

PROFILES

IRRIGATION BY DESIGN

Volume 3, Number 1

Getting Below the Surface of Low-Volume Irrigation



Impeccable landscape design requires creativity. But sometimes you need help finding creative solutions for those narrow and odd-shaped landscape areas that can present irrigation challenges. With subsurface irrigation, trees, shrubs, ground cover and turf can be irrigated virtually anywhere that sprinklers are impractical.

According to Dennis R. Hansen, A.S.L.A., C.I.D., there are a whole host of reasons to employ subsurface drip irrigation:

- Enhanced turf viability
- Decreased maintenance
- Increased use time
- Efficient water use
- Effective slope watering through enhanced control

- Very high coefficient of uniformity (90-100%)
- Reduced vandalism
- Ease of retrofit
- Lower water volume requirements per square foot
- Ability to fertilize without spraying
- Safe use of recycled or reclaimed water

Precise Water Application

Subsurface irrigation eliminates overspray and potential water damage by delivering water at the roots, not through the air. Flowers and shrubs get the precise amount of water required to ensure beauty and health.

(See Low-Volume Irrigation, p. 6)

When To Use Subsurface Irrigation

Dennis R. Hansen, A.S.I.D., C.I.D., provides the following checklist to help you determine if subsurface is an appropriate choice for your next project.

- ✓ **Suitability of the site.** Will it be a complex system with many small or very specialized areas? Is the soil more-or-less uniform in depth or compaction? Do the grades change in rapid succession in the same potential zone area? If so, subsurface is a good choice.
- ✓ **Cost differential.** Understand the difference between the cost (initial installation as well as long-term maintenance) of a well-designed overhead system (10 mph wind or greater) and a subsurface drip irrigation system.
- ✓ **The client.** Look closely at your client. What is his comfort zone? Will he lose interest in the application? Can he motivate his maintenance organization?
- ✓ **You.** Look closely at yourself, too. What is your level of expertise and experience? Is good advice or direct help available to you? Can you handle potential problems?

"I think that any designer or seasoned practitioner can design, install and/or run a good subsurface drip irrigation system," asserts Hansen. "Careful planning and good advice from the manufacturer are musts," he continues. "If all else fails, hire a good consultant to help you chart the waters, so to speak." ●

TORO

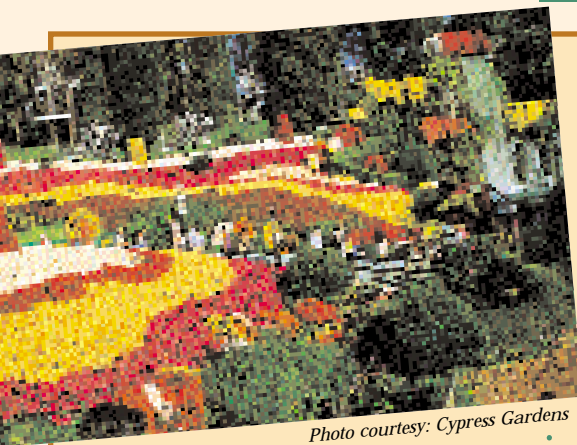


Photo courtesy: Cypress Gardens

CYPRESS GARDENS

Winter Haven, Florida

Irrigated Areas:

- Plantation Gardens
- Poinsettia Festival Garden
- Mum Festival Garden
- Growing Nursery

Irrigated Acreage: 30

Equipment:

- Toro Maxijet® Products
- Toro 570Z Series Sprinklers
- Toro Super 600® Series Sprinklers
- Toro 2001® Series Sprinklers
- Toro 640 Series Sprinklers
- Toro 252 Series Valves
- Toro 216 Series Brass Valves
- Toro Custom II Controllers
- Toro Vision® I Controller
- Toro Monitor II® Controllers

Cypress Gardens isn't your mother's little tomato patch. It's a 22-acre stretch of Plantation Gardens known as "America's Backyard." Vegetable gardens, rose gardens, herb gardens and even a grape arbor are nestled in an idyllic parcel of land in central Florida. And from November to mid-January, two major floral festivals expand the landscape to other areas of the park with tens of thousands of mums and poinsettias. With so many different plant materials in such a diverse area, traditional irrigation just wasn't quite right.

It all starts in the nursery where Cypress Gardens grows the thousands of plants used throughout the

property, including those grown during two major growing seasons specifically for the Mum and Poinsettia Festivals. The Mum Festival covers four acres using 25,000 plants. The Poinsettia Festival showcases 20,000 plants under a huge tent. Yards of dirt transform concrete slabs into rolling terrain with hills and valleys, walkways and waterfalls. It is created in one week, then removed in just three or four days at the end of the festival.

It was the Poinsettia Festival, in particular, that prompted Cypress Gardens to seek out an alternate irrigation method. The environment, with its temporary, portable, changeable nature, did not lend itself easily to overhead irrigation. Along with the many plants, there are extensive decorations and signage. There's even a European G-scale railroad that travels through a miniature town tucked among the poinsettia plants. Using overhead irrigation would require that these elements be replaced constantly or somehow protected from water damage. Obviously, an alternate irrigation method was preferable due to the time and expense that replacement and protection would require.

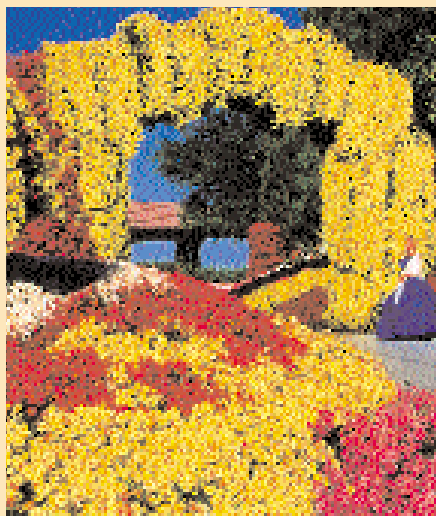


Photo courtesy: Cypress Gardens

According to Erica Bridges, Promotions and Partnership Marketing Manager for Cypress Gardens, "we looked at many different products, but we chose Toro Maxijet because we couldn't find any other product that could beat their superior manufacturing process while meeting all of our needs — 100%. They were always there for us." After Maxijet was introduced to the Poinsettia Festival area, "it far exceeded our expectations and took it to a whole new level," Bridges continued. This year, Cypress Gardens introduced a Festival of Trees into the sea of poinsettias. Twenty-eight Christmas trees dot the landscape of the display. Individual misters fill the watering pans for each tree — making this maintenance chore a thing of the past. Cypress Gardens is very committed to the environment, constantly on the lookout for any way to save water. Low-volume Toro Maxijet products are the perfect partner to their important commitment.

Gary Smith, Director of Nursery Operations for Cypress Gardens, worked with Maxijet to design custom systems that would meet the specific needs of the Poinsettia Festival. From there, the use of Maxijet has spread to the Mum Festival, the nursery and the Plantation Gardens. In fact, Maxijet is the preferred low-volume provider for Cypress Gardens. "We were so pleased with Maxijet products that we wanted to tell everyone what we use," said Bridges.

Whether you're designing a low-volume irrigation system for a backyard garden or "America's Backyard," Toro Maxijet has the right products to produce a bountiful harvest. ●

THE ALAMO

San Antonio, Texas

Irrigated Areas:

- Shrubs
- Groundcover
- Flowerbeds
- Turf

Irrigated Acreage: 4.3

Equipment:

- Toro 570Z Series Sprinklers
- Toro 340 Series Sprinklers
- Toro Super 600® Series Sprinklers
- Toro DL2000™ Dripline and Fittings
- Toro 252 Series Valves
- 24-Station Toro Network LTC™ Plus Controller

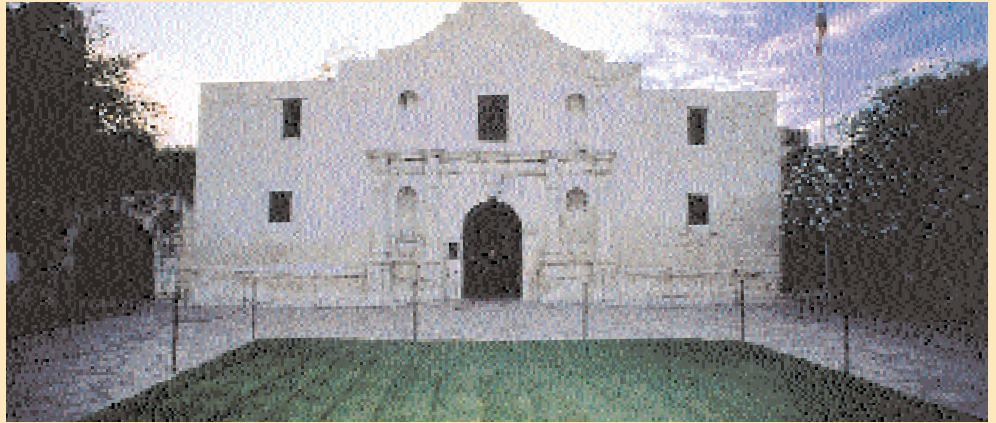
Irrigation Designer:

- Pete Olfers
Peter B. Olfers & Associates

Today's Alamo isn't what you see in the movies — tumbleweeds blowing across a dry, desolate patch of dirt in old Texas. Instead, it's intensely landscaped with grass, groundcover and flowerbeds. Maintaining that lush landscape isn't easy where summer temperatures hover above 100 degrees for months on end. In the sweltering heat, it's not uncommon for landscapes to experience as much as an inch of evaporation each day.

The Alamo is one of five Spanish missions established in the early 1700s, near the headwaters of the San Antonio River where an abundant supply of water was available to the missionaries and their Indian converts. But the Alamo is best known for being the site of the epic battle that took place during the Texas Revolution. In the early morning hours of March 6, 1836, 189 Texas defenders lost their 13-day struggle to fight off the army of Antonio Lupez de Santa Anna. However, their noble effort provided a rallying cry for other Texans who ultimately won independence from Mexico.

Since 1905, the Alamo has been a memorial to the Texans who died there in defense of Texas liberty. Owned by the State of Texas, the site



is managed by the Daughters of the Republic of Texas, which takes great care to maintain the historical integrity of the site. When it comes to landscaping, strict rules must be followed. For example, the ground cannot be disturbed below 16 inches without approval from the Texas Historical Commission. During the hot summer months, irrigation is vital to maintaining the health and beauty of the grounds. And because the Alamo is one of the top tourist attractions in Texas, it is important to carry out irrigation even when the grounds are open. These factors, along with a site that is very flat with a lot of concrete walkways, posed some unique irrigation challenges.

The first sprinkler system was installed in 1954. Age, however, took its toll until just two valves were operating before the irrigation system was renovated last year. The Alamo contacted landscape architect, Pete Olfers, who has been using Toro irrigation products since he received his license in 1972. Mark Nauschutz, the Alamo's horticulturist, also trusts Toro products as "the most recognizable name in the industry" and because Toro "pioneered product innovations in rotors and pop-ups." Since Nauschutz is responsible for maintaining the beauty of a site that is visited by nearly three million people each year, he couldn't afford to gamble with any other manufacturer. With these endorsements, there was no question that Toro products were the solution to the Alamo's irrigation challenges.

While two-thirds of the plant material at the Alamo is now irrigated with Toro rotary and fixed-spray sprinklers, a third of the landscape uses low-volume irrigation to deliver

water to the plants. In order to get better coverage in the shrubs and ground cover, the antiquated spray heads have been replaced with Toro DL2000 dripline. Heavily buried under three inches of mulch, the dripline can operate at any time without disturbing the Alamo's patrons or evaporating into the atmosphere. Since roots can penetrate even this much mulch, Toro's exclusive ROOTGUARD® protection guards against root intrusion. Olfers estimates that as much as "30% of the water in an overhead sprinkler system will be lost before it hits the ground" in the extreme temperatures of San Antonio. So, wherever practical, subsurface irrigation was used.

After years of coping with an irrigation system that relied on manually operated valves, the productivity gains of the updated, automatic Toro irrigation system are not lost on Nauschutz. His watering schedule used to be restricted to before 10:00 a.m., forcing him to juggle the needs of the plant material with the needs of the visitors. Now he can water at night or, with subsurface drip, even when the grounds are open. An additional bonus is that the San Antonio Water System will soon be supplying reclaimed water so irrigation can continue even during periods of water restrictions.

Respecting the historical significance of a national treasure like the Alamo is as important to Toro as respecting the world's dwindling natural resources. Developing products that preserve water while beautifying the landscape of a harsh world is more than just our business — it's our commitment to future generations. ●



THE CANYONS SOFTBALL COMPLEX

St. George, Utah

Irrigated Areas: 7 Softball Fields
Playground
Common Areas

Irrigated Acreage: 38

Equipment:

- Toro DL2000™ Dripline with ROOTGUARD®
- Toro 2001 Series Sprinklers
- 2" Toro 252 Series Valves
- Two 48-Station Toro OSMAC® Controllers

Irrigation Designers:

- Bill Jackson
City of St George
St. George Utah
- French & Associates
Columbus, Georgia

Typically, when you think of Utah, you think of snow-capped mountains, ski resorts and the Osmonds — not temperatures that soar past the 100° mark. But St. George is in the southwestern corner of Utah bordering Nevada on the edge of the Mojave Desert. In fact, it's less than two hours north of Las Vegas, where temperatures regularly push the mercury into triple digits in the summertime.

With extreme temperatures like these, it's often difficult to get a sufficient amount of water into the ground before it evaporates. That means that water windows must be longer, and larger amounts of water must be applied in order to achieve

optimal precipitation rates. The cost implications in terms of water and energy are significant.

So when The Canyons Softball Complex was on the design board, Bill Jackson, Park Planner for the City of St. George, knew that a non-traditional irrigation approach was required for all of the areas surrounding the ball fields. Subsurface irrigation was the obvious solution because water is delivered directly to the root zone — minimizing water loss due to mist, evaporation, runoff and wind. In fact, water use can be cut by up to 50% with subsurface irrigation.

In St. George, where it's common for temperatures to remain above 105° for as long as a month or two in the summer, the perfect answer was Toro DL2000 dripline with 0.53 GPH pressure-compensating emitters pre-installed at 12" intervals. DL2000 also was used on the medians in the parking lot to prevent water from spraying on cars. A total of 52,800 linear feet of DL2000 dripline was used on the project — that's 10 miles of tubing! Because the sun shines year 'round, DL2000's built-in UV protection gave Jackson the peace of mind he needed in the event that the tubing became exposed to the elements.

In the large turf areas on the softball fields, French & Associates used Toro 2001 Series sprinklers. The entire system is operated by a stand-alone OSMAC controller and two-inch 252 Series pressure-regulating valves.

Aesthetics and erosion control were Jackson's other primary concerns. Obviously, when the irrigation equipment is below grade, there is nothing to distract from the beauty of the landscape. Erosion was a very real concern with slopes around the fields at a very steep 2:1 grade. A subsurface solution meant that because water does not hit the

surface from above, it cannot take soil down the slope as it runs off, slowly eroding the landscape over time.

Jackson designed each zone according to the contours of the landscape. That meant that on the slopes he ran the lines horizontally, rather than vertically, so he could program the lower zones at shorter run times to accommodate the water that follows gravity to the bottom of the slope. This design, along with pressure-compensating emitters, has prevented any puddling at the bottom of the slopes. "Everything is green," said Jackson, "and we couldn't be happier."

The decision to use Toro products was an easy one for Jackson. Not only does St. George use Toro irrigation products exclusively, but Jackson is sold on the local Toro distributor. "The number-one reason we chose Toro was their Salt Lake City representative," he said. "They were very helpful with the design and they were here constantly over the course of the project — and it's five hours away."



A year and a half later, The Canyons Softball Complex is gathering recognition and praise from all over. The National Parks & Recreation Association named it the number-one softball complex in the country, and the softball competition for the 1999 World Senior Games was held there in October. Now the only heat that's having an effect on the field is the heat that's thrown from the pitcher's mound! ●

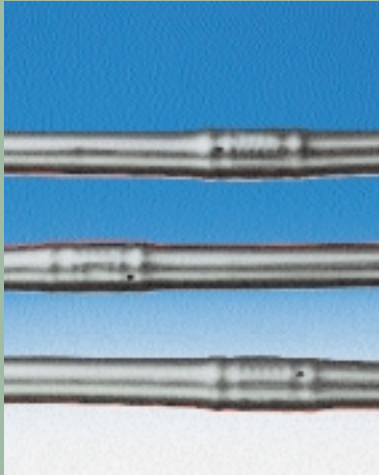
PRODUCT SPOTLIGHT

DL2000™ Series and Maxijet® Microspray Nozzles

DL2000™ Series

Toro DL2000 is the most technologically advanced subsurface irrigation system available. Through revolutionary ROOTGUARD® technology, DL2000 prevents emitter clogging while delivering optimal water application directly to the root zone.

DL2000 is perfect for odd-shaped designs, median strips, public recreation areas and residential property — any place where sprinklers don't fit the application.



Features:

- EPA-approved ROOTGUARD® protection, using the pre-emergent TREFLAN®, is non-toxic and guards against root intrusion by diverting root growth away from the emitter outlet
- TREFLAN is impregnated during the manufacturing process and requires virtually no maintenance
- DTech™ self-cleaning emitters for precise, trouble-free water application
- Flexible, sturdy design to fit into unusual spaces
- Easy to install and requires minimal maintenance
- Can be installed at grade or buried 4" to 8" underground, delivering irrigation directly at the plant's root zone
- Choice of pressure-compensating or non-pressure-compensating dripline with 12" or 18" emitter spacing
- ¼" microline tubing available in 12" spacing for small, tight areas
- Emitters are inseparably welded to the inside wall of durable polyethylene dripline tubing during manufacturing
- Withstands acids down to pH2 as well as fertilizers, chemicals and chlorine
- Two flow rates: 0.53 and 1.02 GPH
- Pressure regulators maintain a constant pressure from 15-40 PSI
- Approved fertilizers and chemicals can be added at a central inlet and flow directly to the root zone
- Distinctive red stripes on dripline signifies Toro quality



Maxijet® Microspray Nozzles

Toro Maxijet microspray nozzles provide maximum versatility with low-volume irrigation benefits. They can be used with all Toro 570 Series pop-up sprinklers, shrub adapters, risers and extenders. Now, precision water conservation is simpler than ever.

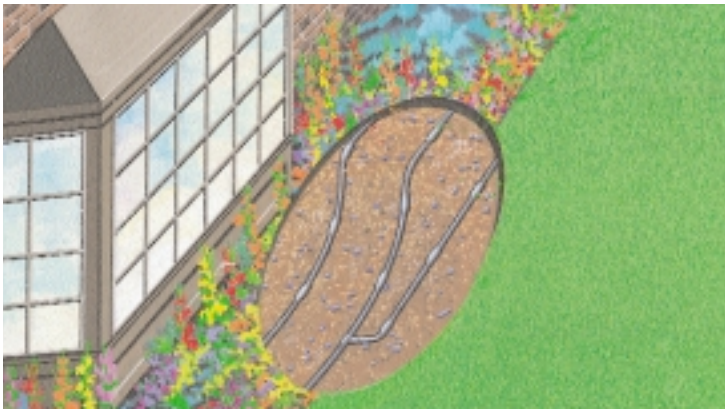


Features:

- Pre-assembled nozzle, adapter and pressure-compensating screen
- Pressure compensation provides uniform application over elevation changes and long runs
- Flush mount Top Hat design allows nozzle assembly to retract into the body (pop-up models) for added debris and vandal resistance
- Low flow rates reduce runoff in compacted soils and deep percolation in sandy soils
- Nozzles and pressure-compensating screens are color coded by GPH for easy identification
- Ideal for ground covers, flower beds and low-water-use plants
- Three radius and flow rate choices:
 - 10 GPH (blue) — 4'
 - 15 GPH (green) — 5'
 - 24 GPH (red) — 6'
- Four nozzle patterns:
 - 90° quarter-circle
 - 180° half-circle
 - 360° full-circle
 - center strip



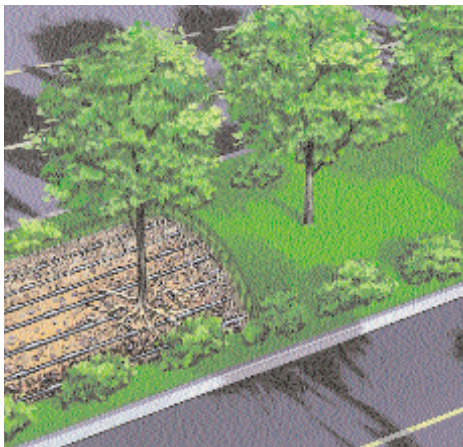
Low-Volume Irrigation (Continued from page 1)



When using above-ground irrigation, expensive walls, glass, signage or hardscape sometimes fall into the path of the spray — leading to water marks. But because there is no spray with subsurface systems, these hardscapes will not deteriorate or discolor over time.

Environmentally Friendly

Using pressure-compensating emitters to control flow variations allows the system to deliver equal amounts of water to every emitter on slopes, long lines and hilly terrain. And since irrigation takes place at or below grade, there is minimal water loss due to mist, evaporation, runoff or wind. In many cases, water use can be cut by up to 50%.



With water going right to the root zone, subsurface water application decreases the need for chemigation or fertigation to maintain the health of the landscape. This, in turn, reduces the impact of chemicals on the environment.

Safer, Vandal-Resistant Surroundings



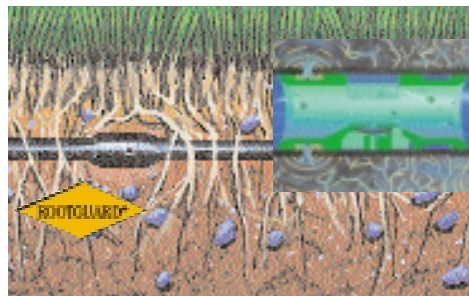
When it comes to vandalism, out of sight is out of mind. So installing low-volume irrigation below ground means there is no exposed equipment to tempt would-be vandals. And the landscape surface is free from irrigation equipment that may disrupt activities or cause injury to playing children, joggers, pedestrians and maintenance crews.

Because water is delivered at or below grade, slippery walkways caused by irrigation runoff or overspray are minimized. So potential liability is reduced while the beauty of the landscape is maintained.

While subsurface irrigation is not always appropriate for all turf and landscape areas, it is an excellent addition to traditional irrigation methods when faced with perplexing design situations.●

Solving the Root Intrusion Dilemma

Some people are reluctant to use subsurface products because they fear root intrusion and clogged emitters. But Toro has solved that problem with DL2000 Series dripline. It features patented EPA-approved ROOTGUARD® technology to prevent the dreaded root-intrusion nightmare. The pre-emergent TREFLAN® is impregnated in the emitter during the molding process and requires virtually no maintenance. There are no filters to



change. No chemically treated disks to handle. Because the TREFLAN is in the

emitter, not the tubing, this root-intrusion-prevention process is non-toxic and safe.

Once DL2000 dripline is installed in the ground, the slow release of TREFLAN creates a barrier around the emitter so that roots are directed away from the emitter opening. Even when the dripline is covered by mulch, roots can get through. But ROOTGUARD stops them in their tracks. Goodbye roots. Hello optimal water application. ●