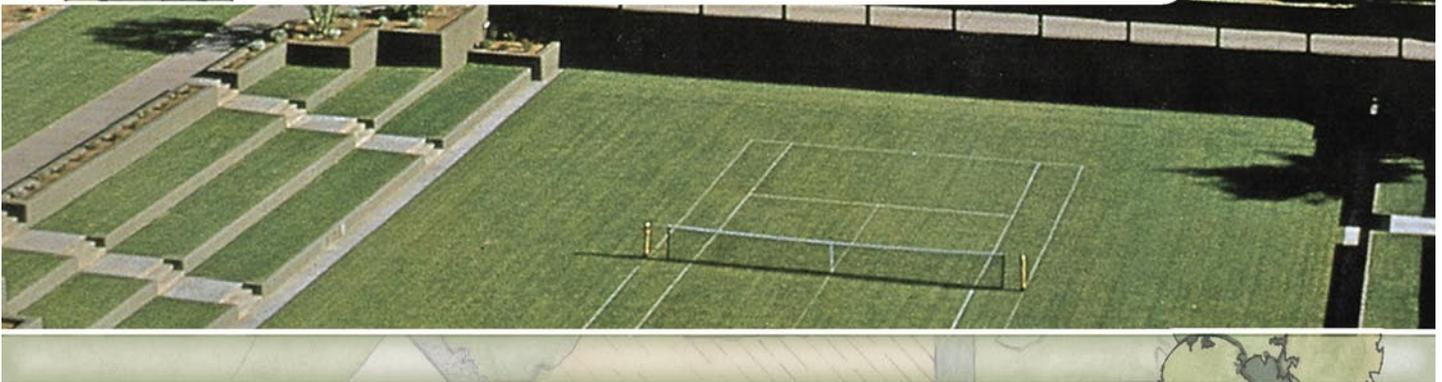


Solutions by NETAFIM



Wimbledon Never Looked Like This! *Sonoran Clubhouse Emerald Green Complex, Scottsdale, Arizona*

Skillfully camouflaged against its desert backdrop, the Sonoran Clubhouse is barely visible from the outside. Part of the exclusive Desert Mountain community, the clubhouse appears as unobstructive as the rest of the gated, residential area that includes four Jack Nicklaus golf courses. Here, native earth tones and stone architectural features that blend with nature are required and street and tennis court lighting is prohibited.

Yet, once inside, visitors catch their breath as they are led to the outdoor dining patio. Cascading out before them is revealed one of the most magnificent jewels of the Southwestern desert – a spacious, three-tiered emerald green grass terrace surrounding an exquisitely manicured sunken grass championship tennis court, hard and clay tennis courts, an upper terrace nine-wicket croquet lawn and panoramic views of the city lights of Scottsdale and Phoenix, Arizona. Many of the members-only Sonoran Clubhouse's upscale clients have played tennis all over the world, and even they can't believe their eyes at the meticulous care that has been given to every detail.

"Our director of tennis, Ward Phelps, said Jimmy Connors took one look at how nice our grass court is and remarked, 'Wimbledon never looked like this,'" says Sonoran's environmental manager, Wally Camp. "All the people that work here take extreme pride in the appearance of this facility."

PROJECT OVERVIEW

Constructed in the spring of 1993, the Sonoran Clubhouse and tennis complex measures more than 20,000 square feet (the spacious grass tennis court itself measures 95 by 120 feet) and the grounds were constructed to meet exacting USGA putting green specifications – identical to those used for premium golf courses. This meant installing a complex herringbone-pattern drainage system 18 inches below the surface, followed by six-inches of pea gravel, followed by 12 inches of a highly specific custom blend of sand and peat moss that, prior to installation, was tested at a Georgia soil laboratory to verify percolation and water retention rates. All turfgrass areas are a hybrid dwarf Tifgreen Bermuda, PD102, mowed to 0.150 (thousandths) of an inch.

Beyond adhering to stringent soil preparation and turfgrass requirements, the project utilizes Netafim's state of the art Techline subsurface drip irrigation technology to ensure top performance of the world-class grass tennis court, croquet lawn and surrounding seating terraces. In addition, a heating system was installed beneath the grass tennis court itself in order to prevent winter dormancy.

Grass Tennis Complex Summary

Designer

Don Teal, Teal Design Group, Las Vegas

Irrigation Equipment Supplier

Century Rain Aid, Gaithersburg, Maryland

The Issue

In the middle of the Southwest desert, construct and maintain a tennis complex measuring 20,000 square feet - which includes three-tiered emerald green grass terrace, grass championship tennis court and upper terrace nine-wicket croquet lawn. The grounds must meet exacting USGA putting green specifications.

And the irrigation system must:

- Improve safety and increase court playable time
- Eliminate problems resulting from overspray
- Water conscientious

Netafim Products Used

- Techline Subsurface Drip Irrigation Technology - almost seven miles
- Buried six inches below grade
- Runs of 120 feet in length
- Drippers spaced 12 inches apart

Results of Subsurface Drip Irrigation

- Improves safety and court playability time – allows watering even while people are playing. The ground is never soggy and puddles never form.
- Overspray is eliminated
- Conserves water – no water is lost to evaporation or wind drift, each emitter in the tubing delivers water at a precise rate.
- Allows large spans of turf to be easily maintained.

"Using our underground heating system, we are able to keep the soil temperature at approximately 78 degrees consistently." Since its opening, the clubhouse has hosted a number of member events featuring various legends of tennis, as well as the A2 Open Croquet Championship Tournament for the past three years.

REASONS FOR NETAFIM DRIP

"As far as I know, this was the second grass tennis court built in Arizona," says Camp. "The first one was also part of a project that I was intimately involved with, so I had a good basis of comparison for certain things we wanted to improve upon."

Improved Safety and Playability

"First, we wanted improved safety and playability, including a longer window of time in which the court is playable. Because we use subsurface drip irrigation versus overhead spray, we can open the courts for playing between 7:00 and 7:30 AM without worrying about morning dew – or frost in the winter. Subsurface drip allows us to water whenever we want, even while people are playing, and they never know it. The ground never feels soggy or develops puddles because the water is drawn by capillary action to the root zone where it's needed and never floods the surface."

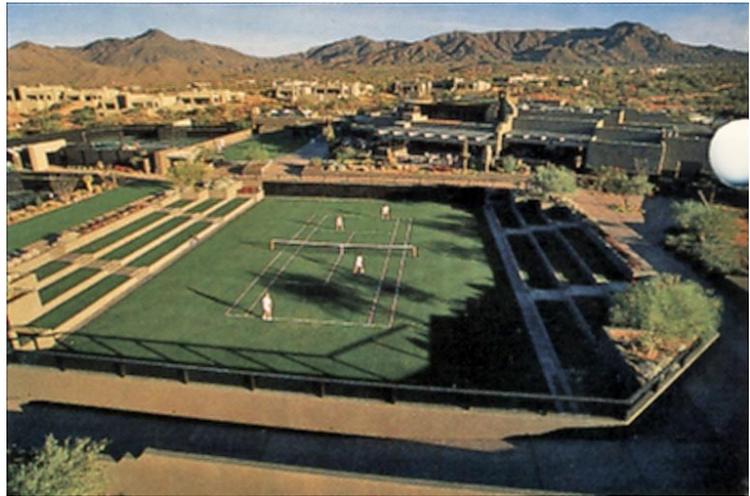
Avoid Overspray

"Secondly, we wanted to avoid overspray. With traditional sprinklers, you always need to go right to the edge of our hardscapes, especially with our hot, dry climate and prevailing southwest winds, so you always have overspray. Our water here in the Southwest is high in pH (calcium carbonate), and overspray turns concrete and other surfaces white. The custom pleko finish we have on our concrete walls is an extremely attractive elastomer type finish, but if it stains you have to wash it with a mild acid, which also breaks down the concrete. Our net posts are made of oak and brass, and our windscreen frames are custom made. Plus, we paint our court lines on with turf-quality liquefied chalk using custom-made stencils that give us extremely precise, straight lines. Even one-quarter inch off is unacceptable. With all this, you can see why we simply didn't want the additional maintenance and expense involved with managing an overspray problem."

Conserve Water

In addition, Camp is very conscious about conserving water and planning for maintenance efficiency. With subsurface drip irrigation, there's no water lost to evaporation or wind drift. Each emitter in the tubing meters water at a precise rate. Compared with the other grass court he managed, it appears he's saving a substantial amount of water and labor, greatly reducing long term maintenance and improving the aesthetics at the same time.

"The fact that we have been able to utilize subsurface drip irrigation to successfully maintain extremely large spans of turf with the kind of rigorous requirements demanded by Desert Mountain has been a source of amazement to many visitors, including professionals in the field," says landscape architect Don Teal, Teal Design Group, Las Vegas, who was the chief landscape and irrigation designer for the project.



Meticulous care has been given to every detail of the Sonoran Clubhouse's Emerald Green Complex.

SEVEN MILES OF DRIP TUBING

The soils beneath the courts, three-tiered stadium court and croquet field are mostly sand, and the subsurface drip tubing – almost seven miles of it – is buried six inches below grade in runs of 120 feet in length with integral self-cleaning, pressure-compensating drippers spaced 12 inches apart.

"Normally", says Teal, "we specify tubing burial between four and six inches below the surface. On this project, we placed and secured the drip tubing exactly six inches below, so that the turf could be regularly aerated down to three to four inches, and filled in with sand-and-soil mix to encourage percolation and aeration and provide for new growth. Most people are surprised to find that water will actually migrate up to the surface from an eight-inch depth, even in sand, after approximately 25 minutes run time. The truth is that water percolates both upward and outward by cohesive forces."

According to Teal, who has been designing subsurface drip irrigation systems for landscape applications for 17 years, it is essential to combine quality design with reliable products and careful installation to achieve long-term satisfaction. In the Phoenix area, one of his first under-turf subsurface drip projects measures six acres and continues to do very well after eight years. Teal insists that, during construction, the tubing goes in clean. That means the minute the lengths are cut they are capped, taped or connected to fittings to eliminate the chance of debris getting in there. Taking just a few seconds to do that during installation will avoid hours and days of troubleshooting later on.

"I always tell my clients that subsurface drip irrigation is preventative maintenance, not repair maintenance," Teal says. "There are no moving parts, so you're not replacing components due to wear and tear – you've got much, much less irrigation maintenance cost in terms of materials and labor. However, you do need to make sure you zone your system to give you maximum flexibility and make sure you install sufficient flush valves for adequate flows through each tube and exhaust header."

SYSTEM LAYOUT

"With the Sonoran Clubhouse project, we provided three main zones; one covering the entire grass court area and one on each side covering the out-of-bounds areas. We also created separate zones for terraced seating areas with check valves installed between each header for each level, so water doesn't back down due to elevation changes. To obtain optimum results, it was essential that the tubing be secured at a uniform depth and deviate less than one inch from either side of the center line."

Teal says that, because of the porosity of the sand, he used one-gallon-per-hour emitters versus the typical half-gallon. And he made sure that at the perimeters, near the walls, the tubing was installed less than four inches away. The reason, he says, is that "during our Southwest summers the heat is extreme, and the hardscapes heat up and wick moisture out of the soil very quickly."

BELOW GROUND HEATING

The Desert Mountain community is located at an altitude ranging from 3,000 to 5,000 feet, so heavy frosts are variable between November and February. Air temperature can drop to the low to the mid twenties while soil temperature varies from the mid to upper forties.

"Normally, we would have to keep the grass tennis court closed until 9:00 or 10:00 AM during the winter, which is our busiest season," says Wally Camp. Using our underground heating system, we are able to keep the soil temperature at approximately 78 degrees consistently, so we can assure our members a frost free and well performing court between 7:00 and 7:30 AM each day.

"Originally, we had consulted with leading agronomists all over the world and thought we might be able to prevent winter dormancy by utilizing underground heating. In reality, we noticed signs of stress – perhaps from the lack of solar radiation – so we began overseeding all turf areas with premium rye for the winter months. We do feel that the underground heating has contributed greatly to helping us maintain superior quality in our overseeded areas throughout the winter," Camp concludes.

The heating system is designed to heat water in three boilers located in the pool equipment room, then distribute that water through manifolds and out beneath the surface of the grass tennis court in half-inch diameter, thick-walled poly tubing placed two inches below the drip irrigation tubing, running parallel on six-inch centers. Temperature sensors located underground monitor current readings, and the system automatically regulates itself.

EASY MAINTENANCE

By and large, we have very few problems with maintenance," says Monte Varah, assistant environmental manager at the Sonoran Clubhouse. "It took us a short while to get everything precisely dialed in to achieve maximum performance, but that's normal.

"As far as turf care is concerned, we cut all the turf areas three times a week with a greensmower to the same height as greens are kept: 0.150 inch. We fertilize every week in the winter and every two weeks in the summer. Because we don't have the compaction of normal soils, we only have to aerate two times a year. And we do very little to the irrigation system.

"Four times a year, we check and clean our screens and filters. We keep 15 pounds of pressure at our regulators, and during the hot summer season, we double our run times. During the winter, our water consumption is very low. We use multiple cycle starts – five or six times for a total of 45 minutes to an hour per day at each station in the summer months. From what I understand, the fact that we keep our soils at ideal moisture levels without letting them dry out, together with the fact that the Techline product has a physical barrier, is the main reason we experience no problem with root intrusion. And we, of course, have different pressure regulators installed at each zone.

"As part of our refinement process, we installed small Y-strainer micron filter screens to eliminate any incidental debris and upgraded the pressure regulators from plastic to brass with dial indicators. It's all come together very nicely and our owners, club members and guests are very pleased.



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