

Global positioning systems...

# COMING OF AGE

...the promise realized, Part Two.

**L**ike Marc Thigpen and his NuTec Soil precision variable-rate application service profiled last month, **Mike Nuzzo of Nuzzo Course Design** (Houston, TX) has embraced GPS technology and integrated it lock, stock and barrel into his golf course architecture practice. GPS gives him the ability to easily adjust preliminary routing sketches to actual site conditions in the field, respond to unexpected challenges or surprises found during construction, and document the entire process with an instantly correct as-built and dataset.

A New Jersey native with an engineering degree from Boston University, Nuzzo first utilized GPS when creating as-builts for a construction company back in 2001-2002. During his subsequent work with architects, superintendents and golf course builders, he honed his skills while realizing just how powerful a design tool GPS represents.

Plenty of people use GPS along with CAD software for golf course mapping today, but Mike Nuzzo uses it a bit differently. Rather than a CAD program, Nuzzo imports the GPS data into a drawing program (Adobe Illustrator) loaded on a tablet PC to better sketch and ultimately reproduce irregular landforms such as bunkers and green complexes — all while on site, in the field.

“Doing it this way allows me the freedom of drawing by hand while also taking advantage of the instant calculation and re-adjustment capabilities of computer-aided design,” Nuzzo said.

**Nuzzo’s first solo design project**, Wolf Point Club, has been in design/construction for the past two years in Port Lavaca, Texas, halfway between Houston and Corpus Christi, near the center point of the 275 mile Texas Gulf Coast. Using his unique combination of technology while working directly for a private owner with a short chain of command and a long leash has enabled

Nuzzo to design and manage the project on schedule and on budget — even with a summer this year that saw precipitation within 5” of breaking a 106 year old record for total annual rainfall. Wolf Point is in the grassing stage now.

Working alongside Mike Nuzzo on the Wolf Point project is Don Mahaffey, a long-time TurfNet member who is also managing his first soup-to-nuts construction project. Nuzzo and Mahaffey “met” while participating on golfclubatlas.com, a popular website geared toward golf course design enthusiasts, and hit it off. Nuzzo brought Mahaffey on board in February, 2006, before the first shovel went into the soil.

**“Doing it this way allows me the freedom of drawing by hand while also taking advantage of the instant calculation and re-adjustment capabilities of computer-aided design...”**

**Mike Nuzzo**

## The process...

Nuzzo started the process of designing Wolf Point Club by having the site flown and a topographic map and aerial photograph created to work with. He then downloading a local quadrant image of the area and embedded the data before sketching a conceptual routing onto the quad image.

With a pocket GPS receiver (later upgraded to a hand-held), a small GPS antenna under his hat and tablet PC in hand, Nuzzo then went out on the site and adjusted the conceptual routing

*(Continued on page 2)*

connecting  
golf course  
superintendents  
worldwide...  
since 1994.

inside:

### Coming of age... (Continued from page 1)

as needed to best incorporate the strategic course design into the landforms as they existed.

"Using GPS, I always knew where I was relative to the hypothetical routing," Nuzzo said. "If I saw a need to shift a tee location one way or another, for instance, I'd just take a new datapoint and the plan would automatically adjust. The plan remained dynamic through the entire construction process, as we were constantly shifting, rotating a green or eliminating a bunker, as field conditions dictated," he added.

Nuzzo used the traditional methods of tee poles, turning points and green points to lay out the design, but flagged areas as guided by his GPS receiver rather than working off a traditional center line.

### Construction...

Nuzzo's client, the golf course owner, asked Don Mahaffey if he felt comfortable managing the project. Mahaffey responded that he was and could, with the help of Nuzzo and others, so was given the green light.

The owner insisted that the project be managed from a labor utilization standpoint rather than a strict budget, feeling that the latter would fall into place if the labor were managed properly. With that in mind, Mahaffey hired a team of four local farmers — even though unskilled in that process — to do the mass excavation with scrapers and tractors, with Mahaffey and Nuzzo jumping in to help when needed. Nuzzo and Mahaffey staked where all the cuts and fill would go and the team took it



**Mike Nuzzo with GPS antenna under his hat and tablet PC in hand.**



**A handheld GPS receiver was integral to the design, documentation and implementation stages of the construction of Wolf Point Club in Port Lavaca, Texas.**

from there, building the course in layers, like a wedding cake, in one-foot increments.

Since GPS is 2-dimensional, elevations were measured and staked using "lasers, a level and eyeballs," according to Nuzzo. "Just as siting was adjusted as the project progressed, we also tweaked the elevations on site to ensure the correct mix of aesthetics, playability and functionality—particularly drainage," he continued.

**"The plan remained dynamic through the entire construction process, as we were constantly shifting, rotating a green or eliminating a bunker, as field conditions dictated..."**

**Mike Nuzzo**

Mahaffey managed one small crew of 4-6 people at a time as they progressed through the various tasks of moving dirt, shaping, irrigation, drainage and finishing. He spent 500+ days on the project, with Nuzzo on site in the range of 125+ days — from one day to a week or more at a time, depending on activity and need. According to Mahaffey, they touched base frequently and bounced questions, problems and decisions off each other for input.

"We both crossed over into the other's domain often, sometimes positively, sometimes not... normal stuff when you're doing something intense

like building a golf course in-house with limited labor," Mahaffey commented. "Mike helped me tremendously with managing the project. When we had serious issues to discuss, they were usually resolved over a few Bohemias at the local Mexican restaurant. That was the spirit of the project," he quipped.

The irrigation was installed by a contractor who used a traditional cabling system. As Nuzzo became more familiar with the process, he began us-

ing the GPS to orient the heads. Mahaffey tweaked the positioning to ensure the location of every head was in an optimum location.

"We would start at the green, positioning heads to triangulate around the green as best we could," he said. "We then triangulated out to fairways, or even multiple fairways if connected. There is one area on the course where four fairways are connected, although not shared. We then flagged and adjusted when needed, knowing that when we got to the end of the fairway it will work out. That's nice."

*(Continued on page 3)*

### Coming of age... (Continued from page 2)

Nuzzo commented that he could even set it up to triangulate through two holes with connected fairways and wind up perfectly triangulated at the second green.



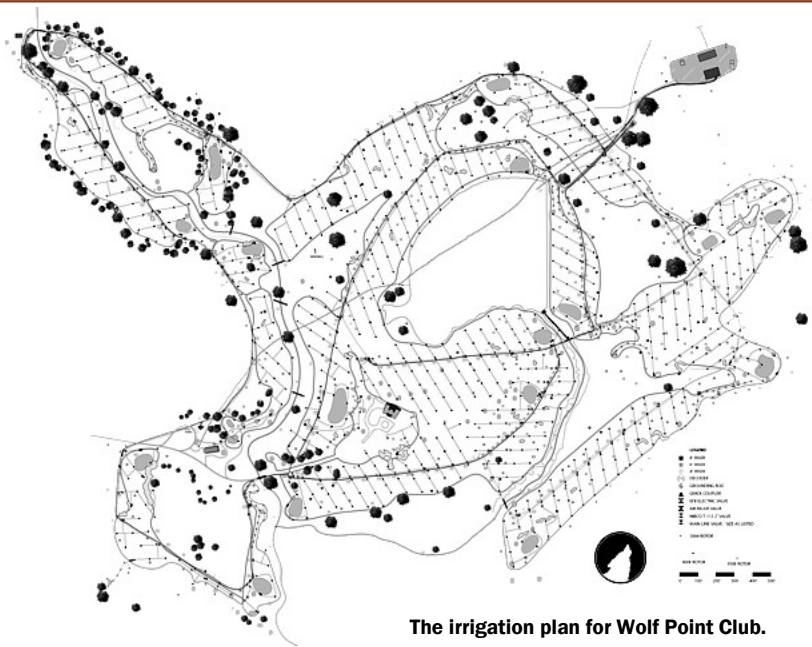
**Don Mahaffey (l), Mike Nuzzo and one of their local "hired hands".**

As the irrigation contractor worked through the site, Mahaffey "was everywhere, checking every detail," said Nuzzo. While that was going on, Nuzzo walked the open trenches with his GPS to document main lines, laterals, drainage pipe, utilities, wire and even the buildings on the property, and then updated all data points to refresh the as-built.

Nuzzo noted that only 90 acres of the 200 acre site are irrigated, although "the area looks much larger than that," he said. "GPS was very helpful in ensuring that the irrigation didn't extend beyond our area of disturbance."



**With a practiced and critical eye, Don Mahaffey ensured every irrigation head was properly positioned and oriented.**



**The irrigation plan for Wolf Point Club.**

The GPS as-built plan was eventually integrated into the Rain Bird central control system selected for the project.

### From Mahaffey's viewpoint...

The golf course architect always has his opinion, while the golf course superintendent may have another. Sometimes the twain don't meet, but in this case, Don Mahaffey's thoughts on GPS utilization during the Wolf Point project closely echo Nuzzo's.

"There's no doubt that GPS helped tremendously in managing and accelerating the project," he said. "Everything was always under our control. We could make instantaneous changes and adjustments, and we always had a current set of plans. We knew the correct measurements, and didn't have to guess on quantities."

Data was continually recorded in the field and construction drawings were updated and printed weekly.

Did it save money?

"I'll give you just one example," Mahaffey said. "The surveyor's bid to survey and stake the course was \$28,000. Mike and I staked it in one weekend. That paid for a \$6,000 GPS unit very quickly."

How difficult is it to use the GPS device and enter the data? "We had Mike's brother [17] and my son [14] helping us out with no problems at all," Mahaffey said. He plans to continue to use the device to document future changes to the irrigation system or as drainage is added.

The golf course at Wolf Point Club is in the final stages of grassing as the torrential summer rains finally relented and the seasons morphed into a cooperative autumn. Nuzzo is wrapping things up while Mahaffey will stay on to manage the golf course.

Both Nuzzo and Mahaffey stated that GPS allowed them to continue to massage and document the design well past traditional time limits, up to and including finishing and grassing.

"We changed the course right up to the very end," Nuzzo said, "so we could get it just right."