of the golf course who takes ownership of both preservation and major renovations. Golf courses represent the highest level of plant management out of any agricultural or horticultural commodity. Golf courses also represent some of the most valuable pieces of property in the world. When you are a superintendent, you have to take ownership, and you often have to think outside the box to be successful.

## Problems, geological and manmade

In geology, a hydrologically closed basin refers to a topographically low-lying area that has water coming in, but none going out. As you can imagine, this is not an ideal situation for a golf course, and many superintendents battle this on a day-to-day basis.

The Milbrook Club in Greenwich, Conn., is a private, nine-hole facility that rests in a hydrologically closed basin. Since the construction of the golf course in 1923, a combination of runoff, groundwater, and storm sewer water has plagued the small piece of property, particularly the southeast corner of the golf course. In this location, after any significant storm, the No. 4 and No. 5 fairways would flood into a single continuous body of water approximately 70,000 square feet, sometimes as much as 2.5 feet deep.

In other areas of the golf course, smaller bodies of water would accumulate, coalesce and eventually transform the golf course into a virtual wetland. During one particular storm in March 2006, for the first time in my life, I witnessed a flash flood take place right in front of my eyes. I was standing on my No. 4 green.

When I took over the position of superintendent in November 2005, I learned that the existing golf course drainage system was intact, but extremely limited. All of the golf course drainage emptied into a single drainage ditch that flowed to a small pump chamber, which in turn delivered the water into a city storm sewer system. The amount of water that the club was allowed to pump into the storm sewer was restricted by the town, so the pump was sized accordingly. When flow to the pump chamber exceeded the capacity of the pump, the system would back up and the golf course would flood.

A combination of a high water table, runoff from the golf course, runoff from surrounding properties and roads, and a city storm sewer that actually discharged onto the property were the reasons for the frequent flooding. Like many courses in this part of the country, the geological conditions make matters even worse. The area is underlain by solid bedrock that is capped with glacial till and/or clay that was deposited during the last ice age. This geological profile results in moderate to severely poor drainage conditions, and in our case, a water table that was only a couple of feet deep.

## The solution

Prior to my position at Milbrook, I had worked on several golf course drainage projects, but never to address flooding issues of this magnitude. My instinct was to drop laterals and catch basins everywhere I could in an effort to collect as much surface water as possible. When I first witnessed flooding after only an inch and a half of rain, I began to understand that the problems were on a much larger scale and that traditional, in-house solutions would be futile.

With the help of a local engineering firm, S.E. Minor, a solution was calculated to address the issues without affecting the surrounding community. The idea was to utilize a system of 8-inch to 12-inch perforated curtain drains that contoured the base of slope around the perimeter of the golf course. Essentially, groundwater, runoff and the discharge from the city storm sewer would be intercepted, rerouted through the golf course using a series of large pump chambers, and discharged off-site into two separate neighboring storm sewers. The system involved three pump chambers (two of the pump chambers housed a 5-hp pump, and the third housed two 2.5-hp pumps) and two 7.5-hp pumps.

Initially, it was difficult for me to digest the schematics provided from the engineers, because from a golf standpoint, there were a lot of playability and maintenance issues that would remain a problem. The club was relying on me to interpret and approve the design, and I was certain that even with the new system, smaller areas would remain subject to the accumulation of casual water. Our contractor, Down to

"The field work was the easy part," says Sean Monahan, the superintendent at the The Millbrook Club in Greenwich, Conn. "Planning and public relations can be the most difficult task a superintendent can face."

Earth, a local golf course construction firm that did a phenomenal job on the installation, was also skeptical that the system would capture every bit of water, and we were both right.

Recalling my earlier days studying hydrogeology at San Jose State, I came to the realization that the engineer had designed a system to pump down a hydrologically closed basin, not a golf course. From an engineering standpoint, it didn't matter whether there was a golf course, an airport or a shopping mall in this location. The bottom line was that we were dealing with very large-scale issues quite uncommon for a golf course. This sort of big-scale thinking is not always easy for a superintendent who wants to address every possible detail, but in this case a very necessary approach. The water table needed to be addressed before we could even begin to consider micromanagement. Once I was able to shift gears from a superintendent's point of view to a geologist's point of view, I became confident with the schematics, and put the job out to bid.

The team at the The Millbrook Club excavates for a pump chamber to be installed.

Today, with the new system in place, the golf course has dried up dramatically, and flooding no longer occurs. The water table has been lowered, and we now have an array of mainlines that provide the ability to install smaller laterals and catch basins to eventually collect every last puddle we can find. In some areas, surface regrading will be more economically sound, and all of this is a process that will take a couple of years to complete.

## Planning and permitting

The club had hired me to implement the project, from start to finish. This was a challenging task, but I was eager to learn something along the way. I had a great deal of field experience in drainage, particularly working under superintendent Eric Greytok at Winged Foot GC, where in the years prior to the recent U.S. Open, small drainage projects seemed to be executed as frequently as raking bunkers. From a field perspective, my project at Milbrook was on a much larger scale, yet the fundamentals remained the same.

What was new to me was dealing with the formalities of planning and permitting. Our drainage system was designed to essentially pump water off the golf course and into a town storm sewer system. The potential impacts from both an environmental and physical standpoint were significant. For more than 10 months, it seemed that I was spending as much time at town hall as I was on the golf course. My job had evolved from superintendent to project manager, and I had to take ownership.

The main concern was how much water we would be discharging from the golf course and whether the storm sewers had the capacity to support it. This is where the engineers came in. Detailed calculations had to be made to eliminate the possibility of expending the capacity of the storm sewers. In theory, the proposed system would work.

There also existed the environmental concerns of runoff containing pesticides and fertilizers entering the system. To address this, the engineer's specifications called for all the perforated drains to be set in trenches that were lined with filter fabric on both walls. Limestone gravel also was used to buffer any materials that entered the trenches. I was also asked to produce a water quality management program that involved routine water testing and the maintenance of a vegetative buffer zone along the open drainage ditch on the golf course.

## Superintendents and public relations

My most challenging task was to assemble the appropriate parties to come to agreement on the proposed drainage solution and secure a wetlands permit for the club. I learned very quickly that without a representative of the club on the forefront aggressively pushing things through, the typical bureaucracy and paperwork associated with projects of this magnitude would smother the approval process for several years. It became a full-time job.

I had to maintain myself as the mediator between our engineer, the town wetlands agency, the department of public works, the engineers who had designed the storm sewers and the 60-plus neighbors whose homes surrounded the golf course and utilized the sewers. Attempting to get all of these people on the same page was like managing an annual blue-

grass putting green in late July: The hours were long and erratic, and I always had to be ready to make an adjustment in my schedule.

What I learned from the experience is that as a superintendent and/or project manager, you need to maintain two important strategies:

- Understand every detail of the project you are managing.
- Carefully discriminate when and how much information you need to release.

This philosophy also can be applied to everyday life as a superintendent when dealing with members.

In the case of my drainage project, communicating with the surrounding community was a lot like dealing with a membership. They can be particularly difficult to inform because, in most cases, you are trying to explain a very complicated and technical task. I found it easy to sit down at a table with a handful of town officials, engineers or even my greens committee chairman. Yet dealing with the public was a much more complicated task.

On two particular occasions, the club decided to hold a neighborhood meeting to educate everyone on our drainage project, as well as some additional projects we had planned for the golf course. My job was to present the details and answer any questions. I learned quickly that word choice can make all the difference in the world, and selecting the right words at the spur of a moment is a skill that takes time to develop.

At our first meeting, I alluded to the fact that we would be "pumping water" off the golf course and into their storm sewer system. At the end of the meeting, almost every neighbor raised a hand with a question, and the response seemed almost a general panic. The neighbors could not digest the technicalities that supported our drainage plan. What we thought would be a helpful, neighborly gesture suddenly backfired because we offered too much information. A couple weeks later, I found out the neighbors had petitioned for a public hearing on our drainage permit. This would set us back at least a month.

About two months later, we held another meeting, and this time I was much more careful about how I phrased my presentation. I replaced the concept of "pumping water" with, "controlling the movement of water through the golf course." At the end of the meeting, I had only one neighbor raise a hand. "How's that little border collie of yours doing?" was the question. Word choice made things a lot easier for everyone.

## Under the hawk's eye

Working with town officials and inspectors can be a challenging task as well. You have to show them that you respect their guidelines and that you're not trying to hide any activities. When you display a sincere respect for their profession you can build a working relationship that eventually works to your advantage. They begin to trust you, and your job becomes a lot easier.

You also do not want to find out the hard way how closely inspectors work together. For example, if you have an electrical inspection scheduled, make sure there are no plumbing or

In the middle of a mild and wet winter, the crew installs pumps inside the new chamber.

zoning activities taking place without a permit. These guys pay attention to every little detail and they talk to each other downtown. If you come across to them as a loose cannon, you'll become the subject of conversation around the coffee machine. Your project can break down very quickly, and this can land you in a difficult situation.

Throughout the drainage installation, a mild, wet winter left us literally working in the water table. Trenchlines only 3 feet deep were constantly filling up with water, and the areas that were excavated to install the pump chambers looked like swimming pools filled with coffee. In order to get the work done, we had to constantly pump cloudy, sediment-filled water out of the excavated areas. Because the only place for water to leave the golf course is into a storm sewer system, I was required under our drainage permit to remediate erosion and sediment loading into the system.

The town wetlands compliance officer was my liaison for this, and his job was to watch us very closely. He had provided me with Connecticut Department of Environmental Protection solutions to deal with erosion and sedimentation issues, but for the first few weeks we were shut down several times because nothing seemed to work.

Eventually I realized that the only solution was to eat thousands of dollars in silt fence, hay bails, gravel and labor hours. On several occasions, I paid the contractor to spend an entire day on erosion control. Eventually, using a series of check dams and pump-down areas, we managed to filter out the sediment. I also came up with the idea to use bunkers as dewatering pits. We would pump the water into a bunker, and the sediment would slowly settle out and flow over the surrounds and through a barrier of silt fence to eventually come out clean.

It was difficult to stomach the fact that I was making a mess of the golf course, but this was the only way to get the job done. When the wetlands compliance officer realized that I was going above and beyond the call of duty to meet his criteria, he started to back off, and the project progressed without any further interruptions.

I had now developed a working relationship with the town official; he trusted me, and the project progressed smoothly from that point on. At a later date when I applied for a wetlands permit to conduct a new irrigation system installation, he signed off on the project on the same day, a process that usually takes anywhere from one to three months.

## Lessons learned

After an excruciating process of planning and permitting, the project was approved, and we completed the drainage installation over the winter of 2005/2006. Many lessons were learned along the way, most important, that field work is the easy part, and that planning and public relations can be the most difficult task a superintendent can face.

The cost of the project was $600,000 with an additional $200,000 in electrical work to power all of the pumps. The most remarkable aspect of the project was that all of this was done to drain only about 20 acres of turf. My assistant superintendent, Scott Zwiers, along with golf course construction contractor Down to Earth, provided outstanding execution of the project and managed to progress through some of the most difficult winter conditions we could have encountered.

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## Leo Feser Award candidate

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