



East Meets West: Architect Brings Home Environmental Safeguards

By Bruce Shank

All of the lakes on Gainey Ranch Lakes Course are part of the linked water storage system used for irrigation.



Natural looking desert waste area reduces irrigation requirements on the Dunes Course at Gainey Ranch.

For the past two decades, the United States has been exporting golf courses to countries throughout the world. American golf course architects today spend nearly as much time out of the country as they do in their home offices. When they travel they carry with them drawings and details for new courses. These plans represent a wealth of expertise developed over fifty years in the U.S.

While it may appear that this outflow of technology is one-sided, in reality golf course architects are bringing home possible solutions to challenges faced by golf courses in our own country. With each course architects lay out in a foreign country a new set of design challenges emerges. As they solve each design puzzle, their wealth of information grows. It's simply a matter of time before some of the techniques developed and applied overseas will find their way onto U.S. golf courses.

Mike Poellot, principal of J. Michael Poellot Golf Design Group in Saratoga, CA, believes the time has come for fellow architects to apply some of their

expertise from foreign courses to those in this country. "Based on some of things we have learned in Japan and other countries, I think we can eliminate sensitive issues such as environmental protection," he states.

Included in Poellot's portfolio are three courses in Japan; the Prestige Country Club in Tochigi Prefecture and Tomisato Golf Club and Glen Oaks Country Club in Chiba Prefecture.

"Japan presents many unique scenarios," he adds. "Golf courses are frequently tucked in between farms on steep mountain slopes with creeks and wetlands. Due to the sparsity of land available for golf course development, we've had to work in comparatively small spaces. Only five percent of its land is suitable for development or agriculture.

Along with all the special problems presented by "tight land" comes working under severe environmental restrictions. Golf courses have to be constructed in harmony with their surroundings. In many cases, the drainage from a course must be retained within its boundaries.

"The Japanese are concerned about runoff containing pesticides and fertilizers," says Poellot. It's up to the architect to provide what is essentially a closed system for irrigation and drainage."

Architects deserve some of the blame for making golf courses difficult to maintain and hard for the average golfer to master, he points out. "The types of golf courses designed in this country over the last 20 years are playable for only five percent of the golfer population," he remarks. "We need to address the skills of the other 95 percent! The physical features of the site and the skills of golfers should dictate the particular style of the layout. We shouldn't impose a preconceived route plan onto any geographic area."

Preconceived route plans are being challenged in Japan. "The Japanese expect excellence," reveals Poellot. "They have almost a fanatical attention to detail. They travel widely. They know quality course design when they see it. This demand for the very best has resulted in an overall upgrading of golf industry design and construction practices worldwide."

Many of the skills honed by architects in Japan have direct application to course construction in the United States, Poellot believes. "The U.S. golf industry faces soaring land costs, a dramatic increase in usable land and increasingly complex environmental regulations. We are dealing more and more with land that cannot be used for anything else. We've been able to apply what I call lessons from Japan very successfully to the changing golf environment in this country."

One of the courses Poellot cites as an example of the changing golf environment in the U.S. is Gainey Ranch in Scottsdale, AZ. He was involved in the design of the course soon after launching his own firm. Poellot had previously been vice president of the overseas arm of the Robert Trent Jones II Group.

The 27-hole course developed by Markland Properties consists of three distinct nines, all of which depend upon recycled water for irrigation. George Corthouts has been the superintendent of Gainey Ranch for more than eight years. "The entire course and all the landscaping except for one pond by the Hyatt Resort uses recycled water," he explains. "No water leaves this course. All drainage is recycled back into the lakes where it is reapplied through the irrigation system."

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The only exception is rainfall during summer storms. Runoff from heavy downpours is directed through an arroyo which runs through the course. Excess storm water is allowed to pass over a dam at the base of an arroyo. The lakes were designed with enough capacity to capture any storm water falling in them or on the surrounding watershed.

Corthouts has witnessed the conversion of the course from well water to recycled water. "We switched over gradually from well water to 100 percent treated effluent as the plant came on line," he recalls. "We take only the water the course requires since it's an interceptor plant and not an end-of-the-line plant."

Since the conversion was completed four years ago, Corthouts has been able to reduce his applications of fertilizer by more than half. The hybrid bermudagrass (328) greens and tees and the common bermuda fairways have responded well to the recycled water, says Corthouts. "If the greens and tees weren't constructed of sand, we probably wouldn't have to fertilize hardly at all."

The bermuda is advantageous to the closed system, he believes. "Our heavy rains come in the summer," he remarks. "I take advantage of the rain to leach any of the salts from the effluent through the root zone. We keep a deep aerifier [Verti-Drain] busy all the time opening up the soil for the summer rains. The bermuda knits back up without any problems."

One of the tradeoffs with using effluent is its high pH. "We treat our holding ponds with sulfuric acid," he adds. "The pH can get up to nine. The acid is a by-product of the copper mines in the area and is priced reasonably. After we treat the ponds, the pH is back down between 6.5 and 7.0."

Corthouts does spray on iron and micronutrients periodically and uses low rates of complete fertilizers mainly in the fall when overseeding and in the winter for the overseeded ryegrass. "We might put down one-half pound of N per 1,000 square feet per month on average. The irrigation water contains

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Mike Poellot.

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nitrogen and phosphorus," he adds. "That makes up a large portion of the nutrients required by the turf. The only problem it presents is in the summer when the ponds can reach 90 degrees [F] and algae gets a foothold." To help combat algae and keep the water aerated, the treated effluent is constantly circulated among six lakes through a network of waterfalls.

He overseeds with Marvelgreen treated with Apron in late September," he adds. "We may treat with fungicides once or twice during the fall. Other than that, we just spot treat with herbicides when we need them."

One reason diseases aren't a problem at Gainey ranch is the course's sophisticated irrigation system. Separate subsystems carry water to turf areas, to drip systems for all trees, a second drip system for shrubs growing in the dunes,

and a spray system for shrubs in other areas. By constructing the irrigation system with subsystems, overwatering has been virtually eliminated. The trees situated in turf areas, for example, will receive less water through their emitters than trees in non-turf areas. All systems are controlled by a central computer (Rain Bird Maxi III). Irrigation consultant Ken Christley from Phoenix has worked closely with Corthouts to refine irrigation programs and to build in adjustments for weather.

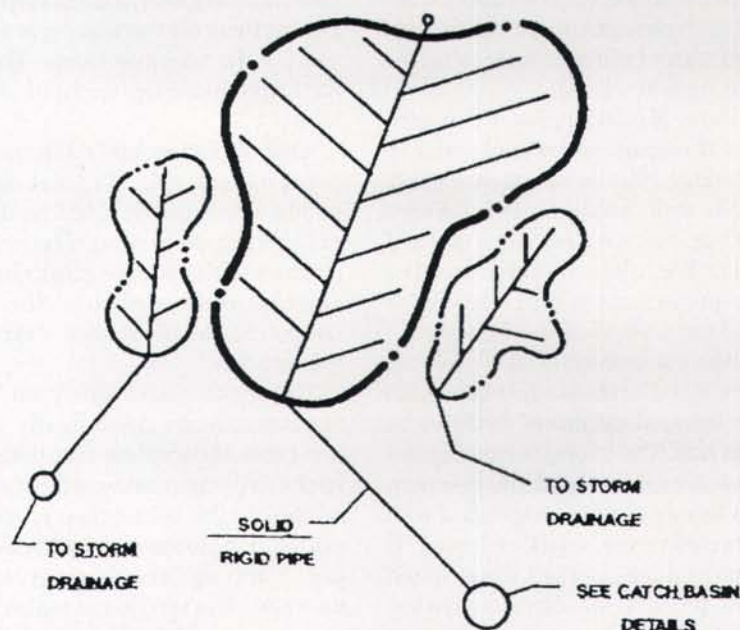
By using only the water and chemicals necessary to meet today's standards for golf, any buildup of salts is minimized. "I do ask myself at times where all the salts going," says Corthouts. There is no indication of a buildup anywhere that we've detected. They must be flushed down below the root zone by the rains."

Poellot asks himself the same question. "I think it's important to use chemicals wisely," he states, "but I also believe we need to explore further ways to control chemicals in runoff and drainage. Perhaps controlled-release products and new application techniques can enable pesticides to remain only where they are needed and effective at the lowest possible rates."

The architect is concentrating his efforts on greens and tees, the sites with the greatest need for maintenance chemicals. For one course in Japan, he designed a drainage pit containing activated charcoal. Water percolating through a green or tee is caught by drain lines which deposit it into the pit. The charcoal traps any chemicals carried by the water before it is allowed to leave the site. Since most turf chemicals have half lives of between one and two months, they could be held safely in the pit while they break down.

"I firmly believe that environmental concern over golf courses is not as big a problem as some people think," says Poellot. "Let's eliminate the issue. Golf courses can be designed and maintained to use treated wastewater for irrigation, to contain runoff and drainage, to preserve natural features, and to meet World Class standards in playability. It will take a concerted effort on everyone's part, but it can be done. What we learn in other countries can help us accomplish our goals perhaps faster than we would have accomplished them on our own. □

PUTTING GREEN DRAINAGE AND STRUCTURE PLAN



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