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Concrete Strategies

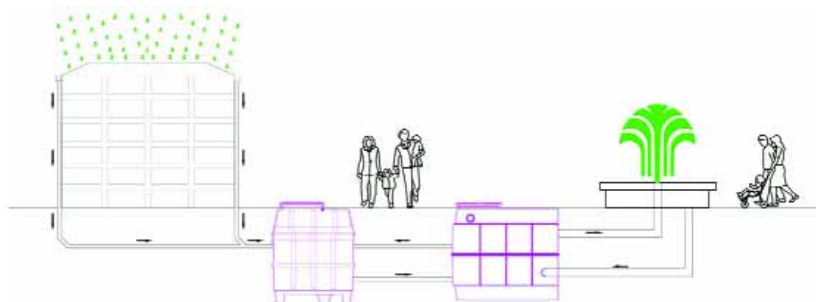
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Economy of Motion

By Eric Herman

As is true of businesses coast to coast, we at *WaterShapes* are counting the days until the economy turns around. We do so confident that economic trends are cyclical and that good times have always replaced the bad.

But this particular recession has been deeper and longer than most among us have ever witnessed, leaving many companies – including ours – to hunker down and make what we can out of thin stocks of available business. As has been suggested numerous times in the pages of our magazine, however, this is no time for rash action: Instead, we must take advantage of this opportunity to evaluate positions, sharpen skills and put even greater energy into enhancing our businesses.

In our case at *WaterShapes*, this sort of honest, careful examination of our situation has led us to a practical decision: Until further notice, we're changing our frequency and will become a bimonthly publication again for the first time since 1999. The reason is obvious: We need to find ways to stretch our resources to stay in the game until things turn around.

In considering our possibilities, we talked with dozens of people (readers and advertisers alike) and picked up two general impressions – the first being that the magazine is important to everyone, the second being that many we spoke with were relieved (and even admired the fact) that we had a sensible plan and the determination to see it through. The consensus was, above all, that we were doing the right thing.

True, this means you'll see us less frequently for a while, but as I gather from my conversations with many of you, it's far more important for us to keep going than it is for us to visit with you every month. In addition, this new schedule will give us a much-needed opportunity to focus on our Web site and on developing original content that will make www.watershapes.com a far more valuable resource.

Through all of this, you can expect the same level of quality you've always found in *WaterShapes*: It's not only that we refuse to compromise on the values that have led us to success, but also that we just don't know how to do things any other way. As we see it, the watershaping industry will bounce back soon – and it will be as a marketplace in which *WaterShapes*' orientation toward excellence will be more important than ever before.

In our recent conversations, we learned that many of you have spent the last several months wrestling with decisions of similar gravity. Like you, we at *WaterShapes* are taking pride in accentuating the positive, in celebrating the small victories and in never taking our eyes off the fact that our industry has a yet-to-be-fully-realized potential for greatness that can't be denied.

We will get through this together.



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In This Issue

May/June Writers

Skip Phillips is president of Questar Pools, a pool design/build firm based in Escondido, Calif. With more than 35 years' experience in the pool industry, he has worked tirelessly to elevate pool design to an art form while building an international reputation for excellence and innovation – particularly with respect to vanishing-edge pools. Phillips started his business in 1975 as a service/supply/repair operation and moved quickly into renovations and new construction. In 1998, he was a co-founder of the Genesis 3 Design Group, a professional community dedicated to education and excellence in pool design, engineering and construction. He has won more than 100 local, national and international design awards; has had many of his projects published in books and magazines; once served as president of the National Spa & Pool Institute; and has been an expert witness in hundreds of cases related to workmanship and standards compliance.

Patrick Simmsgeiger is president of Irvine, Calif.-based Diversified Waterscapes, an aquatic-service/chemical-manufacturing firm that works on ponds and lakes in southern California. While studying business in college, Simmsgeiger realized his true ambition in researching and developing products for use in aquatic environments and worked for 11 years after graduation for a company that produced chemicals for use in industrial, agricultural and domestic water-treatment programs. Later, he opened his own facility to produce what he called the "Formula F-Series Aquatic Treatment Products." He founded Diversified Waterscapes in 1988 and, in addition to his extensive experience in the development, restoration and maintenance of aquatic environments, is also licensed by California's Department of Agriculture as an Aquatic Pesticide Applicator and is a Certified Lake Manager.



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Randy Dukes is a consulting technical sales manager for Aquavations Corp., a manufacturer of pool-surfacing products based in Miami. Regarded among the foremost authorities on issues related to plaster deterioration, discoloration and staining, he has served as a continuing education instructor for the Florida Swimming Pool Association and Florida's Construction Industry Licensing Board and has moderated and taught numerous courses for the National Plasterers Council (NPC), the Association of Pool & Spa Professionals and the NorthEast Spa & Pool Association. Dukes is a current member of the Plaster Committee of the American Concrete Institute (ACI) as well as NPC's Education Committee and has traveled extensively across the United States and Europe identifying pool surface problems and studying their relationship to application techniques, water chemistry and chemical abuse. Indeed, during the past 17 years, he has conducted and documented more than

12,000 of these poolside inspections, which led to publication of the book *Pool Surfaces, Problems and Solutions*, now in its seventh edition. He has also produced a poolowner DVD available through the National Plasterers' Council called "Taking Care of Your Pool."

Thomas Lopez is owner of Aqua Vida Pools, a Phoenix-based pool design and construction firm serving residential and commercial clients. His interest in the pool and spa industry reaches back to his days as a skateboard enthusiast and manufacturer: Through his experiences in riding empty pools, he developed an awareness that led him to join Paddock Pools in 1991, starting in service and eventually working his way up to a role as superintendent of new pool construction. He started his own business 14 years later – and still rides his skateboard on a regular basis to perfect his moves on the half pipe.



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Aqua Culture



By Our Sides

By Brian Van Bower

The great poet and philosopher John Donne once wrote, “No man is an island” – a wonderfully simple declaration that none of us is really alone and that we all exist in a world filled with others.

There are exceptions, of course, and I’ve run into my share of loners who resist the notion that we are all interdependent on some level. But as I’ve moved through the world and have met people I perceive to be talented or successful in some way, it’s been my observation that they have substantial support systems of one sort or another.

That support may come from a spouse, a life partner, a live-in companion or a boy- or girlfriend. Or it may come from parents or siblings – or a combination of any or all of the above. As I’ve grown in my personal and professional life and have for many years enjoyed being married to my beautiful wife Gina, it has become increasingly clear to me that, for almost everyone, being surrounded by sup-

portive people is the key to success in just about every form of endeavor.

The reasons for this are myriad, but when it comes to being in business, I can think of nothing more affirming and reinforcing than having another person (or other people) beside you who appreciate what you do and how capable you are. And I’d say this is particularly true in creative fields such as watershaping, where you’re called on to be courageous in developing fresh ideas and confident in presenting them in what can be a cold, cruel world.

better or worse

One thing we’re often hearing in the media these days is that tough economic times are taking a toll not only on our professional lives, but also on couples and families in ways that can compromise or even destroy these key relationships. That’s both predictable and sadly ironic, because it’s exactly in tough times, when the world at large is treating us harshly, that support at home is more important than ever.

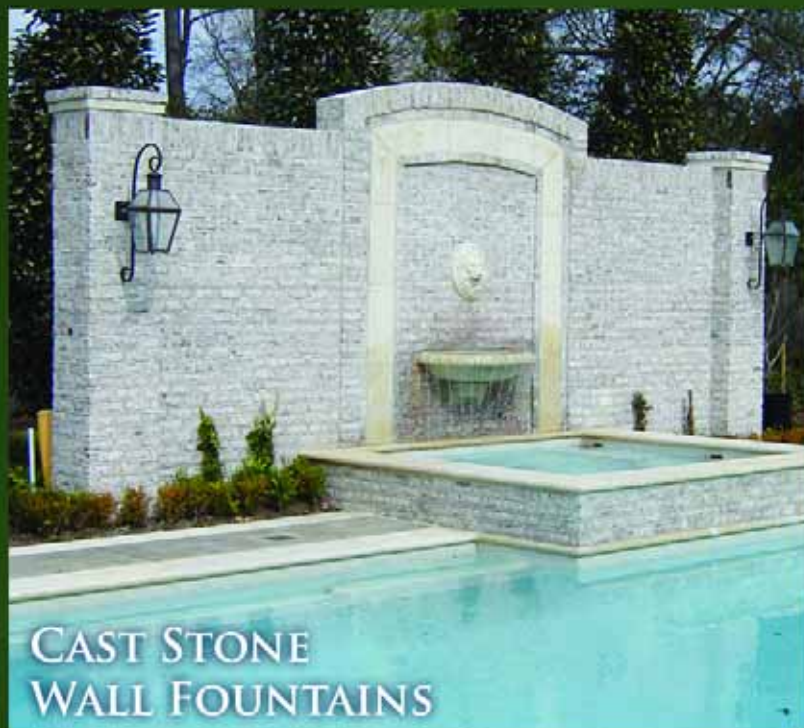
But we can’t blame current events for what happens in our lives: Ultimately, each and every one of us must take responsibility for the status of our relationships. When times are tough, it’s up to us to maintain and nourish our support systems, our “inner circles,” as never before.

I’m not a marriage counselor or a family psychologist, and I would never suggest that anyone should stay in a bad relationship for the sake of some abstract ideal. Rather, I’m suggesting that all of us can benefit from stepping back and routinely taking stock of the value of the people around us and pausing to appreciate how much they contribute to the richness of our lives.

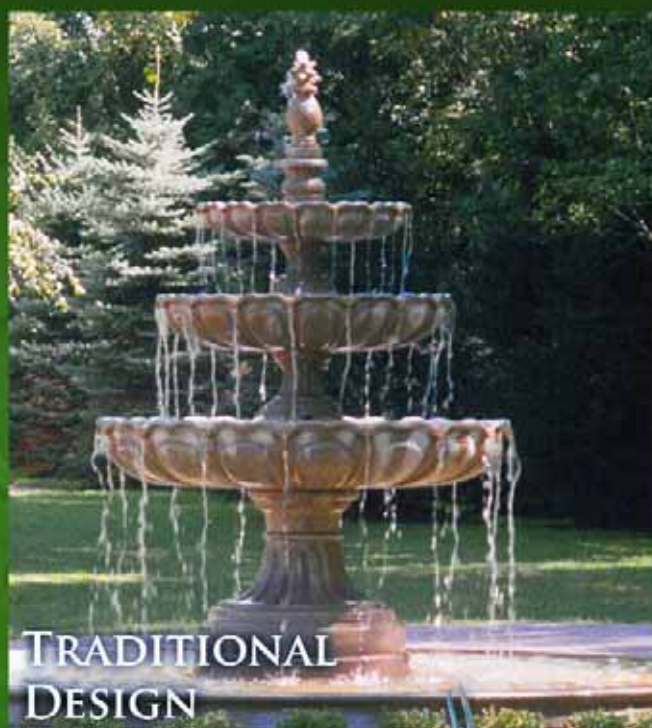
In this way, I think we continuously define for ourselves the value of the support structures from which we benefit and do what it takes to protect them from the corrosive influence of times like these.

My sense is that it’s just human nature to want somebody to be there and listen as we express our hopes, ambitions and dreams – and, when we’re troubled, to help us celebrate our accomplishments and move beyond setbacks and even failures. On that level, I might even say that there’s little point in striv-

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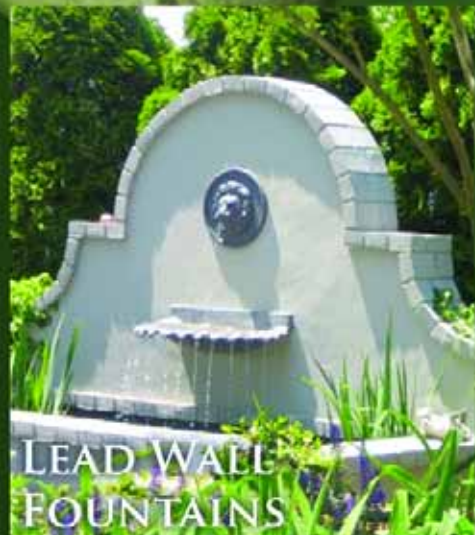


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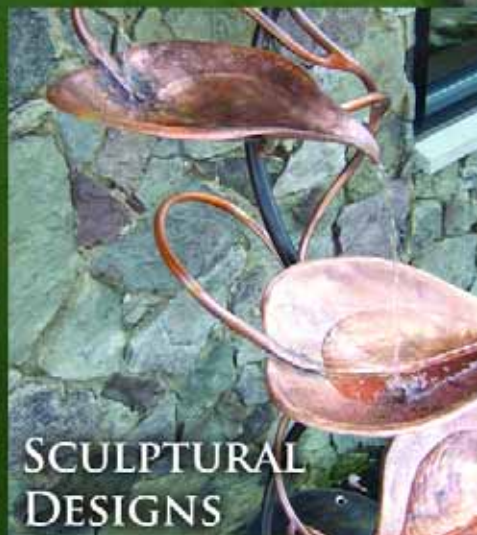
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ing and accomplishing unless you have people around you who appreciate what you're doing: What's the fun of living in a mansion on the hill if you're always alone in it?

In all of this, of course, it's important that the people around you are indeed supportive: If you've ever been in a situation where your spouse or a parent demeans your accomplishments and won't share your trials and tribulations in a positive, supportive way, then you know how difficult it can be to keep moving forward and preserve your own positive outlook.

In that case, those who say they'd rather be alone are probably right, at least in the context of their life experiences. But to me, that's a much harder path to follow.

where it's due

I wouldn't begin writing a column on this subject without acknowledging that I couldn't come close to doing what I do without Gina. I'm happier than I've ever been, and it's also not lost on me that although I was successful in my career *before* we came together, in the amazing years since she entered my life I've seen my working life evolve in ways I couldn't have imagined.

What Gina has done for me, as is true I'm sure of other great partners, is that she's helped me establish a life and lifestyle that encourages me to pursue my best potential. She's done it through encouragement, good humor, involvement in my business and bushel-baskets of patience.

Through the years, my career has developed in ways that have led me to travel quite a bit to meet with clients, evaluate sites and participate in construction management (not to mention trips associated with Genesis 3). This puts me on the road an average of seven to ten days each month – that's a tremendous amount of time in a year, and while I bring Gina along on several of these trips, there are many times when I'm on the road and we're apart.

I know from conversations I've had with others who travel this much that there are many relationships that don't bear up so well with all of that separation and that maintaining equilibrium is a real challenge. These people have told me all too often that this means heading out on the road with anxiety or misgivings – and often to com-

ing home to less-than-warm welcomes.

By contrast, I'm extremely fortunate in that Gina recognizes and appreciates the importance of travel to what I do, and she supports me in ways that enable me to leave home knowing that she'll be happy to see me and looks forward to hearing how things went. Every time I leave, in fact, I'm thankful knowing that if the opposite were true and Gina *didn't* see the importance of my going on the road, well, travel and everything that goes with it simply wouldn't be possible.

(This, of course, doesn't mean that she wouldn't prefer it if I was home more; rather, it's that she understands the importance of my travel.)

It's important as well to bear in mind that all of this about travel and separation and patience is only one of the areas

because it's difficult to speak for someone else on such a personal topic): There was a time in my career when public speaking was new to me. Although I've since come to enjoy being in front of an audience, I was *not* comfortable at first, not in the least. Back in those days, I was in a different marriage in which I did not feel support – and in fact had the feeling that my failures were the source of some perverse spousal pleasure.

I won't venture further into that dark territory other than to say her attitude made branching out into new areas infinitely more difficult than it might have been had I felt secure at home. And now, having had the experience of trying new things in the context of a profoundly supportive relationship, I can say without reservation that it makes an enormous difference.

Relationships work both ways – especially with respect to support and acceptance – and that's amazingly important for those closest to us.

in which I feel supported: When I'm home, for example, the day-to-day rigors of my work can keep me busy for long hours – commonly well into the evening. I'm not alone in this: For those of us who have understanding spouses or partners who don't resent the time we spend at work, we're unencumbered and can keep up with the pace of our working lives.

keeping it right

When I see other couples and families and have the chance to observe how they operate, it soon becomes clear which are working on the basis of support and which ones aren't.

It's tough to say exactly what it is that shows through – everyone's different, of course, and I've also found that the second I think I have someone figured out, that's when I'm in for a surprise – but with people who have support, there seems to be a tendency to take chances and move into areas beyond their immediate comfort zones.

To illustrate, let me refer to my own developmental path once again (basically

And of course it's a two-way street: In seeing the value of my current support system and in understanding the joy, power and importance of giving to others so they can lead happier lives, it is incumbent on me to return the favor and support Gina to the same extent she supports me.

It's also incumbent upon high-energy creative types to offer that support no matter what the other people in our relationships do. If those who support us aren't directly involved in what we do, it's possible their work won't be as stimulating and passionate as ours. It's important under those circumstances to keep things in perspective, avoid becoming self-absorbed and do all you can to honor and value what they do to the same extent they honor and value what we do.

Just because some jobs are not as sensational as others does not mean the work has less meaning. Hard work of any sort should be supported, whether it's maintaining the company's books (as Gina does) or taking care of the kids full-time. Consider where you might be without that effort, without that constant support – or

what it would mean in your life if *you* had to make sure the kids were fed, dressed and delivered to school on time all by yourself.

Whatever the situation, you must give as good as you get: Relationships work both ways – especially with respect to support and acceptance – and that’s amazingly important for those closest to us.

wider circles

As suggested above, networks of support are not necessarily limited to family members alone. Family may be the core, but it’s also important to recognize and appreciate the kinds of support that arise beyond the home.

There was a time (not all that long ago!), for example, when I viewed the profession of watershaping as primarily a solitary activity. Yes, I had some friends in the business and in the community, and there were always people I worked with in my own companies, but there was a notable lack of broader connections.

That changed for me in a big way when David Tisherman, Skip Phillips and I started Genesis 3 a dozen years ago. It was clear from the start we were not alone in our desire for enhanced professional education or for a sense of affiliation with like-minded people in the trade. I don’t think we quite recognized the latter potential at first, but since then it’s become abundantly clear that we and others were bent on developing a community of watershaping professionals.

Time and time again, I’ve been told that for all the value we provide in our programs, the sense of family that develops (not to mention the friendships and even partnerships that form) has an even greater value. Often it starts out small, with one person asking another for advice on a technical challenge. In so many cases, these basic contacts develop into something more valuable than anything that’s picked up in a classroom.

So now when I pack up, say goodbye to Gina and head off to a Genesis 3 event, I’m excited to renew business acquaintances, but I’m also getting ready to visit with friends – some of whom I’m certain I’ll be in contact with for the rest of my life. And I know I’m not alone in this, as I hear stories about people who end up forming partnerships or joint ventures, whose fam-

ilies travel together, who commiserate about challenges and share successes.

I don’t know how common it is to find so much camaraderie in organizations such as this, but in my case and others I’ve come to know through Genesis 3 and my association with *WaterShapes*, the value of these contacts and relationships is immeasurably vast.

reaching out

Support of the sort I’ve discussed here can be found in any number of places – in a family, in a community, in professional circles and more. I happen to have found what I need at home and consider myself sublimely fortunate to have encountered it in a professional context as well.

And it’s not just about watershaping, as I’ve found support in other areas as well – particularly with respect to food and wine, my other great passion in life. This brings me to a last point I want to make: You can find your support systems in any

number of contexts, whether it’s in the culinary arts, some sort of sporting activity, a hobby, a social cause, church, school activities or politics.

The key is to recognize that those opportunities are out there – and that you have to be open to them and at times active in seeking them out. As well, you have to be prepared to give back the support you receive and to do so without expectation or condition.

Truly, the more we share, the more we have. The more we give of ourselves, the more we become. **WS**

Brian Van Bower runs Aquatic Consultants, a design firm based in Miami, Fla., and is a co-founder of the Genesis 3 Design Group; dedicated to top-of-the-line performance in aquatic design and construction, this organization conducts schools for like-minded pool designers and builders. He can be reached at bvanbower@aol.com.

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On the Level



Water Woes

By Bruce Zaretsky

I've expended lots of ink in recent issues extolling the virtues of good water management, but that's nothing new: Through the years, in fact, I've written copiously about the need for conservation and sensible stewardship of the most precious of our natural resources. And this all makes sense, given both the needs of our society and the fact that we who read and write for *WaterShapes* all derive some portion of our livings from the work we do with water.

On those levels and more, water may be seen as our enduring friend. I must add, however, that water also has a distinctly dark side and can turn on us when we least expect it, becoming unwieldy, unruly and occasionally devastating. This is why in speaking with clients I always make the point that water must be watched carefully because it can alter its behavior in the twinkling of an eye.

With that in mind, I thought it was about time to balance the scales of my column a bit and consider water's flaws, warts and downsides while offering some suggestions about what can be done to address these issues in the field.

In speaking with clients I always make the point that water must be watched carefully because it can alter its behavior in the twinkling of an eye.

aquatic demons

You don't have to think too hard to come up with instances in which the presence of water is a bad thing.

Take a situation in which so much rain falls so quickly that drainage swales and storm sewers can't handle the resulting flow. Especially in areas that are usually dry or have experienced wildfires that have denuded the land of vegetation, too much water in the form of rain can be disastrous: Landslides, overflowing streams, raging rivers and collapsing homes are the sometimes deadly consequences of too much of what is ordinarily a good thing.

Those possibilities alone are enough to make me wary of building watershapes in flood plains or on improperly cut, inadequately engineered grades, and that's as true on a small scale as it is on a mass scale. Indeed, even relatively small projects are subject to the forces that rise with improper water management, and the results will range from flooded basements or collapsed retaining walls to "popped" concrete pools.

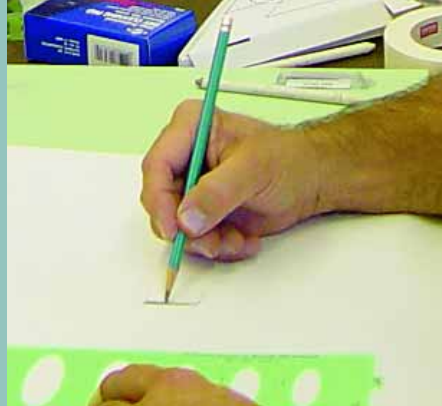
In this context, our ability to control water and bathe its dark side in bright light is paramount to our projects' long-term viability and client satisfaction.

I'm aided in writing this column by the fact that I've worked to counteract water problems for most of my adult life. While employed by a large landscape firm early in my career, in fact, I spent two years doing almost nothing beyond resolving water problems our company's work had caused on project sites. Most of the time, the issues amounted to little more than figuring out what to do with water standing where it was not welcome—common problems, seldom a big deal, but always something that had to be dealt with effectively and permanently.

What I observed through the bulk of these incidents was that they mostly stemmed either from improper grading—that is, there wasn't enough pitch to allow the water to drain away—or from construction or insertion of obstacles to drainage without making any allowance for the removal of the water they effectively trapped.

Although in most of these cases there was never any worry about catastrophic failures, I soon learned that no client wants a pond where none was intended. Just as quickly, I figured out that annoyance will turn to anger if the water stands on clay soils and lasts long enough to breed mosquitoes or start to stink!

As I've always preached to my own employees, "We're only



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as good as our worst details” – so even if a project is worthy of publication and awards, that puddle sitting just out of view in those amazing photographs is the feature on which your client will focus as long as it’s there.

On a more worrisome note, the retaining wall that has been set up without a proper drainage system behind its base may not collapse right away (although I’ve written here about one that started to tumble almost immediately), so you can rest uneasy knowing that, someday, hydrostatic pressure or frost heave will do its work and the water you failed to remove will be the obvious (and legally entangling) culprit.

elegant solution

Truth be told, in almost all such cases the solutions are simple. In virtually *every* case, in fact, the use of a French drain will solve the problem. This is why I’ve installed these drains as my fail-safe solution for drainage issues for the past three decades: They’re easy to install, require use of no large equipment (depending, of course, on the site) and can carry *significant* amounts of water.

For clarity’s sake, here’s my definition of this feature: A *French drain* is a trench lined with geotextile into which a perforated pipe has been inserted at the bottom. This pipe is pitched in such a way that the cap-

What’s true with retaining walls is just as true with home foundations or the footings or foundations of structures we build in the landscape. The key in all cases is to give water a path of least resistance – and get it out of there before it can do any damage!

tured water will exit the trench, which, once the pipe is placed, is then filled with crushed (or washed) stone before being covered with more geotextile. This fabric cover may then be topped by soil, mulch or more stone, and if you’re creative, it can be designed to appear as a dry creek bed or landscape feature.

These French drains come in all sizes and incarnations, but in most residential projects they will include trenches that are nominally 18 inches deep and wide with a minimum one-percent pitch. (A greater pitch is preferable, but even if some water ends up sitting in the pipe, that’s far better than having it sit on the surface!)

Once the trench is cleared, we unfurl a six-foot-wide roll of heavy-duty landscape fabric along the length of the trench, fitting it to the bottom with the fabric climbing both sides and holding the excess in place on both sides to keep it from

falling into the trench. We then position a four-inch-diameter, pre-sleeved perforated pipe (that is, a perforated pipe with a fabric sock already on it) in the bottom of the trench, fill the trench to within about two inches of the top (usually with a #2 stone) and fold the fabric over the stone to create a drainage envelope.

With larger-scale challenges, we’ll double the size of the trench and use multiple pipes. We’ve even set up multiple trenches, placing them in parallel a set distance apart from each other to layer the approach. In all cases, our goal is to displace the surface water, move it below grade and keep it both out of sight and harm’s way. On whatever scale, French drains do a fantastic job of removing water, even in situations where the ground would otherwise be consistently saturated and squishy.

Earlier, I mentioned a column I wrote years ago about the quick failure of a new retaining wall. While there were many issues with that wall (including poor base preparation and insufficient tiebacks), the immediacy of the failure was the result of improper drainage behind the wall compounded by the fact that additional water was being introduced behind the wall via pipes tied to the home’s various downspouts.

This project would inevitably have failed as a result of the first two flaws just mentioned, but I have little doubt that the segmental wall system would have lasted a good while longer than it did had it been equipped with a well-designed and properly installed French drain.

In fact, if you look at the schematics supplied by virtually all of the manufacturers of these wall systems, they all specify installation of a perforated pipe at the bottom of the back of the wall along with landscape fabric and a backfill made up of crushed stone – in other words, a

Fancier Fixes

In recent years, a number of manufacturers have come up with novel solutions that make the insertion of remedial drainage systems easier than ever before.

One I particularly like (and often use) is the Multi-Flow System offered by Varicore (Prinsburg, Minn.). Whereas the traditional perforated pipe used in French drains has a four-inch diameter, Multi-Flow is a stack of one-inch pipes welded together. One product, for example, includes five one-inch pipes stacked and wrapped in fabric: The entire unit carries lots of water, but it’s only six inches tall and just a hair more than an inch wide.

The great advantage here is that, instead of having to create a wide, deep trench that typically involves bringing in an excavator or backhoe, these stacked pipes can be installed using a simple four-inch trencher in a furrow the manufacturer recommends backfilling with coarse sand.

Especially for retrofits but also in new construction, the use of this system can result in major cost savings in labor as well as site restoration – particularly where access is an issue. In addition, the supplier makes fittings that tie the product into four-inch piping systems in the event you’re working with existing pipe or need to tie into laterals coming off downspouts.

– B.Z.

French drain. And this is true whether the walls are to be five or fifty feet tall.

And what's true with retaining walls is just as true with home foundations or the footings or foundations of structures we build in the landscape. The key in all cases is to give water a path of least resistance – and get it out of there before it can do any damage!

high-water marks

While this column started out as a discussion of just how problematic water can be, it has mostly turned out to be about solutions, with French drains earning the lion's share of the attention.


There's a reason for that spotlight: We've successfully used French drains to completely dry out properties, to keep water from ever getting anywhere near the top of a retaining wall and, in a number of cases (including my own backyard), to keep a pool's liner from floating when confronted by high groundwater.

No client wants a pond where none was intended, and annoyance will turn to anger if the water stands long enough to breed mosquitoes or starts to stink.

We indeed have a fairly high water table on our lot. For the first several years we were there, the ground would thaw, the spring rains would come and I'd pull off the pool's winter cover only to find a floating liner. This didn't particularly bother me, but it was a hassle pumping out the water and resetting the liner.

After a few years I'd had enough of this and decided to install a French drain around the perimeter of the pool, running it to a drainage crock that pumped the water to a culvert in front of our home. The liner never floated again.

As I mentioned, a problem like a floating liner is never a cause for panic, whether my company caused it or not. For me, being called to a site to review and solve wa-

ter problems is all in a day's work and gives me a great deal of satisfaction. And just between you and me, it's nice once the problem is solved to be hailed as a hero by our clients, even if the solution usually involves nothing more than inserting a French drain where it probably should have been in the first place. 

Bruce Zaretsky is president of Zaretsky and Associates, a landscape design/construction/consultation company in Rochester, N.Y. Nationally recognized for creative and inspiring residential landscapes, he also works with healthcare facilities, nursing homes and local municipalities in conceiving and installing healing and meditation gardens. You can reach him at bruce@zaretskyassociates.com.



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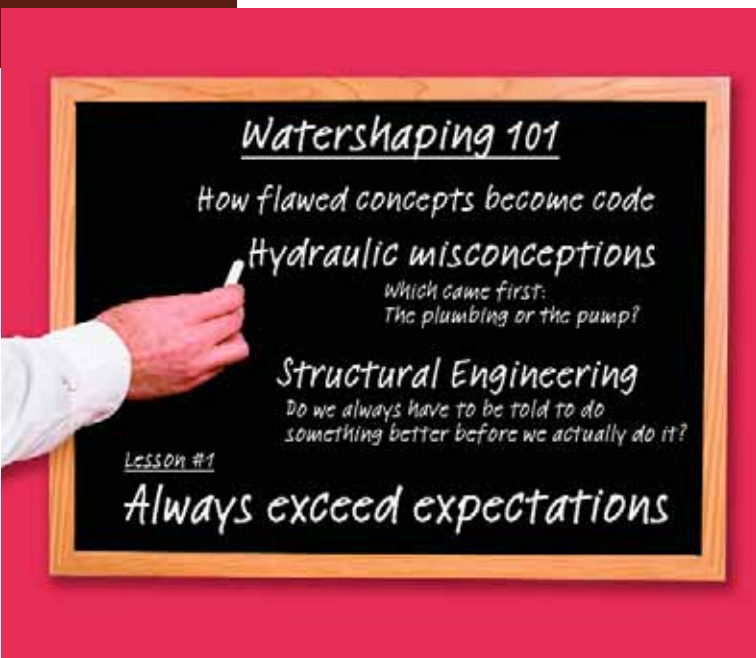
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Personal Standards

By Dave Peterson

During the past year, I've had the pleasure of teaching hydraulics to watershapers in a variety of classroom settings. It's been exciting, believe me, particularly because of the eagerness of the students and their hunger for good information.

These courses, which have been presented under the auspices of Genesis 3, ask a lot of the students who sign up for them. Especially given the tight economy, I find it enormously encouraging that so many people are focused on spending the time and energy required to improve their skills and raise their levels of expertise.

At the same time, unfortunately, my classroom experience has exposed me to some misguided ways of thinking and leads me to conclude that the watershaping industry hasn't done a particularly good job through the years in reaching its practitioners with core technical education.

In many cases, the people attending my classes have spent years or even decades in building pools, spas and other watershapes.

Of all the observations I've gleaned from my classroom ventures, perhaps the most significant have to do with my growing understanding of the impact codes have on watershapers' daily lives.

With distressing consistency, however, they tell me that their education in hydraulics – which is about as fundamental to watershaping as any discipline can be – has almost entirely come to them in the course of listening to sales pitches from suppliers or their representatives.

Frankly, the idea that so many watershapes are being built by people who don't really understand basic hydraulics other than from product-specific standpoints is quite sobering. By the same token, seeing that so many want to change and grow is most encouraging!

reactive or proactive?

Of all the observations I've gleaned from my classroom ventures, perhaps the most significant have to do with my growing understanding of the impact codes have on watershapers' daily lives.

At any given time somewhere in this country, you'll find small groups participating in the writing of these codes, which are meant to define standards to be met in all phases of design, engineering and construction. I myself have been involved in such efforts in the past, and I've always been interested to observe the agendas (sometimes masked but often quite obvious) of those at the table with me.

Often, for example, there will be someone who wants to devise standards that favor certain types of products or certain common practices – and all too often they will carry the day, if only because their ideas are sharply defined, well packaged and easily adoptable.

The result is, in my opinion, that all too often our standards are either manifestly flawed and plain wrongheaded – or that they fail to reflect optimum conditions in favor of products or practices that dwell on the fringes of acceptability.

Back in November 2008, for example, I wrote my "Currents" column in *WaterShapes* about codes emerging from the Virginia Graeme Baker Act. If you'll recall, I described numerous instances of absurdly inadequate, contradictory and in some cases self-serving concepts that had little to do with protecting anyone from suction entrapment. It was a case

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where flurries of rules were making things worse, not better.

I won't revisit that swamp here, because there are many other examples that affect every pool and spa built these days. Take, for instance, the six-feet-per-second maximum velocity for suction-side plumbing – a standard set both for safety and hydraulic efficiency. As I see it, standards such as this are not unlike speed limits: They represent allowable maximums, and to exceed them at all involves breaking the law.

So why on earth would anyone ever use the six-feet-per-second threshold as a design standard? I know lots of people do, because I see so many of them in my classrooms. And the thinking apparently has it that the standard is what might be termed "best practice" when in fact it is nothing more than what is *minimally* acceptable. The problem is, if you use the standard as a design criterion, you essentially leave yourself no leeway, no

buffer against "breaking the law."

I preach instead that you should never aim above a four-and-a-half-feet-per-second velocity on the suction side. With that as my target, I'm comfortable with six feet per second being the minimum standard – and I understand that if I really want to optimize system performance and safety, four-and-a-half feet per second is better.

This gives me the room for variation that comes only from having leeway if I must exceed my own standard. If, for example, the pump I select isn't exactly optimal for the application and I end up with a velocity of *five* feet per second, the system will still function well within the limit. If, by contrast, I've designed right up against six feet per second, then I'd find myself in violation of the code.

application driven

Here's another hydraulics-specific example of the thought processes I'm ad-

vocating: In my work in the classroom as well as the field, I'm startled to discover how many people think they should select the pump *first* before developing any other part of a design. In fact, the way you really should work is to make pump selection the *last* step in developing a circulation system.

This is generally a sign of rote behavior: You pick a one-and-a-half-horsepower pump simply because that's what you've always done – and then you size the plumbing and develop various system features based on the pump's performance.

It should go the other way around: The first thing you do is establish a flow rate based on turnover, the performance requirements of a desired water effect, the desired flow over a vanishing edge or the constraints of some other form of water-in-transit detail. Thus, you start with the performance needed for *X* gallons per minute, then design your plumbing to handle that flow rate, then calculate the total dynamic head of the plumbing system. *Only* with the flow rate and head loss numbers in hand should you go about selecting a pump.

Why would you do it in any other sequence? Effectively, this makes the pump selection the driver of the design, which is a case of the tail wagging the dog, big time. Not to offend, but it's plain silly to think the design should respond to a preselected pump size.

The key here, I tell my students, is to remember that just because we've always been told something is true does not make it so.

As another example, I was discussing weirs in one class when a student expressed the belief that the size of the body of water in surface area has an influence on the performance and size of the weir. What this means, I suppose, is that if you have a two-foot-long weir on a 200-square-foot body of water, it is somehow different from a two-foot-long weir you'd place on a *two*-square-foot body of water.

It wasn't the first time I'd heard this nonsense, and I felt compelled to explain that, within the surprisingly complex dynamics of water flowing over an edge,

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the size of the body of water doesn't really have anything at all to do with it. It doesn't matter if the weir is on Lake Tahoe or on a bathtub: The size of the body of water is so *completely* irrelevant to the performance of the weir that it's not even part of the equation.

When I gently pressed this student on how he came by the information, he acknowledged that it had come from another pool builder who had presumably picked it up from someone else.

This is just one tiny example of the misconceptions that permeate our industry. The sad thing is, these misconceptions often get written into codes, thus reinforcing the flawed thinking and driving people's practices in a direction in which technical correctness is completely absent.

grounded thinking

And of course, these issues are not at all limited to hydraulics, with structural engineering being another area where inferior or flat-wrong assumptions manage to find their way into the code books.

In Florida, for example, concerns over groundwater and its ability to pop pool shells out of the ground have led to development of standards for shell thickness – the idea being that the sheer weight of the shell will counteract hydrostatic pressure. Well, that might or might not be the case, depending on site conditions.

A better approach would be to write a requirement that, as part of soils analysis, there should be a determination of the nature of the groundwater and that the structure and other features of the design must be developed with the site's specific conditions in mind. Such an analysis will tell you whether the situation simply calls for a hydrostatic-relief valve – or for the use of a bed of crushed rock and a complete dewatering system.

To think that a one-size-fits-all standard can be devised to deal with something as variable as groundwater is simply absurd, but that's what has happened in Florida.

I point out to my students that this is just a limited example of a much bigger problem – that is, the widespread belief that swimming pools can be properly

designed without a soils report. I've run into numerous situations where assumptions about soil conditions are made based on "prior knowledge" of the area – and sure, that might work occasionally, but there is no question that it might also be insufficient and lead to disaster and tens or even hundreds of

thousands of dollars' worth of remedial work.

In an industry that builds concrete structures designed to hold water indefinitely, it defies logic to think you can guess successfully every time and get by without knowing specific soil conditions. Yes, on occasion a report



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will indicate a course of action that might make the cost so prohibitive that an otherwise good project will be cancelled – but isn't outright cancellation preferable to months or years of litigation and/or remediation?

Following that line of thought, what's the harm in exceeding structural recommendations in favor of creating reliable watershapes? I ask this in view of the ongoing debate about compressive strengths of concrete between those who advocate a 2,500 psi standard versus those who support a 4,000 psi standard. As I understand it, the 4,000-psi target results in stronger structures that are less permeable and less subject to the corrosive influence of groundwater wicking into the structure – so why is there any question about which way to go?

It all boils down to this: Do we really have to be told to do something before we do it, even if it's obviously better? If 2,500 psi concrete is the minimum standard, is there any possible harm in shooting for 4,000 psi?

take charge

My point here is that each of us must set his or her own standard for excellence. In this process, we can be informed by codes and industry benchmarks, but we shouldn't let observing minimums or hand-me-down practices determine how we work. Instead, we should consciously strive to observe standards we know will create outstanding end products.

As I mentioned above, I'm encouraged that so many people are investing in education – even in these difficult times – and have a clear sense that what they need is good information to help them define their work practices. There is little doubt that, when things turn around, these people will be ready to make the most of the upswing. In fact, if there's any silver lining in the pressure we're all under right now, it's that tough times elevate our appreciation of true value and give us opportunities to recalibrate approaches and critically evaluate common wisdom.

Those of us who base our work on real

value will be among the best prepared to meet the demands of clients who want reliable excellence in exchange for their dollars. To exploit these opportunities – which are surely out there – we must first shift our thinking and embrace the idea that we can and should *far* exceed the least that is expected of us. **WS**

Dave Peterson is president of Watershape Consulting of San Diego, Calif. He's been part of the watershaping industry since 1994, starting his own firm in 2004 after stints with an aquatic-engineering firm and a manufacturer. A registered civil engineer, he now supports other watershape professionals worldwide with design, engineering and construction-management services and may be reached via his web site, www.watershapeconsulting.com.

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Perfected **in** Place



California's Skip Phillips has been a vocal advocate for excellence in swimming pool design, engineering and construction for the past two decades – and through the past three years has pressed his point far away from home, collaborating with Canadian builder Gene Brown in producing watershapes that exemplify what he calls true excellence in construction and, from his perspective, show just how good watershaping can and should be.

By Skip Phillips

One of the great things about watershaping is how the work can lead you to unexpected places where you sometimes encounter vastly different ways of doing things.

In the past few years, for instance, my design work has led me to design a number of projects in the great open spaces of western Canada – many of which have been built by Gene Brown of Valley Pools in Kelowna, British Columbia. Working with this true professional has taught me a great deal about the precision and power that comes in using poured-in-place concrete as a medium and, as a result, has greatly influenced my thinking about how watershapers everywhere should strive to elevate their own standards of construction.

My northward migration began with small steps. In fact, I started off with Valley Pools simply as a consultant for hydraulic and mechanical issues, exchanging plans with Brown and helping him ensure the functionality of some of the more complex systems he found himself doing. At first, I did little more than flesh out the plans mechanically, but I couldn't help noticing that he was finding some interesting projects – and

also observed that he was one of those watershapers who had completely dedicated himself to excellence in all facets of the work.

Our usual exchanges were set aside, however, when one day he sent me a set of plans that had been produced by an architect in collaboration with the homeowner: The house was extremely interesting, but the pool was ghastly – wrong in style, wrong in scale, wrong in placement, wrong in every way possible. I immediately offered to travel to Canada and revise the approach, basically because I couldn't justify doing the hydraulic and mechanical plans while ignoring the hideousness of the design.

The owner flew me up and, after we toured the site and looked at the house, I offered a set of sketches that would eventually become the pool. From that moment, I started working with Brown to create complete designs he would build for upscale clients in his region.

Canadian Character

I started making trips where we would meet with three or four prospective clients each time, and our batting average was great: Every clutch of meetings tended to result in two or three contracts.

Along the way, I learned a lot about what was to me a wholly different marketplace in which homeowners tend to be less impulsive than I've known them to be in southern California, where I've designed and built pools for more than 20 years through my company, Questar Pools & Spas in Escondido.

The Canadians take their time making up their minds on design details, and I quickly learned that multiple meetings can be involved before the green light flickers to life.

That endemic cautiousness extends to the way work gets done in Canada: The people I've teamed with are extremely methodical and deeply concerned about doing things right the first time, and there's nothing grating or confrontational about it. Through it all, everyone seems to stay gracious and forthright, and they don't seem much interested in the sorts of drama I'm familiar with in, say, San Diego or Orange Counties.

Of course there are exceptions among



the clients, but I can say without fear of contradiction that Gene Brown is the perfect embodiment of this calm professional ethos: He's careful, deliberate, courteous and committed to getting things right on the first try. It also helps that he's an accomplished designer in his own right but has let me know that he feels more comfortable with me tackling the design work while he handles construction.

Personally, I couldn't be happier with this arrangement, not only because he's a builder of the highest possible caliber who pays the closest possible attention to the smallest details, but also because he's a thoughtful person who sits back and listens and then asks lots of direct, insightful questions that tend to clarify key issues.

Make no mistake: As reserved and modest as Brown and many of his clients may be, some of the projects we've done together are anything but understated: British Columbia is a mountainous region filled with spectacular views, and a great many of the pools we've created have been cantilevered off steep lots and include complex water-in-transit systems.

These are, in short, the kind of projects you want built only by the best of the best.

The biggest revelation that's come out of my Canadian experience has been the firsthand view I've gotten of what quality formed- and poured-in-place concrete construction is all about. In observing the attention Brown and his crews pay to detail and the precise way they form and waterproof their shells, I must say that I've witnessed an entirely new and different standard of construction that exceeds what I'm familiar with in shotcrete.

Indeed, his structures are built so accurately that tile installers don't even have to float the tile to achieve perfect level – *that's* how precise these structures are when he removes the forms. The only other place I've seen this zero-tolerance construction is in commercial projects with "tilt up" concrete structures or in freeway bridges. It's definitely not anything I've ever seen with residential swimming pools!

POURED IN PLACE

One of the key characteristics of poured-in-place structures in general is that it's possible to achieve extremely high compressive values in the concrete. Not only are they incredibly sturdy, but they also prevent water from seeping through the concrete, essentially mak-



The construction processes followed with poured-in-place concrete allow a measure of precision that is much harder to come by when using pneumatically applied material – a wonderful advantage when it comes to executing rectilinear designs and all-tile finishes because the walls are so amazingly clean when the forms are pulled.



ing them impermeable.

In Brown's case, he uses mix schedules that easily allow his shells to reach compressive strengths of 5,000 pounds per square inch or more. And once poured, the material is vibrated into place to achieve complete coverage around structural steel. When the forms finally come off, what you see is a low-tolerance structure that appears finished.

With this sort of construction, certain issues are easy to handle. There have been situations, for instance, in which we've excavated to find competent, load-bearing material and have had to go down ten feet or more. Instead of having to resort to piles and grade beams, it's not a stretch using Brown's poured-in-place methods to decide to insert a simple room below the pool to serve as an equipment or utility room that will be as solid as a bomb shelter.

The construction process entails two or more phases, depending on the structure's design. Typically, the first involves pour-



While linear designs are perfectly suited to poured-in-place applications, these techniques also produce fantastic results with all sorts of tight curves or dramatic sweeps. It's all about sophisticated, careful forming – and having crews on hand who know how to achieve ultra-tight tolerances no matter whether the shapes are linear or radiused.



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ing the support structure and/or the pool's floor, using the ground as the form. It's not unusual for these floors to be two feet thick or more, largely because they need to resist damage from the freeze/thaw cycles experienced locally.

With the floor in place, the crews come back and build forms for the walls. In these free-standing structures, both sides of the walls are precisely formed using sturdy plywood and two-by-four construction – which means that all of Brown's pools are over-excavated to accommodate the exterior forms and supports and that the voids must later be carefully backfilled and compacted.

Brown's crews spare no expense and spend ample time in the forming process: Every single detail is established to the dimensions called out on the plans, with zero tolerances on all levels. Even before the concrete is poured, the forms themselves give the impression of tremendous strength and exactitude. And when the forms are stripped to reveal that concrete shell, what you see is virtually flawless, with nothing needing adjustment or reworking.

I've been at it for a long time, and I have to admit that I've never seen anything approaching this level of precision or perfection in a shell done with pneumatically applied concrete, no matter the expertise of the applicators or the perfection of the mix. In a word, it's *impressive*.

As a designer, I know in working with Brown that whatever I represent on the plans will be accurately built in the field. I can't tell you how liberating and encouraging that is when it comes to specifying such details as perimeter overflow gutters or vanishing edge dam walls or catch basins or steps or shallow lounging areas – features that almost all of my projects with Brown have included because I know they will be built correctly and perform as required.

Opening Up

Through the years, I've spent a considerable amount of time acting as an expert witness in lawsuits over failed pool structures. In many of those cases, I've observed that the design and plans are fine but that the builder has failed to construct the shell accordingly and that the



level of workmanship has at times been truly appalling.

In working with Brown, I rest assured each and every time that those sorts of worries are as remote as can be. And where his skills free me up to design as I see fit and the site requires, what I appreciate most of all is the intellect he brings to the process and the degree to which he thinks things through in detail and anticipates and accommodates issues before construction begins.

Most of the projects we've done together have been contemporary in terms of design, basically because so many of the architects working in the area are modernists who prefer to work in rectilinear forms. But when a pool design calls for sweeping lines and complex radiuses, I've found that Brown and his crews are more than up to the challenge and accomplish the contours we're after with unmatched precision.

In fact, it's apparent that he loves a good challenge: We recently completed a project, for example, where the pool shares one of its walls with the foundation of the house – a detail that can only be achieved with near-zero-tolerance construction and, it goes without saying, superb waterproofing, which is another of his valuable strengths in an area where the ground freezes.

Obviously, I'm tremendously impressed by the standards Brown and his crews observe at every turn – so impressed, in fact that he's made me an advocate for applying this level of quality to construction throughout the industry. Nothing Valley Pools does is beyond the ability of most companies: It's all about investing in skills development and in finding people who share a desire to do the best work possible at the highest level imaginable.

In simple, practical terms – and again drawing on my experience in courtrooms – just consider the reduced exposure the lawsuits, the increased level of client satisfaction, the greater serviceability and longevity of the product: In my book, those all point toward a much more successful industry in the long run.

On another level, I've found that working in this way is infinitely more satisfying to me as a professional. I've always been proud of my work, but I find as I spend more time collaborating with Brown and Valley Pools that I enjoy even more the prospect of pursuing excellence in design knowing I'll be turning my plans over to professionals who embrace excellence in construction.

All that, and I get to spend time in a beautiful part of the world as well.



As a designer, I've come to enjoy the freedom and confidence that poured-in-place concrete gives me, especially when the material is managed by crews that know what they're doing. I can be as creative as can be in working with my clients, secure in the knowledge that what I put into my plans will ultimately appear on site – just as the clients and I expect.





Keeping Clean

By Patrick Simmsgeiger

For the past 35 years, Patrick Simmsgeiger has maintained scores of ponds and lakes throughout southern California and says that every single one of them seems to have a mind of its own. As a result, he advises those who design and build these watershapes to learn the general approaches to making the water manageable and trouble-free – but also to pay even closer attention to each vessel's specific character and situation.



If

there's one thing all ponds and lakes have in common (beyond the obvious fact that they all contain water), it's that they're as different as snowflakes – highly idiosyncratic, often challenging and sometimes almost willful in the way they resist being manipulated.

For the past 35 years, we at Diversified Waterscapes (Laguna Niguel, Calif.) have just about seen it all as specialists in maintaining man-made ponds and lakes and in remediating those that have fallen on hard times and suffer with severe problems. We've found that every situation is different and that figuring out what's going on involves the evaluation of countless variables – some obvious and easy to read, others less so.

For all that, our experience tells us that the serviceability and sustainability of ponds and lakes is for the most part determined long before we come on the scene – even before they are filled with water. When they've been designed and installed with a few key principles in mind, we find them to be cooperative and affordably manageable.

If a few of the



Some ponds simply were not designed for easy maintenance. Indeed, we sometimes encounter nightmare ponds – such as the one on the left, where nutrient-rich runoff from wonderfully green lawns flows unimpeded into the water – a burden so overwhelming that even a good aerator can’t help much. Happily, we also run into well-designed watershapes, such as the beautiful golf-course pond on the right, where the designers and installers knew to include French drains to control runoff and multiple aerators to keep the water circulating adequately.

more common mistakes are made, however, it’s a completely different and far nastier tale of woe.

In the course of doing business, we’ve learned to take holistic approaches to the watershapes under our care, looking at entire systems and seeking to balance key sets of variables we’ve identified. The difficulty is, there are no rules of thumb: What’s needed in one situation may be completely different in another – thus leaving designers and installers with the considerable challenge of anticipating how things will go with a less-than-fully-predictable body of water.

green and greener

To demonstrate what I mean, let’s start by considering the plants designers and installers place around their ponds and lakes. Without question, this is the source of most of the problems we encounter down the line.

That may seem a harsh judgment – and problematic because in the vast majority of situations plants and water are placed in close proximity and it is their combination at the water’s edge that lend these settings much of their beauty. It’s not that we object to comingling water and plants; rather, our issues come when designers or installers force the point and insist upon too much of a good thing. Our concerns in these situations are with

plant material falling into the water and the introduction of nitrogen- and phosphate-rich runoff – with the former being the larger issue by far.

As service professionals – but also as people with eyes open to beauty – we certainly understand the desire to make ponds and lakes as beautiful as possible by planting material next to and within the water, but we also know there are a couple of simple steps to be taken that can spell the difference between a manageable relationship between plants and water and a complete service nightmare.

Let’s begin with the biggest problem of all: deciduous trees and shrubs that overhang or have been planted right on the water. In southern California, for example, Bougainvillea is extremely common and popular in landscapes and often finds its way into watershape settings – but it’s a species that is *constantly* reproducing and shedding its leaves and flowers. In addition, these plants have wicked thorns and really should be kept away from places where people may come in contact with them, including at the water’s edge.

Weeping willows also look great near water edge and have the extra advantage of thriving in damp soil, but they’re a major problem when it comes to pond or lake maintenance because they drop *huge* amounts of material. The same is true of pepper trees, magnolias and

jacarandas – all extremely common in our region and each one terribly messy.

Don’t get me wrong: I’m not suggesting that these plants should not be included in the landscape. All that’s needed is to move them back so they don’t overhang the water – and to make certain they can be pruned back if, over time, they demonstrate a tendency to reach in that direction.

A variation on this theme occurs quite frequently in new developments, especially with condominium complexes where the developer wants to sell units as rapidly as possible: Here, there’s a tendency to overplant, putting in too much material and placing whatever is being planted so close together that everything will fill in faster. That’s not a healthy situation for the plants as they mature, so some will need to be removed – a hassle that could easily be avoided simply by planting an appropriate number of plants and keeping them back from the water’s edge.

the beat goes on

It’s not just trees and shrubs: Grass can be an issue as well, largely because the tip of a blade of grass contains the most nutrients in the plant and that’s *exactly* what gets cut off and frequently finds its way into the water. On top of that, these clippings decompose very rapidly in water, and when this occurs

in volume a minor problem can become a serious one.

In these cases, all we can do is recommend to landscape maintenance companies that they mow away from the water rather than toward it – and basically do all they can to keep clippings out of the ponds and lakes whose landscapes they service.

Problems also arise when lawns flow down to the water and runoff flows with them. The key to minimizing this issue involves placing French drains around the perimeters of ponds and lakes. This will transfer a large portion of the fertilizer-laden water to an outlet away from these nutrient-sensitive watershapes.

There's also a common misconception that it's a good idea to dump grass clippings into the water because some species of fish love to eat grass. While that is true of some fish species, it generally overfeeds them and leads them to drop higher-than-usual volumes of organic wastes into the water. In addition,



They can make for great views and artful settings, but placing 'messy' trees alongside ponds puts a tremendous burden on these watershapes in the form of debris that just won't quit. There's no reason to omit trees of this sort from the landscape, but pushing willows and pepper trees back from the edge so their leaves don't fall directly into the water can be a big help.





much of the grass will go untouched and will simply decompose in the water. (If I *do* have a rule of thumb to offer, here it is: Grass clippings should never be dumped in the water – *ever!*)

Getting back to developers for a moment: All of the above situations with trees, lawns and drainage are worsened dramatically where corners are cut in organizing a pond's or lake's circulation system. Compromising on quality may save some money, but it's a false economy because of the problems that will arise down the line.

If there are too few skimmers, if strainer baskets are undersized, if plumbing is downsized, if too few pumps are used, if aerators are eliminated, if filtration systems are inadequate, then any issues related to overhanging trees, nutrient intrusion or any other problem that might arise will be exaggerated. A project might look good for a while, but before long it will run into huge problems with algae and the growth of undesirable plants.

So why not take the pressure off and set trees back from the edge, develop a proper landscape maintenance program and design the watershape to take whatever comes its way? You can't overwhelm the system and expect good results down the road.

It's all about striking balances: If you've thought things through, you can

create a pond or lake surrounded by lush plantings that drop a tremendous amount of material into the water, but the system must be set up to handle that load with respect to turnover rates, skimming and filtration.

Turnover is an underappreciated val-

ue in that equation. In most cases, we like to see the water turned over at least once and up to twice a day. That's easy to achieve in relatively small systems of the sort you see in backyards or business parks. But it's not so easy when you get to lake-scale systems: Here, you need big

Fish on Balance

One of the biggest and most common mistakes we see in servicing ponds or lakes has nothing at all to do with how they are designed or built, but instead with the level to which owners have decided to populate them with fish – and the timing of that important step.

Quite often, we find that anxious owners will immediately stock a new body of water with bass – great for sport, but they breed quickly and will rapidly overpopulate the water and load it with waste. Moreover, bass are predators, so they don't do much to benefit the overall ecosystem that is being established.

We always counsel patience and a step-wise approach that starts with scavenger fish such as bluegill, mosquito fish or red-ear sunfish: These will keep the bottom clean and the water free of mosquito larvae and other pests or invaders such as snails. In our experience, starting this way can make a difference between a healthy body of water and one that might have to be quarantined.

If you think that's a stretch, quarantines are happening all over the place to cope with invasions of quagga mussels, freshwater mollusks that are taking over rivers and lakes across North America. They're native to waters in Ukraine but have no specific predators here and have been wreaking havoc with ecosystems coast to coast.

Foraging fish can keep these mussels from gaining a foothold. If the owner starts a vessel out by introducing predator species that will eliminate foragers, this will allow quagga mussels to take over and eliminate all other forms of aquatic life – not a pretty picture!

–P.S.



Trees are only one challenge to the maintainability of pond, stream or lake systems. Excessive populations of fish or the presence of large numbers of waterfowl can be a huge issue, for example, as can inadequate flows across rugged waterfall systems or sluggish velocities in stream systems – especially if there isn't adequate skimming. The consequences of all of these problems include algae growth and turbidity, neither of which make the water look the way anyone wants it to look.

pumps and will probably need to supplement filtration with effective aeration to strike the right balance.

beneficial measures

Now I need to do an about-face and extol the potential virtues of plants.

Indeed, one of the best ways to achieve balance in a system with a well-designed circulation system is through proper use of beneficial aquatic and terrestrial plants.

This approach has been well documented in numerous seminars and publications (*WaterShapes* included), and

for good reason: The wise use of constructed wetlands, planting pockets and floating islands will *always* tilt the balance of a pond or lake in the right direction, especially if the designer or installer knows a thing or two about what works and what doesn't.

Cattails, for example, are quite popular and do a fantastic job of removing heavy metals from soil with their deep root systems. But they are also quite invasive and, if not maintained with some care, can take over an entire pond or lake. Moreover, they do nothing to remove nitrogen and phosphorus from the water column.

Better choices are available, including chara, coontails and various grasses. We use all of them in remediating troubled watershapes, and they have the advantage of not being nearly as invasive as cattails. They also have shallower root systems that enable them to compete effectively with algae in absorbing nutrients from the water.

The right plants can be so effective in absorbing nutrients that we often use them as temporary measures in remediation projects: We'll put them in place and let them grow to maturity, then we'll come back and pull them out again. (In large applications, we'll even go after them with a big harvester.) The advantage this has is that, by removing the

Say 'No' to Ducks

Ducks and ponds go together in most people's minds, and it is indeed part of the pleasure of visiting a pond or lake to watch them come and go. Unfortunately, people tend to focus on welcoming them and, by feeding them, make the ducks less inclined to move along. That's *not* a good thing.

Resident ducks add tremendous amounts of organic compounds to water that will result in massive water-management problems. A temporary stop is no big problem, but when ducks or geese get comfortable and start nesting – and then people overfeed them – these waterfowl will excrete excessive quantities of waste, get fat and unhealthy and basically sit around, waiting to produce future generations of fat, lazy, quasi-domesticated chicks.

Prevention is a two-stroke process: First, don't provide large nesting areas in the form of cattails or bulrushes; second, do what you can to let your clients know that feeding waterfowl is not desirable. In a worst-case scenario, these sedentary birds can develop avian botulism, which in turn can infect healthier, migrating birds and present the possibility of a true environmental disaster.

Worse yet, these birds and their prodigious waste will often result in muddy areas at the water's edge – places where *E. coli* colonies develop. This puts children and even adults at risk and is yet another reason to discourage anyone from feeding ducks, geese or any other migrating birds: They may be great visitors, but they can be lousy tenants!

– P.S.

plants, we also permanently remove the chemicals they've absorbed. This means that the permanent plants we've left behind will have a much better chance of keeping up with the load.

We're also big advocates of constructed wetlands and floating biofiltration islands, both of which can be beautiful, will help keep nutrients in check and provide wonderful habitats for all manner of birds, amphibians and useful insects.

We also like systems that use biofilters made with perforated pipes buried in layers of gravel – when, of course, they're properly designed and maintained. As colonies of beneficial bacteria develop within the filtering beds, they absorb nutrients that would otherwise fuel algae growth. But these beds must be deep enough as well as large enough in surface area to be effective.

Biofilters also require some upkeep. As they load with material, they display a tendency to form channels through the

Roofs and Rain Gutters

In many cases, runoff from rooftops and gutters is directed into a pond or lake – and in many cases, we've seen flooding as a result of insufficient capacity.

If you set things up this way, you must make certain that the watershed's capacity is ample enough to handle the additional water. If it's a retrofit or that capacity simply isn't available, you'll need to make sure the drainpipes themselves are large enough to provide the surge capacity you need.

– P.S.

gravel, in which case the water isn't being filtered effectively. As a result (and as is the case with the sand filters used with swimming pools), these biofiltration beds occasionally need to be disturbed – in their case by raking the soil rather than backwashing. It also helps, once the bed has been disturbed, to inject them with liquid enzymes that will break up solids and encourage bacteria growth.

Again, this is a clear design/installation issue: It's very important to keep in mind that someone may need to get into the water and rake up the gravel bed – something that can't be done easily under 20 feet of water, which is why we always suggest placing biofiltration fields in a pond's or lake's shallows.

Aerators help as well, not just with turnover but also in the effort to maintain dissolved oxygen at proper concentrations. We often recommend the use of bottom diffuser units because of the way they distribute oxygen from the bottom up and disrupt any pockets of stagnation in the bottoms of ponds or lakes.

bottoms up

As suggested above, depth is a design/installation decision with which we frequently contend – and it's not just about great depth, either.

In many cases, in fact, ponds in particular are so shallow that sunlight readily penetrates to the bottom, thus promoting plant and algae growth where nobody wants it. In my view, in fact, deeper is almost always better because deep water will have a tendency to remain clear of unwanted growth.

There are no guidelines here, but we always hope to find that a large pond (with a surface area of an acre or so) will reach

a depth of 20 feet or more in spots. To be sure, there are some plants that will take root and grow at that depth – especially if the water has a high degree of clarity – but for the most part plants have a hard time at levels below six or eight feet of depth.

True, areas of deep water can present problems with thermal stratification that can impede circulation and lead to problems with poor oxygenation, anaerobic conditions, bacterial decomposition and rotten-egg smells, but the deployment of aerators will generally take care of these issues. (We prefer to see dissolved oxygen levels at six parts per million or more, especially at the bottoms of the watershapes under our care.)

There is no doubt that managing ponds and lakes can be a complex and difficult task – or that the design and construction of these bodies of water has a huge influence on their health and long-term performance.

In this article, I've outlined a number of factors that should be considered as these vessels take shape. I also recommend checking in with the North American Lake Management Society (www.nalms.org), an organization that boasts among its membership some of the world's top researchers and scientists working in the field of aquatic-system management.

As I see things, it's vitally important that ponds and lakes remain healthy both because of the beauty and value they add to our lives and landscapes and because the consequences of letting them go bad can be so dire and even dangerous. That's why I believe you can never have too much information when designing or installing a new pond or lake: The work you do is important, now and for future generations!

Skimmer Placement

Just because you have a skimmer in a pond or lake does not necessarily mean that it's doing much good. The key is making certain it's in the right place.

Our firm, for example, is currently servicing a large pond where the skimmer was put in the wrong place. Rather than positioning it on the leeward side facing the prevailing wind, it was positioned on the other side – so debris is constantly blown away from it.

The upshot: The pond is chock-full of debris, but the skimmer basket is almost always empty. So what happens is that a heavy load of plant material falls into the pond, saturates and sinks to the bottom, where it decomposes and causes a wide array of problems. In addition, there's a terrible mess on the side of the pond where the skimmer really should be.

Designing ponds and lakes for sustainability and easy maintenance mostly requires common sense. In this case, that means placing the skimmer where the leaves are going to go!

– P.S.



When designed with the right combination of positive attributes – adequate aeration, good flow characteristics, perimeter-encompassing French drains and thoughtful plantings – even the water in environments as nutrient-rich as a golf course can be maintained with relative ease. In this case, it means thinking big and integrating all of the facility's water systems (ponds, streams, waterfalls and even ornamental fountains) to keep the water fully aerated, healthy and clear.



For decades, controversy has surrounded the initial interactions of water and cementitious finishes in pools and spas – controversy that has led to heated debate, bad blood, litigation and very little by way of resolution. But that hasn't stopped numerous organizations and individuals from working toward an answer, says Randy Dukes, who discusses here an approach to start-ups that represents the consensus of an array of experts and trade associations.

By Randy Dukes

From the Start

It's an old, unfortunate history: For more than 20 years, the pool/spa industry has witnessed a conflict that has pitted plaster subcontractors against service technicians and put pool/spa builders in the uncomfortable position of not knowing which way to turn to deliver the quality interior finishes their clients demand.

The source of the conflict is any change in appearance of an interior cementitious finish that occurs after the watershape is filled with water: Whether it manifests itself as etching, staining, mottling, scaling, nodule formation, delaminating, cracking and/or crazing (among others), homeowners typically want somebody to fix things fast – and that usually means they want the disfigured material removed and replaced.

So the client calls the builder, who calls either the plaster subcontractor or the service technician – and whoever answers first immediately pins the blame on the other party, with the plasterer

claiming that the pool's chemistry has been improperly managed while the service technician will say that the surface material was inferior or improperly applied. All too often, these disputes remain unresolved until court proceedings are concluded.

The challenge here has always been the fabulous number of variables that come into play when water comes into initial contact with the plaster. There are always questions on the one hand about the quality and proportioning of the raw materials used in the plaster mix as well as the way it has been applied. On the other, there are questions about the nature of the feed water, water balance, testing protocols, treatment methods and a host of chemical factors including pH, calcium hardness, total alkalinity and total dissolved solids.

If you step back and look at that set of variables objectively, it's small wonder that reaching a consensus on how to avoid problems has been hard to do.

a long, winding road

For more than 20 years now, however, that consensus is precisely what a number of individuals and organizations have attempted to achieve. This has included not only the National Plasterers Council (with which I am affiliated), but also associations that represent service technicians as well as raw materials suppliers, independent laboratories, trade groups, academic institutions, chemical manufacturers and others.

For years, these entities have wrangled with the issues and have tirelessly accumulated masses of reliable data in the process of developing appropriate recommendations and establishing valid standards. I've been one of the individuals involved in this process, and it's been a fascinating and often frustrating ride. Along the way, I've examined thousands of pools, been part of countless meetings and discussions and, I am pleased to say, have played a part in our collective reaching of a reliable set of conclusions.

One of the areas in which we've made the most progress has to do with recommendations related to start-ups – that is, the procedures used when water is first added to a newly constructed pool or spa and a watershape actually becomes a watershape. Without question, this is one of the most important steps in determining the performance of the interior surface – the place where plasterers and service technicians come together.

It is important at this point to run through the official list of organizations that back this recommended procedure, as published by the National Plasterers Council. These include the Independent Pool & Spa Service Association (IPSSA) (which has included the document in the latest edition of its technical manual), the Association of Pool & Spa Professionals (APSP), the Portland Cement Association (PCA) and the American Concrete Institute (ACI).

For an issue as controversial as this, achieving that level of across-the-board endorsement is truly remarkable. Those of us who have been involved in the development of this start-up procedure believe that if it is used consistently and followed correctly, it will serve as a powerful tool in reducing plaster problems and all the headaches and legal and financial woes that come with them.

In looking at start-ups, we had to consider everything that was happening. We recognized immediately that the key was in the curing process, an amazingly complex set of chemical reactions that have a dramatic effect on the strength of the plaster. We also recognized the hazards involved in exposing that fragile, vulnerable material in intimate contact with large volumes of water, the universal solvent.

That's *not* a desirable match, and experience of the past 20-plus years has shown it can become a living nightmare.

water and cement

In its role as the universal solvent, water always seeks mineral balance: If it contains too little by way of mineral content, it will seek it out and try to take it from any available source. In that state, which can be recognized by low-level readings for pH, total alkalinity and calcium hardness, water is said to be "corrosive."

This spells trouble in the context of a freshly plastered pool, because the plaster features an abundance of soluble materials (such as calcium hydroxide) that are *exactly* what the water needs.

If, by contrast, the fill water is overly full of minerals, it will seek to deposit or precipitate them onto the nearest available surface in the form of scale. In that state, water is said to be "alkaline," "basic" or "scaling" and can be identified by high readings of pH, total alkalinity and calcium hardness. Again, a freshly plastered pool – porous and comprised of aggregates and cement paste – is a perfect scale-accepting surface.

When the water is balanced – that is,

riod during which the shell is hydrated in preparation for finish application. Through our partnership with experts at ACI, we learned that proper water-curing of concrete during this interval can increase concrete's strength by 55 to 60 percent.

As a cementitious material, plaster is closely related to concrete, so it makes sense to infer that a water-curing procedure after installation will similarly increase the strength of a plaster finish.

While we consider that proper start-up procedures will reduce the number of finish failures and the aggravation that comes along with plaster problems, we also recognize, of course, that proper start-ups

If you step back and look at the set of variables that occur when water comes into contact with water, it's small wonder that reaching a consensus on how to avoid problems has been hard to do.

when the water is neither corrosive nor alkaline – it is a perfect companion for curing plaster by keeping it wetted and slowing down the curing process. This moderation of the curing process renders the plaster far more durable over the long haul.

Most of this curing process takes place in the first four weeks after the plaster is applied. By definition, this is what we now refer to as the *start-up period*. Working with builders, plasterers and service companies, we've found that by controlling water chemistry and maintaining close-to-neutral water conditions, the problems associated with curing plaster can be substantially reduced. (For more on the chemistry behind the recommendations, see the sidebar on page 42.)

As it stands, this curing interval should be familiar enough: We see similar issues with shotcrete or gunite shells and the conventional observance of a 28-day pe-

are not a cure-all: If there are gross errors in materials mixing or application – or if the service process is botched – the plaster can and will fail. Our point here is that good start-ups make properly applied plaster even better.

a safe investment

The start-up procedure recommended by NPC and the rest of the endorsing organizations involves testing and adjusting the water chemistry and brushing the pool's surface twice daily for the first 28 days. Somebody who knows what they're doing has to perform these services – and this is where the industry as a whole needs to change the way it typically approaches the process.

At a basic level, the problem here is that many firms – builders, plasterers and service companies alike – aren't thrilled by the prospect of following through with such a laborious, inconvenient regimen.

For all that, this is *not* something that should be ignored or left to the homeowner: If the builder does not include the start-up procedure as part of the construction package, then it's his or her responsibility to communicate the importance of a good start-up procedure to the client, volunteer an approximate cost and, I believe, refer the client to a company that knows how to do start-ups and is prepared to provide the service. (To that end, NPC is currently developing a Certified Start-up Program for technicians.)

In other words, this is not something that can be left to the last moment. Instead, it should be viewed as part of the construction process and discussed with the homeowner as part of the overall project-management package. On that level, it's all about giving the client every opportu-

nity to protect a substantial investment.

Let's consider the disposition of a homeowner who's just spent \$60,000 (or \$600,000) on a backyard paradise and comes out a few days after the job has been completed to find a plaster surface that looks awful (if it's white) and truly terrible (if it's colored). Topping it all off, let's assume that the expensive waterline tile – the homeowner's pride and joy – is covered by a hard, milky-white deposit.

To say the homeowner will be disappointed is an understatement, and it's reasonable to expect he or she will make a quick call and want immediate action to resolve the issue. That's bad enough, but even at this early point, even more damage has been done: The builder will lose referrals and the whole industry takes the hit, too, basically because the fun of owning a pool and spa has been spoiled

through a loss of consumer confidence.

Experience in these debates and in the field tells us that a proper start-up will dramatically reduce the chances of that sort of unpleasantness, and the ounce of prevention we're recommending need not cost that much – perhaps \$500 (or maybe more depending on the service company). By any measure, that's a pittance compared to the potential damage caused by lack of a proper start-up!

never resting

As someone who has looked at these issues for most of my adult life and have endured the debates and rancor for decades, I've come to believe that the recommendations offered by NPC are both effective and workable.

It's also fair to point out that no one person or organization can claim pri-

by the index

The chemical processes taking place during start-ups are so complex that this article would have to be much longer to get the whole story out. In fact, whole books have been written on the subject, and anyone who has a deeper interest in the subject can easily find them.

For our more limited purposes here, what's important to know is that, during the curing process, a number of reactions take place that, when allowed to occur slowly, will make the material stronger.

When plaster is applied, it is troweled on in such a way that the "cream" or fines of the material form an ultra-smooth surface. As this surface hydrates, it develops high levels of extremely soluble materials, such as calcium hydroxide, that gradually transition to become less soluble during the curing process. (For the most part, for example, calcium hydroxide will slowly transition to become calcium carbonate.)

While this transformation takes place, the surface is extremely vulnerable: The presence of water will either aid the process if it is balanced or exacerbate potential problems if it is either corrosive or scaling. This is why, during this interval, the primary goal is to maintain balanced water chemistry while also brushing the pool to remove calcium-rich dust from the surface.

Several chemical indices are used to determine water's characteristics. In the case of the National Plasterers Council recommendations, start-up procedures are based on chemical parameters defined by the Langelier Saturation Index (LSI), which uses pH, total alkalinity and calcium hardness to generate a positive or

negative value that indicates a scaling or corrosive environment.

The challenge with start-ups is that the fill water can vary wildly with respect to balance and will need to be treated in differing ways to generate an LSI-neutral value. What this means in practical terms is that, immediately after filling, the pool water's balance should be adjusted to a pH level between 7.2 and 7.6; a total alkalinity of at least 80 parts per million and a calcium hardness ranging from 150 to 200 parts per million achieved in the course of the next 28 days. The procedure also recommends the (optional) use of a sequestering agent to help keep minerals suspended in the water while the balance is being adjusted.

The guidelines offer specific advice on making those adjustments. Copies can be downloaded from the NPC Web site (www.npconline.org), or a printed version can be obtained by calling the office at (866) 483-4672.



It's worthwhile to note here that the recommended, LSI-based procedure recommended in the consensus report is not the only start-up approach now being used in the industry. For years, in fact, there have been substantive and sometimes ferocious debates about the fundamental nature of start-ups, with some people favoring procedures that generate a more basic water balance and others advocating low pH chemistries and acidic conditions. All of this discussion is well beyond the scope of this article.

–R.D.

macy of authorship of this standard. While it is being issued through NPC, it represents the work of countless individuals, and the simple truth is that the chemical values advocated in the recommendations are widely known within the industry – especially among service technicians, many of whom doubtless will wonder what all the fuss is about because the procedures being advocated are so elementary and “back to basics.”

For my part, I’m simply glad we’ve found a procedure that has finally forged the elusive consensus we’ve been after for so many years and, more important, that it seems to be performing consistently in the field.

Ultimately, it’s all about making the industry’s clients happy. On that scale, the value of a good start-up is immeasurable, and a pool that contains a cementitious surface of any kind deserves to begin its life under the watchful eye of someone who knows a thing or three about the restless nature of water and concrete.

the technician’s role

As explained in the accompanying text, good start-ups are crucial to the performance of the interior surfaces of swimming pools and other plaster-lined watershapes: In practice, this step in delivering a finished product to the homeowner is accurately considered as both the end of the construction process and the beginning of the service process.

Most of these transitional procedures are performed by service technicians who either work directly for a builder or operate under contract. It’s my belief that these relationships should be revisited and that builders must take a more active role in ensuring that what happens when they turn a watershape over to a technician will serve the long-term interests of both the watershape and the client.

The way I see it, service technicians are custodians of our industry’s output, and increasingly these days, that output can easily be described as a form of high art. These professionals maintain and protect the value of our clients’ investments, and to do so efficiently and effectively, they need to possess an array of knowledge as well as skills in working with chemistry, hydraulics, mechanics, electronics, masonry, plumbing and more.

They answer the call when things go wrong, and they rarely get the credit they deserve when everything works properly. If you’ll allow me to step onto a soapbox for a moment, it’s high time for designers and builders in the watershaping industry to recognize service technicians for the professionals they are and the importance of the work they do.

–R.D.



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Refurbishing Wright's TRIANGLE

By Thomas Lopez

Of all the structures at Frank Lloyd Wright's Taliesin West, the triangular reflection/swimming pool may be the most iconic – a highlight on a campus that is itself a monument to modern architecture. But the watershape hadn't been touched since the 1960s and was in need of a serious cosmetic update, which is why watershaper Thomas Lopez was called in to install new tile, fresh plaster and a new equipment set – and do it all in a hurry.

I grew up in the Phoenix area and have known about Frank Lloyd Wright's Taliesin West all my life. It was kind of unavoidable: One of the major streets here is named after Wright; the area is marked by examples of architecture that directly reflect his influence; and pretty much everyone in town knows that it was the place Wright used as a summer home while teaching his numerous protégés about his approaches to project design and execution.

For my part, however, my closest association with the facility had to do with the fact that my dad routinely delivered produce to the 600-acre facility and often shared stories about the unusual buildings and the occasionally eccentric people he met there. Several decades passed in which I became a water-

shaper who specializes in contemporary designs, but until quite recently I had never been to Taliesin West.

That seems crazy given its vast influence on design in this region, but I made up for my information deficit in a big way last November, after I received a call from a representative of the facility who wanted to speak with me about restoring the facility's famous triangular reflecting/swimming pool – one of the most recognizable of all the design elements on the property.

Needless to say, I jumped at the chance – and along the way gained a much greater appreciation of the genius of one of the country's greatest architects.

Desert Retreat

I was amazed to learn in the course of the initial conversation that this was to be the first-ever renovation on the vessel, which Wright designed in 1946. It was finally built in 1951 at the request of his third wife, Olga, and, according to campus records, had been untouched since the early 1960s. As I saw it, this meant that I would be interacting directly with a structure designed by Wright toward the end of his life and ultimately built by his own students – truly a once-in-a-lifetime opportunity.

The overall facility was established in 1937 and, beyond serving as Wright's wintertime alternative home for the original Taliesin in Wisconsin, has served as the primary setting for both the Frank Lloyd Wright School of Architecture and the Frank Lloyd Wright Foundation. Such is its stature that the campus was designated as a National Landmark in 1982.

Up to his death in 1959, Wright continuously added and altered Taliesin West's buildings, with most of the work being performed by his students. In addition, a number of the master's most famous buildings were designed in the school's drafting room, including the Guggenheim Museum in New York City.



As for the campus itself, many of its buildings are considered masterworks on their own, notable for the way they blend seamlessly with the surrounding desert environs and used indigenous materials to achieve that effect in their design and construction.

To this day, a small number of Wright's own apprentices still live on the site among the school's current crops of architecture students. It is a place filled with the lore and legend of one of America's most creative minds – a spirit captured in the hypnotic forms and movement of the architecture itself.

When the call came to me at Aquavida Pools (Phoenix, Ariz.), Russ Karlstad was on the line. He is an architect who also serves as Taliesin West's property manager, and he explained to me that the Frank Lloyd Wright Foundation had decided it was time to update the pool.

I met him shortly thereafter along with a number of other representatives of the foundation. With all of us at poolside, they asked me a number of questions about my background and my 21 years of building and remodeling swimming pools, but to some degree I also think the fact that my dad was a regular visitor to the site had some effect – a sort of mystical, familial bond. Whatever the case, Karlstad called me back the next day with the news that he wanted to move forward.

So we met again on site and started getting specific. The scope of the work was simple: replace the waterline tile, replaster the pool, rework some of the plumbing and fittings, run new electrical wiring and replace the equipment set. I wasn't surprised at all when Karlstad said their biggest concern – and the reason the project had so often been delayed – was that the pool might crack or suffer some other sort of serious damage in the process of removing the old material.

The Right Shape

Helpfully, the pool has always been a favorite subject of photographers, so we had a very good idea of how the watershape had appeared when first built.

It takes the form of a large right triangle, with two sides measuring 45 feet in length and the third side at 65 feet.



There are no steps down into the water, which has a surface area of 1,012 square feet and a perimeter of 155 feet. It has a depth of two feet across the long side, dropping very gradually to a depth of three feet before plunging quickly to a depth of four feet that carries into the 90-degree corner. This corner points to the northeast, directly toward the main drafting room.

The fact that it's a *right* triangle designed by *Wright* has given some rise to speculation that there was some sort of jovial link or pun at work in the architect's mind – or maybe it was just his homage to the drafting triangles he used in his work? More likely, say the historians, it has to do with the fact that the furthest point of the triangle points to vast desert views – more an embodiment of Wright's blending of structures and landscapes than any sort of inside joke.

The pool sits three inches above grade, wrapped in a two-foot-wide band of coping made using "Desert Cast" stonework

(a mixture of concrete and crushed desert stone that is one of the primary materials used throughout the campus). The area surrounding the pool is covered in grass and was, according to some of the older residents, a popular place for sunbathing among Wright's students.

I examined the watershape with great care: The tile and plaster were in horrible shape after 60 years of service in the desert sun, but I saw no signs of settlement or cracking, and the eight-inch-thick concrete walls looked rock solid. In fact, before we installed the new tile, we put a laser level on the coping to see if we needed to make any adjustments for settlement: The perimeter was *perfectly* level – something that surprised all of us in a pool of this vintage.

Further investigation revealed the fact that the original plumbing consisted of black "poly-pipe" that ran to four wall returns, a main drain, an old-style drum skimmer and a dedicated suction fitting that presumably had worked with an



Our first day on site saw us chip out the old plaster finish – a process that clearly had everyone on edge in fear of any collateral damage that might occur with the decks or anything else having to do with the setting. But all went well, and we found that the concrete shell was in great shape and plenty hard enough to put up with our hammering.



automatic pool cleaner or a vacuum head. The original equipment set (just a pump and filter) was positioned some 280 feet away at a point five feet below the waterline.

We also learned that the electrical systems had been down for about a year, having rotted out at some point. This left the staff to maintain the pool with a cumbersome routine of draining, rinsing and refilling – one of the main reasons the foundation finally decided to move forward with the renovation.

(One other thing: In the center of the pool is a submersible pump surmounted with a standpipe. This generates a flow that creates a subtle surface effect that had to be maintained. We offered to run a new line and install a more efficient external pump to drive the effect, but this would have involved saw-cutting the shell, so it was decided we should just leave it alone.)



As good fortune would have it, we were able to find an exact replacement for the original waterline tile and, on our second day on the job, meticulously set the new tiles in place. We did all we had to do to make our work befit the pool – a key visual component of a national architectural treasure.



Three Brisk Days

Although the project was simple in nature, there were two complicating factors.

First, the campus receives thousands of visitors each year who are keen to go on the various guided tours the facility offers. As part of our agreement, those tours would continue during our time on site – so we were obliged to shut down any noise-making equipment when tour groups stopped to see the pool. This definitely slowed us down a bit; more significant, it was a steady, nerve-wracking reminder that we were performing major (albeit cosmetic) surgery on a national treasure!

Second, we had to be in and out in just three working days. To that end, we visited the site on Sunday, January 10 of this year, set the sump pump and started draining the pool to a point well out into the desert and away from any structures. The clock started ticking when we showed up Monday morning at sunrise and we began chipping out the 50-year-old plaster – a process that took us about twice as long as usual because of the hourly noise-breaks for the tours. We also removed the original six-by-six inch waterline tiles that first day.

As we started chipping away, I could see that Karlstad was extremely nervous: Despite our optimism that we could do the work without damaging the structure, he was painfully aware that we were taking power tools to one of the country's most significant watershapes. Much to his relief (and ours), it was quickly apparent that the shell was up to the challenge. (Later, when we replaced the wall fittings and actually had to bore into the walls, we discovered that they were *extremely* hard.)

On Tuesday morning, we repaired all of the existing wall fittings and began installing an exact reproduction of the original aqua-blue waterline tile. One of the old tiles had fallen off the wall and had had the maker's mark on back. Karlstad had saved it and turned it over to me early in

On our third and final day, we put a new plaster finish in the pool. As we had all through the process, we did what it took to protect the decking around the pool while also updating the equipment set and restoring full function to its circulation system.



our discussions in hopes I might be able to track down something similar.

It was labeled as Franciscan Ceramics, and I called my contacts at Dal Tile's Phoenix branch to see if they had any suggestions. Much to everyone's relief, it turned out that Gladding, McBean & Co. of San Francisco is still in operation and still makes these tiles – and in fact still produced a tile in the exact same color, size and style we wanted.

The next day, January 13, we applied new Finest Finish plaster, a pre-mix marble aggregate product from Universal White Cement Co. of Glendale, Ariz. This is a beautiful, pure-white product that was about as close a match to the original material as we could find.

That same day, we also ran 280 feet of new electrical conduit through the hard desert rock to reach the old equipment pad. Here, we installed a new 48-square-foot diatomaceous-earth filter and a Whisperflo pump, both from Pentair Water Pool & Spa of Sanford, N.C.

We started filling the pool 5 p.m. that same day, following up in the next few weeks with daily brushing and various water-chemistry adjustments.

What It's Worth

As far as remodeling projects go with respect to scope and technical difficulty, this one was about as light as they get. But given the historic nature of the pool, we were all put on edge and spent an unusual amount of time making certain that what we were doing was as non-intrusive as possible. (As is true of most types of historic restoration work, less is almost always best!)

Despite the simplicity of the work, we were constantly aware of the broader meaning and context of what we were doing. It was an honor – quite the heady experience to know we were working on a pool designed by Wright and built in his lifetime by his students – and by far the most unusual and memorable project we've ever tackled.

Furthermore, everything we did to the pool was carefully documented, so now our small contribution is part of the site's history. I know I'll come back to visit again and again, proud of my work and filled with memories that no longer have much to do with bags or boxes of fresh produce!

Photos by Greg Hynes



With this sort of renovation work, we took great pride in getting our work done efficiently and considerably while doing nothing to compromise the overall setting. In this case, we brought a pool that hadn't been touched in decades completely up to speed in just three days – quite an achievement with so many people looking over our shoulders!



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Sequencing Fountain Kit



ROMAN FOUNTAINS (Albuquerque, NM) has introduced a smaller, affordable sequencing-fountain kit for backyard applications. The factory-engineered assembly includes up to 12 adjustable angle nozzles and high-quality solenoid-operated sequencing valves along with a feature pump, a cartridge filter, a chemical-treatment unit, a center drain, a storage reservoir and an operator-friendly control panel.

Underwater LEDs



NEXXUS POOL & SPA (Orlando, FL) has introduced Melody Blanco, a white, nicheless underwater LED pool light. Powerful enough to illuminate an 18-by-36-foot pool, the unit installs into a standard inch-and-a-half wall fitting and requires no bonding or grounding. It wires to a low-voltage transformer and can be placed as little as four inches below the waterline steps, swim-outs and sundecks.

Non-Metallic Butterfly Valves



ASAHI/AMERICA (Malden, MA) has expanded its line of butterfly valves with the Type 57LIS. Designed for direct replacement of metallic butterfly valves, the industrial-quality thermoplastic valves feature short face-to-face dimensions

along with all-plastic housings to withstand corrosive environments. They are available in a range of sizes from 3 to 8 inches with either lever-style or automated operation.

Acid Feed System



HAYWARD POOL PRODUCTS (Elizabeth, NJ) has added the Stenner Pump Acid-Feed System to its Sense and Dispense chemical-automation line. The new system automatically balances the rise in pH that often occurs with the use of salt-chlorination technology. Designed for safe, robust, reliable operation, the new system largely relieves pool owners of another chemical transport/handling chore.

Construction Domes



PLASTIMAYD POOL PRODUCTS (Oregon City, OR) has improved its construction domes – air-inflated structures designed specifically to help builders extend the construction season and keep building into the late fall and winter or the early spring. The lightweight product is made from a reinforced vinyl fabric that is now more rugged and stands up even better to the rigors of pool construction jobs.

Acrylic Pools and Fountains



REYNOLDS POLYMER TECHNOLOGY (Grand Junction, CO) offers cutting-edge pools and fountains made from the company's durable, crystal-clear R-Cast acrylic. The strong, versatile material can be designed for use in executing vanishing-edge pools, underwater windows and a broad range of waterfeatures. It offers excellent resistance to ultraviolet radiation and won't yellow or delaminate.

Deck Furnishings



ART-DECK-OH (Irvington, NJ) offers a line of deck furniture with a unique, interlocking design that allows four chairs and a table to be stacked together as a single space-saving unit. Made with an all-weather resin and welded, all-aluminum frames, the furnishings resist fading and sun damage, can withstand extreme temperature swings and come with two-sided cushions for design versatility.

Safety Door Alarm



POOLGUARD (North Vernon, IN) offers the Model DAPT-WT, a door alarm that sounds immediately when a child opens the door and will continue to sound if the door is left open. (If a child goes through the door and closes it, the alarm will sound for five minutes and then automatically reset.) The system also includes an outdoor wireless transmitter that allows adults to enter the home without sounding the alarm.

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Translucent Fiberglass



WHITEWATER WEST INDUSTRIES

(Richmond, British Columbia, Canada) has expanded its line of SilkTek translucent-fiberglass components. Used on the company's AquaTube and Poolsider

waterslides, the translucent components come in an array of colors and elevate the visual drama of waterslides (for riders and observers alike) while maintaining the highest standards for safety and durability.

Water-and-Fire Pot

SCOTTSDALE WATER DESIGNS (Scottsdale, AZ) offers a fire-and-water pot with four water-delivery spillways. The core fountain structure is 36 inches square with a 24-square-inch firebox mounted in the middle, and there are copper stabilizing rods at all four corners. The units are available in copper, stainless steel and powder-coated steel and include water and grounding connections.



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Custom Pool-Interior Finishes



SGM (Pompano Beach, FL) now offers custom blending of its River Rok Natures Collection of pool finishes. Designed to allow greater flexibility in matching color palettes to a design's or setting's needs, the service allows contractors to mix varying combinations of the line's six standard, pre-blended colors into truly custom blends. The company also provides samples of various blends to show how they look.

Underwater Windows



NATARE CORP. (Indianapolis, IN) offers underwater observation windows for swimming or diving pools. Designed to assist in teaching and underwater photography or to provide the ultimate view of competition, the strong rectangular units are suitable for installation in any concrete or stainless steel pool and install flush with a pool's interior pool so nothing interferes with equipment or competition.

All-Gray Pool Cleaner



PENTAIR WATER POOL & SPA (Sanford, NC) has added an all-gray Kreepy Krauly Legend II cleaner to its line of pressure-side cleaners to meet the demand for cleaners that complement dark-bottomed pools. All models deliver cleaning power and performance without booster pumps and have front-wheel drive for traction and dual thrust jets to ensure optimum speed and cleaning performance.

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Lighted Furnishings



POOL SHOT PRODUCTS (Ashtabula, OH) has introduced lighted pool-and-patio furniture. The lightweight rounded chairs and cylindrical tables are designed for use in hotels and resorts as well as backyards and glow from within using battery-powered LEDs. Made for indoor and outdoor use, the units are fabricated using rotationally molded polyethylene and are resistant to weather, chlorine and sunlight.

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FIBERON (New London, NC) has introduced the Deck Pilot, a system for hidden fastening of deck boards. Designed for speed and precision at a low cost, the system allows installers to drive deck screws at the proper angle and to the precise depth required time after time, while eliminating the need for hidden fastener clips and painted screws and firmly attaching both edges of boards to every joist.

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Concrete-Construction Catalog



QUAKER PLASTICS (Schuylkill Haven, PA) has published a new catalog on its lines of deck drains, control joints, coping forms and pool stairs for the concrete construction market. Aimed at pool professionals and landscape contractors who specialize in new construction as well as renovations, the catalog includes a section on new products as well as photos, parts numbers, drawings and specifications.

Lighting-System Controller



FOCUS INDUSTRIES (Lake Forest, CA) offers Astro Timer, a remote-control system that manages the lighting fixtures connected to one or two transformers of any type. The pre-programmed, plug-and-play system has a 2,400-watt capacity and includes two grounded receptacles, automatic sunset/sunrise activation and daylight-savings-time adjustments and two program modes for night and pre-dawn settings.

Construction Grout



W.R. MEADOWS (Hampshire, IL) has introduced 588-10K, a construction-grade grout. This hydraulic-cement-based, precision, non-shrink, load-bearing material is designed to transfer loads effectively and safely, ensuring long service time of the grouted item. It is also non-corrosive and non-metallic and has high flexural and compressive strength – ideal for grouting equipment, bridges and anchor bolts.

Color-Restoration Product

L.M. SCOFIELD (Los Angeles, CA) has introduced Revive Color Refresher. Designed to restore color or intensity to concrete, the easy-to-apply product gives a like-new look to existing, unsealed exterior colored or uncolored concrete surfaces in need of refurbishment by penetrating the surface and adding a measured amount of color to the concrete without producing a paint-like or filmy appearance.



Pond-Treatment Products

ATLANTIC WATER GARDENS (Mantua, OH) has introduced Biocuda Pond Treatments, a complete line to which three varieties of pond cleaners have just been added: Clarity-Blast+, which helps remove slimy debris; Eco-Klean Oxy Pond Cleaner, which safely removes organics while adding oxygen to a pond; and Eco-Solv9 Complete Pond Cleaner, a fast, effective water clarifier.



Shell-Infused Stonework

MATRIX-Z (Fort Lauderdale, FL) offers the SeaStone line of cementitious stones. Containing mixtures of natural fossil shells and aggregates and made using a process that simulates natural deposition, the products are engineered for exterior and interior public and private installations – horizontal or vertical, wet or dry – and include matching edgings and trims to serve a range of design needs.



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WATER SHAPES

ONLINE

Change From Within

By Mike Farley

It might sound a bit strange to put it this way, but when it comes to design work, one of the most useful things you can do is to think about how you think about design.

If you're like me and have been working as a watershape designer for more years than you care to count, much of what you do is now second nature. But if you think back to the way it was when you first started – and if you're anything like me – little or none of what you did felt natural or easy. In my case, I had to process every step methodically, sometimes awkwardly and even painfully on occasion.

That's why I wish, back in those early days, that I'd had a copy of *Think Like an Architect* by Hal Box (University of Texas Press, 2007) at my disposal. In fact, of all the books I've read through the years, this 210-page text rocketed into my top five most valuable resources I'd recommend to a young designer.

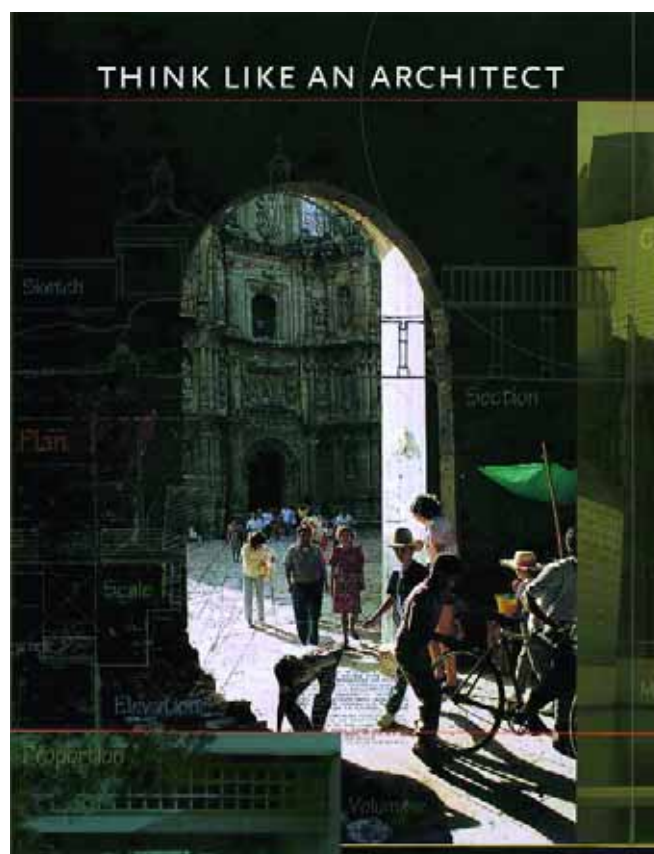
Box is both an accomplished architect and a professor of architectural design at the University of Texas, and my guess is that he developed this book as a means of showing the ropes to entry-level students. (I'd bet he's a *terrific* instructor.) I ran across it by chance while exploring *amazon.com*, noticing that it had received a five-star rating.

(In all my years of finding books through Amazon, I've seen perfect ratings so infrequently that I decided to place the order on the spot.)

What I received shortly thereafter is one of the most insightful descriptions of how to think about design – *any* type of design – that I've ever read. From beginning to end, Box offers practical, profound insights into the creative process – so much so that even the passages that seem completely basic are presented in such a way that they still challenged me and deepened my understanding of the nature of creative thinking.

Much of the book is organized around 16 letters he's received through the years posing a number of fundamental questions, including "How do you start?" and "Where do ideas come from?" In answering these questions, Box covers the process of design from wall to wall. And although he is dealing mainly with buildings, it's no stretch at all to see how his responses cover all forms of design.

In response to one question, for example, he lists points to consider during the initial design phase, including where *not* to build, traffic patterns, sources of sun and shade, color selections and more. He also emphasizes the value of visualization;



of working with all of the senses and not just sight and sound; and of understanding the character and feel of the design.

In another section, he discusses the importance of seeing great designs with your own eyes and lists a number of sites that all of us should visit, from Philip Johnson's Seagram's Building in New York; Thomas Jefferson's Virginia home, Monticello; Frank Lloyd Wright's Guggenheim Museum in New York; and several less-renowned places such as the Chapel in the Woods. (This last one is located in my hometown of Denton, Texas. I'd never heard of it before, but I've since made up for my transgression.)

I could go on at great length about this valuable little book, but suffice it to say that Box gives us all a tremendous set of lessons about understanding how we regard the design process and guidance in ways we can sharpen our focus. Among the many great resources I've described in *WaterShapes* through the years, this is one I cannot recommend highly enough: It cuts to the very core of what we do and how we do it. **WS**

Mike Farley is a landscape architect with more than 20 years of experience and is currently a designer/project manager for Claffey Pools in Southlake, Texas. A graduate of Genesis 3's Level I Design School, he holds a degree in landscape architecture from Texas Tech University and has worked as a watershaper in both California and Texas.



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