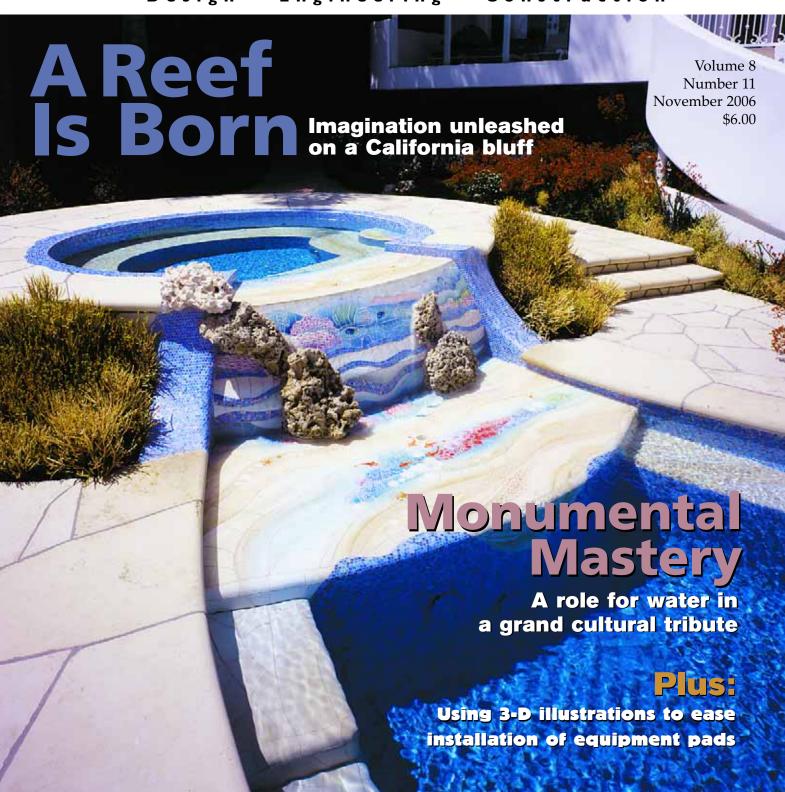
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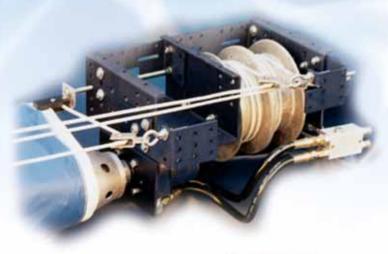
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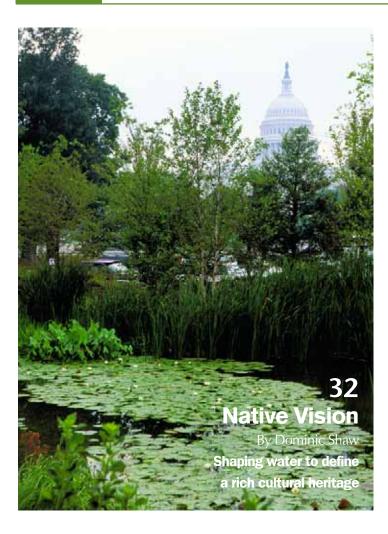


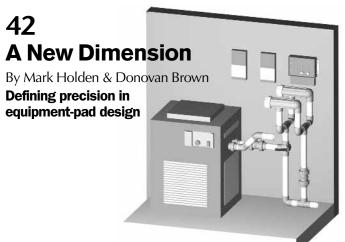


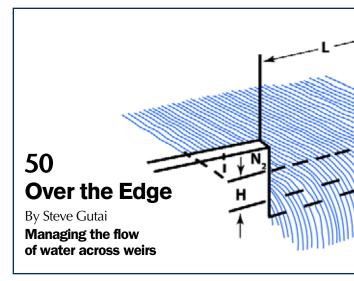
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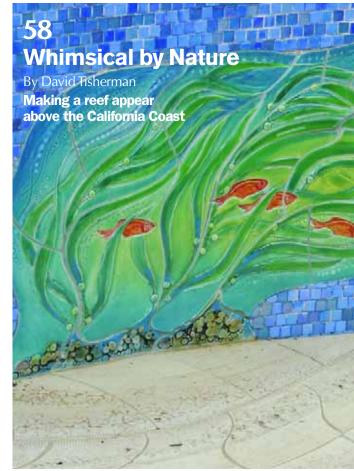
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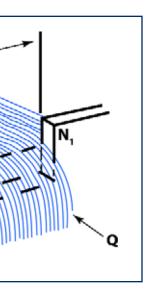






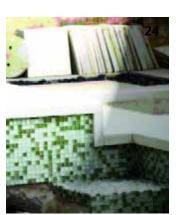
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Photo by Allan Walker, ADW Photography, Santa Monica, Calif.

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By Eric Herman

Technical Ecstasy

I've always found it interesting that most of us have such a clear divide in our minds between technical and aesthetic thinking.

Science tells us that our brains conduct analytical and logical thought processes on one side and creative and emotional thought processes on the other – and that certainly makes sense when you consider how most people appear better suited for work governed by one half or the other.

Personally, however, I've never been satisfied with the absolute, categorical nature of the "dichotomy" – it's just too simple.

In fact, I'm not alone in observing that, in most people, there's actually an asymmetrical balance between the two halves: Yes, some are more technically oriented while others seem to have greater doses of creativity, but in almost all endeavors requiring refined skill, education and applied thought, you really do need the neurons to be firing on both sides of your brain.

That duality can be seen in a great many fields, industries and professions – endeavors as diverse as architecture, music, space exploration, computer programming and publishing to name a few – in which both technical and creative skills are required. Watershaping certainly has a place on this list.

During preparation of this issue, conversations with my good friend and regular *WaterShapes* contributor Steve Gutai drove these points home in a big way. In the latest contribution to his *Hydraulic Fundamentals* series ("Over the Edge" on page 50), he covers the concepts and mathematical nuances involved in designing and managing water flow over various types of weirs.

It's an eminently technical, practical, analytical discussion that just so happens to focus on one of the most evocative, creative, emotional design elements in all of watershaping and indeed in nature – that is, water cascading over an edge. On its face, having water flow up to and over an edge and down to a lower level seems so simple, but as Steve's article demonstrates, this seemingly elementary concept, like so many other aspects of watershaping, is actually an extremely complex expression of principles of physics, mathematics and fluid dynamics – all hardcore, scientific stuff.

The vastness of the principles behind the design and construction of weirs gives all watershapers a wide range of aesthetic design options – and those who see through the science on some level an even *greater* ability to deliver transcendent water effects to their clients. It's the wisdom behind the most powerful component of watershape aesthetics and a discipline that rewards those who take the time to understand what's occurring at the point where water breaks surface tension and flows over an edge.

Certainly, most of you are well aware that design details such as vanishing edges, perimeter overflows, runnels, troughs and waterfalls are far more complex than most clients will ever realize; it's our thought that Steve's approach will be immediately helpful to you as you work your way through complex system designs and then build such systems.

For my part, I know that in the future, whenever I see water spilling over an edge, both sides of my mind will be at least partly engaged.

WATER SHAPES

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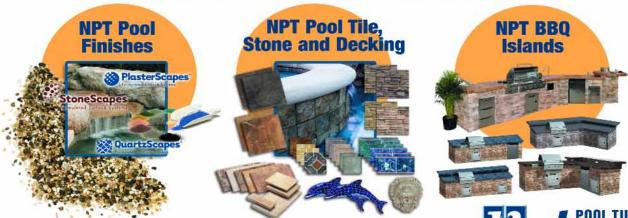
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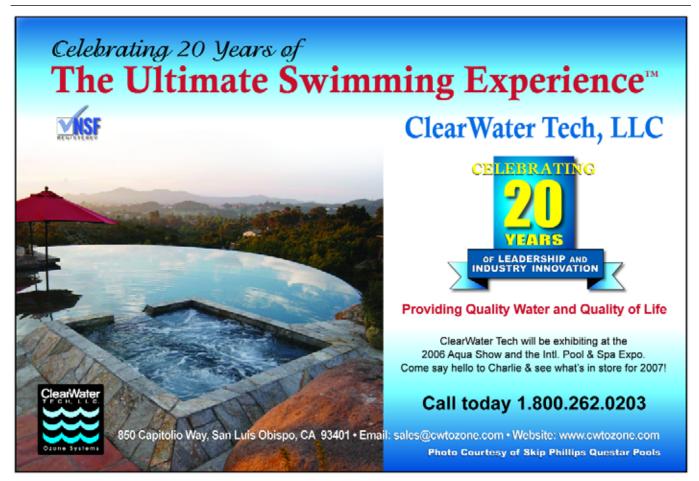
November's Writers

Dominic Shaw is founder and president of Waterline Studios, a fountain design firm based in Fort Collins, Colo. Previously, he was a principal and director of waterfeature design for EDAW, Inc., which he joined in 1997 and for which he served the architecture and landscape architecture communities as a consultant on waterfeatures, swimming pools, ponds and constructed wetlands. In the 23 years before he joined EDAW, he worked variously as a product manager for a fountain manufacturer, owned and operated a fountain installation/ maintenance company and worked as an independent fountain consultant.

Mark Holden is a landscape architect, contractor, writer and educator (through Genesis 3

and the California State Polytechnic University at Pomona) specializing in watershape designs and their complete integration with surrounding environments. Holden and **Donovan Brown** are principals at Holdenwater, a design firm based in Fullerton, Calif., that offers design and engineering services to landscape architects and pool builders working on elaborate watershapes including swimming pools and spas, community aquatic facilities, fountains and waterparks. The partnership's goal is to work to the highest standard possible in all aspects of watershaping. Holden can be contacted at *mark@waterarchitecture.com*.

Steve Gutai is product manager for pumps, filters and valves for Jandy Pool Products of

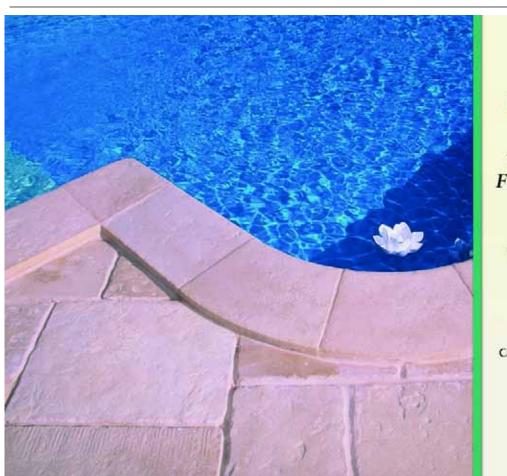


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Petaluma, Calif. Gutai is a veteran of the swimming pool industry, having spent more than 13 years as an independent service and repair technician and subcontractor in the Los Angeles area. He spent three more years as a technical service manager and outside sales representative for Waterway Plastics in Oxnard, Calif. Gutai joined Jandy in 2000 and now works directly with contractors and engineers in designing circulation systems for pools, spas and other watershapes. He teaches hydraulics at trade shows throughout the United States and is the featured hydraulics instructor for Genesis 3's schools.

David Tisherman is the principal in two design/construction firms: David

Tisherman's Visuals in Manhattan Beach, Calif., and Liquid Assets of Cherry Hill, N.J. A designer and builder of custom, high-end swimming pools since 1979, he is widely known in the pool and spa industry as an advocate for the highest possible standards of design, engineering and construction. He has degrees and credentials in industrial design, scientific illustration and architectural drawing from Harvard University and Art Center College of Design and has taught architectural rendering and presentation at UCLA. An award-winning designer, he serves as an industry expert for California's Contractor State License Board. Tisherman is a co-founder of and principal instructor for the Genesis 3 Design Group.





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By Brian Van Bower

Riding a Wave



f you've been paying any attention to the media lately, you may have noticed that watershaping is "in" as a big-time topic for television, books, magazines, newspapers and other forms of mass communication.

Never in all my years as part of this industry can I recall a time during which the subject of beautiful custom pools, spas, fountains, ponds, streams and interactive bodies of water has won so much attention. It seems as if our society has finally caught on to the power, beauty and excitement of the art form many of us now call watershaping.

If we are, in fact, seeing what was once an obscure niche – that is, the creation of highly detailed, aesthetically inspiring outdoor environments – evolve to become the focus of interest among the mainstream media, one can only surmise that this coverage of our wares is attracting readers and viewers and advertising. Otherwise, I'm certain we wouldn't be getting the nod.

It's great fun to see this happening and certainly bodes well for our future prospects, both as an industry and as individual practitioners. We're partly responsible, of course, because our work in the recent past has stepped up to an all-new level of beauty, sophistication and performance. But so are our clients, who seemed to have awakened to the reality that, if they want it, they

We are seeing what was once an obscure niche – that is, the creation of highly detailed, aesthetically inspiring outdoor environments – evolve to become the focus of interest among the mainstream media.

can get something truly special.

I see this as a glorious opportunity, and I'm hoping we can collectively apply ourselves to perpetuating this "wave" and riding it for all it's worth.

in the mainstream

I've been fortunate through the years to get involved in a long list of stories and features in various media about custom swimming pools and outdoor environments. I've participated in articles in *The Wall Street Journal* and *Miami Herald*, among many other newspapers, in lots of consumer magazines and on CNN, NBC and PBS. It's been fascinating in these encounters to see what "sticks" with producers, editors, publishers and reporters – and how their coverage has shifted when it comes to working with our industry and its products.

Just prior to this writing, for example, I appeared on a CNBC show called "On the Money" in a segment about elaborate residential watershapes. I was one of a small group of watershapers interviewed along with a few savvy consumers.

One of the projects involved an extreme backyard environment that included a pool with rope swings, slides and other fun bells and whistles as well as an adjacent dry vessel built specifically for skateboarding.

The homeowner reportedly paid more than a quarter-million dollars to create his play space, and when the reporter asked him what had motivated him to dig so deeply into his pockets, he indicated that he worked hard, loved playfilled family activities and wanted to have his good times in his own yard rather than travel-





2nd PLACE - Moroccan Desert Pool Sharon, CT Tessera 1" x 1" mosaic field in Moroccan Desert blend Design & Installation: Drakeley Pool Company



3rd PLACE - Incense Fountain Scripps Ranch, CA Tessera 1" x 1" mosaic field in Incense Design & Installation: Questar Pools & Spas/Genesis 3



Honorable Mention - Sandstone Fountain Tiburon, CA
Tessera 1" x 1" mosaic field in Sandstone Design: Therese Brown, Ceramic Tile Design

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ing anywhere else.

That honest and simple answer speaks volumes. Indeed, the coverage we're seeing these days is the direct result of grand societal trends as well as the individual desire of consumers to enjoy themselves in the safety and comfort of their homes. This is not a new idea by any means, but the fact that our products are so clearly

part of the discussion in the mainstream media points to a moment of opportunity that won't come around very often in any industry's history.

In a real sense, what this kind of coverage means is that elaborate watershape designs are now mainstream rather than novelty items. It means that the watershapes on display in these articles and

Fine watershaping is an international art form, which bodes well for those whose focus reaches beyond the United States.

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broadcasts have been "normalized" and have become both attainable and desirable. Ultimately, it means that our potential clients have seen and are considering watershaping options that never seemed to be within reach before.

One of the people interviewed for the segment pointed out that there was a time not long ago when "quality outdoor living" was all about lawn chairs and hibachi grills. Those are still great, but the image of the ideal backyard now includes everything from pizza ovens and outdoor sound and video systems to grottos and interactive waterfeatures. It's all good – and better yet, it's apparently fit to print!

imprints

This isn't just my own experience.

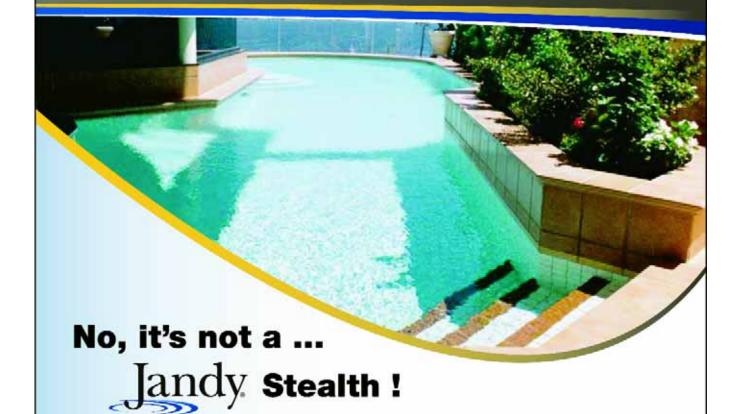
The work of my good friend and fellow *WaterShapes* contributor Juan Roca, for example, was recently covered at length in a new book called *Infinity Pools* (Collins Design/Harper Collins Publishers, 2006). Juan is a wonderful designer and builder who dominates the custom market in Costa Rica, and a half dozen of his projects appear in the book.

This particular example leads me to a couple of important points. First, Juan is just one among a new breed of watershapers who have gained widespread acclaim in recent years - and for a very good reason: His work is as creative and exciting as it comes. Second, fine watershaping is an international art form, which bodes well for those whose focus reaches beyond the United States. Third, although many of us have reached a point where vanishing edges seem old hat, here comes an entire hardback, coffee-table book devoted entirely to this one subject. Could it be that what seems overly familiar to us will become brand-

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aqua culture

new again?

What we have in this book, no matter its narrow focus, is a display of our products in the very best light – a beautiful idea book that will stoke the desires of potential clients looking for something special. Yes, it will be great for Juan's reputation and business, but it will also be great for absolutely everyone from consumers and designers to the suppliers of the glass tile and other gorgeous materials he uses in his projects.

And this is just one example among many. If you do an Internet search for books about "swimming pools," you'll be stunned by the number and variety of both hardback and paperback volumes you can buy. And you really should buy them, not just for your own inspiration but also to share with clients. (WaterShapes columnist Mike Farley often discusses these titles in "Book Notes" – a great place to get leads on the best available releases.)

You don't have to look very hard to find



Printed material on the subject of watershaping has bloomed dramatically in recent years. The fact that these books and magazines exist at all is testimony to consumers' interest in (and willingness to pay good money for) the opportunity to see what we can do for them.



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In economic terms, placing good work within eyes' reach of mainstream consumers can only be good for watershaping.

these publications. And when you pick them up, you'll be amazed by what you see. And again, it's a market-driven thing: These books simply wouldn't be on store shelves if consumers weren't interested in buying them.

bigger pictures

And it's not all coffee-table tomes these days, either. Beyond *WaterShapes*, which has become an idea book that designers share with clients as they explore possibilities together, there are also consumer-oriented, newsstand-style magazines that are helping spread the good word about watershapes.

One I've participated with for some years now is *Luxury Pools* (published by Manor House Publishing Co.), which currently comes out twice a year and offers spreads about specific watershapers and their work. When it first came out a few years back, it was filled with projects I thought didn't rise to the level of "luxury." More recently, however, the caliber of contributions has picked up – right in line with the rising trend this column has been discussing and the positive evolution of our marketplace.

In economic terms, placing good work within eyes' reach of mainstream consumers can only be good for watershaping, if only to the extent that it makes prospective clients more open-minded when it comes to thinking about details, materials and budgets.

This same upward trend has also changed the inner workings of our industry: I remember a time when trade shows focused mainly on low-end, affordable products, but now we see lots of suppliers of glass tile, deluxe stone, elaborate equipment, lighting, sculpture – fine art of all varieties.

We've done our part as watershapers by stepping out and getting more creative,



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aqua culture

and media outlets are finally responding by catching on to what we're doing in meaningful ways. We've broadened our palettes and have great stories to tell, and the more varied and rich the picture becomes, the likelier the media will be to shine a light on it.

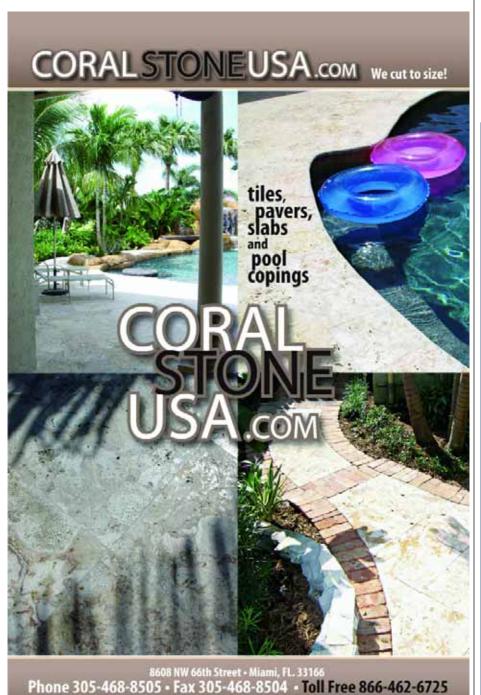
It is both important and useful to recognize that this increased media cover-

age is not happening in a vacuum. In all our media endeavors, for example, watershaping is aided and abetted by a growing societal focus on health, fitness and all forms of exercise. Indeed, aquatic exercise has been getting more and more play in the media – again, it's all good.

We also know, for example, that our

society is getting older and that just about every story (at least those I've been part of) mentions "baby boomers" somewhere. These aging boomers have accumulated wealth and are freely expressing their desire to enjoy recreation and relaxation and pass an appreciation of this pleasurable lifestyle on to their children. This isn't news to anyone who's been paying attention, but it does seem to be coming into increasing and more practical focus.

This passing of the lifestyle torch has, in fact, already been helpful to water-shaping, as children of the boomers are now becoming our clients. Like their parents, they want something beautiful,



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Trendsetters

I've found that you can break consumers down into two basic categories when it comes to quality/creative exterior environments: There are those who want something that no one else has, and there are those who want things other people have. In both cases, what these consumers have in common is a desire for something that makes them happy and gives them a sense of pride.

From the designer's standpoint, it's always fun to work with clients who want a unique watershape: It forces us to stretch our abilities. At the same time, this original work feeds future projects and sets us up to accommodate clients who want "time-tested" elements they've seen elsewhere. (The latter group, by the way, is far larger than the former, even when the clients are bracingly affluent.)

To have the media step up and help us demonstrate our creativity on the one hand and display our "common" wares on the other is something that accelerates our industry's evolution. What was once exotic (underwater windows, fire effects, perimeter overflows and vanishing edges) and the province of trendsetters has now received such wide exposure in the media that many more consumers are catching on and making us all advance creatively.

- **B.V.B.**

16

something that will provide recreation and relaxation, something that has an air of prestige and of having "arrived."

are you ready?

I'm of the opinion that, as an industry and as individuals, we should be prepared to latch onto these trends with unbridled enthusiasm. Whether for recreation, relaxation or exercise, swimming and swimming pools are tremendous resources for our clients and their families. That's a powerful message we should trumpet at every opportunity.

And we can't overlook the fact that resorts and vacation destinations continue to play major roles in opening our prospective clients' eyes to the world of possibilities watershaping now encompasses. Just about every time we see any kind of story about a fun place to visit, the coverage more often than not focuses on water – and the influence of these places on people who actually go there is of incalculable value in advancing the state of our art.

What all of this means for watershapers is that, more than ever before, we have a growing capacity to convey our messages. What was once an industry that resided in obscurity now finds itself on the cutting edge. Now's the time to get involved and start talking with media outlets in your area. Be ready to talk to producers, journalists and editors when they call, and don't fear to make bold statements about the importance, creative flexibility and beauty of our products.

Riding this surge of attention means being bold and proud of what you do: You never know, but one of these days you just might find yourself on television or in a major magazine being recognized for your best work — a great wave to catch and a fun ride beyond doubt.

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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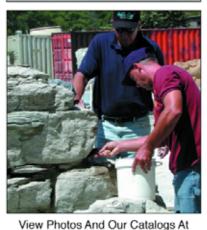


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By Stephanie Rose

Changing Your Tune



s designers, we learn to evaluate landscapes and watershapes with critical eyes, deciding if we like a plant palette, for example, or if a hardscape makes sense or a watershape is sited properly in a yard. These critical skills are important, because clients hire us to pull all of those elements together and develop solutions that suit their needs as well as those of the setting.

On rare occasions, a design/build project will stay on a straight course from initial concept to execution. Usually, however, I know that any ideas or biases I carry onto a job site will change and become more complex as I get to know my clients' wants, needs and desires. In other words, my critical skill – my designer's point of view – is consistently tempered and adjusted as a result of my interactions with clients.

Case in point: I was recently hired to design the planting for a large property in the San Fernando Valley area of southern California. The climate is hot and generally dry during the summer and somewhat cold during the winter, although it seldom reaches the freezing point.

Surrounded by a large Ficus nitida hedge – roughly 40 feet tall and 15 feet wide – the property is well screened from adjacent commercial properties and

By forcing ourselves into territory that may seem uncomfortable, we expand our creative potential and find all sorts of new ideas and opportunities presenting themselves.

residences and is what I would call a very private environment. The homeowners had hired David Tisherman to design their pool and hard-scape; at David's suggestion, I was brought in to design the planting.

building relationships

After reviewing David's plan and meeting with him and the homeowners, I set off to learn more about our client and what they envisioned for their yard. I knew up front that the entire yard (except for the Ficus hedge and a large Carrotwood tree) was to be demolished, including all foundation and perimeter planting and the existing pool. This left us with a clean slate – the best of all possible worlds.

The property is flat, with the areas to be landscaped forming a large L shape on two sides of the house. On one leg is the pool area, including a wide expanse of potential planting area; on the other is an entertainment area with a covered patio, a barbecue island and decking for tables and chairs.

As it was, the hedge-lined property felt like it was surrounded by high, solid walls and wasn't a particularly comfortable space. After reviewing the architecture (modified Tudor), my initial supposition was that we'd design a lush, full planting that would extend from the foundation to the hardscape and that we'd intersperse a few trees to ease the verticality of the house and the Ficus hedge – the aim being to make the yard warm and inviting.

I formed these initial impressions without any discussion with the clients. It's my usual practice to develop *some* sense of how I'll approach a planting design even before I speak to clients, just in case they don't have any no-

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natural companions

tion of what they want. That way, I can start by giving them a sense of who *I* am with my ideas while not forcing preconceived notions on them before they're ready to make final decisions. Often, I never even get to relay these ideas, because most times clients are fairly clear about what they want.

With David's overall layout in mind, I

began my process of discovery with the clients in an initial meeting that was all about them and their expectations – and, of course, an opportunity for me to evaluate views from inside the house and around the yard.

We looked at pictures she'd cut out that represented her likes and dislikes. Soon, it was clear to me that her sense of style She was after a sophisticated, elegant, clean, low-maintenance planting, which meant my initial thoughts about a lush, cottage-like planting needed adjustment.

was well developed and that she had a liking for clean lines, non-fussy appearances and lots of green. She also gravitated toward a more formal, symmetrical look, but not of the Boxwood-hedge type.

Instead, she was after a sophisticated, elegant, clean, low-maintenance planting, which meant my initial thoughts about a lush, cottage-like planting needed adjustment.

defining directions

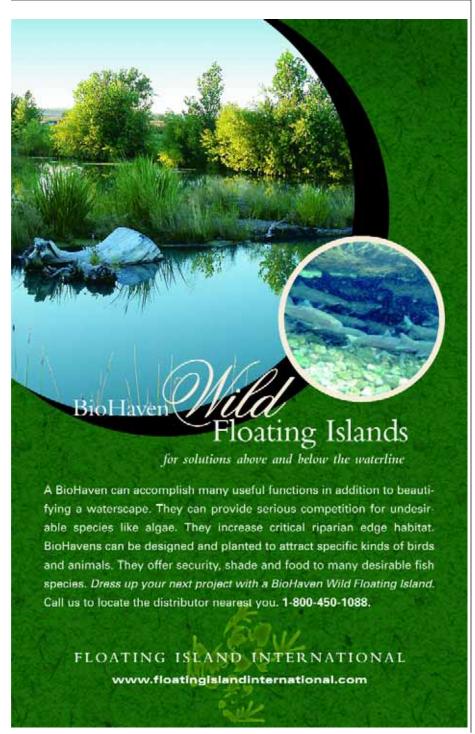
During our meeting, we consulted my color bible – Malcolm Hillier's *Color Garden* – to define her leanings with respect to color. She declared her preference for medium greens, indicating that we could also lean toward the yellow tones just a bit.

She tended toward oranges, reds and yellows, but always preferred the less-saturated pastels and medium tones with minimal contrast – and absolutely no purple was allowed. (This request made me sweat a bit, as in my area, purple and lavender are by far the most prevalent flower colors.)

She also rejected spiky foliage and annual color (not wanting to throw money away every few months), and any sort of meadow/wildflower look was totally out of the question.

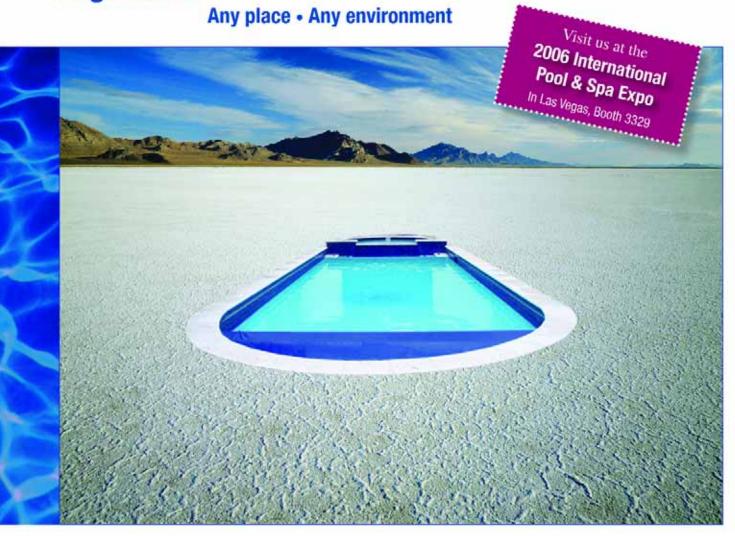
What became clear right away was that this plant palette was going to be much simpler than usual, but also that it would be quite distinctive – and different from anything I'd ever done before. With all these parameters defined, we scheduled a trip to the nursery. In preparation, I made a preliminary plant list based on our discussions.

Once at the nursery, we moved up and down the aisles with me pointing out plants I thought would work in the design. Quickly, I noticed that she liked only



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natural companions

those plants that had white flowers – or that didn't flower at all. When I pointed this out to her, she said she would love to have an all-white garden.

Of course, I know of famous, highend "white" gardens that work wonderfully, but in this particular case, I believed we couldn't achieve the look the client wanted. Considering the already-flat appearance of the yard and the barrier created by the hedge, I said that I'd advise against such an approach because it would make the yard look flat. Additional colors, I added, would lend depth to the design and that while I could use white as a principal color, I wanted the flexibility to use others.

She took note of my reservations and ac-

cepted my judgment, at which point I told her that I was now ready to insert plants into the design and would need a couple of weeks to prepare a final blueprint.

second thoughts

Once back in my studio, I reviewed the concept layout we'd agreed upon and began constructing the planting design in my head and on paper. I usually prepare tissue overlays of proposed plant layouts and then ponder a bit, picturing things in my head for a time to "see" if they work visually.

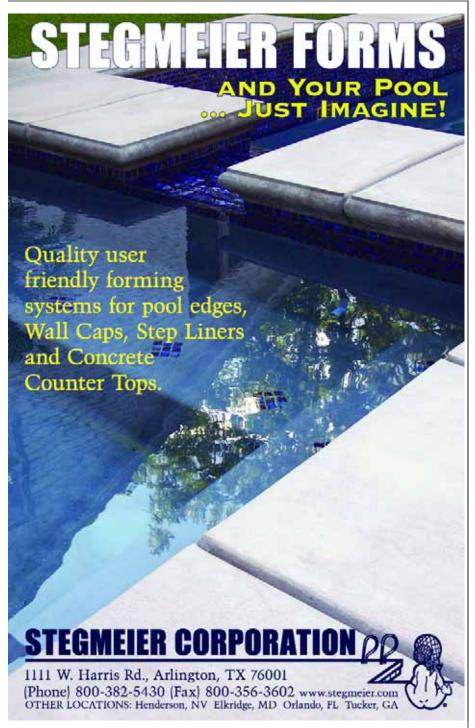
I find real value in drawing everything and then giving myself a few days to walk away: It gives me what I need to return to the plan with fresh eyes and make any adjustments that need to be made before committing to a blueprint.

This time, what became apparent to me was that I was being narrow-minded. The plant list for this project was much shorter than is typical: This enabled me to work through combinations in a way that led me to see that I could, in fact, give my client the white garden she wanted.

What I discovered as well was that I was in something of a rut when it came to thinking about color. I was relying (as always) on mixtures of color, line, texture and form to create interesting planting designs, but what I now recognized was that I could eliminate one of those elements and still develop a design filled with depth, dimension and interesting plant arrangements. What I needed to do for this client was rely more heavily on the texture and form of the plants and on the lines I was organizing within the design.

What became apparent to me is that, with most of my designs, I have always relied primarily on color – much more so than on any other element of planting design. In my case, all it took was the right client to shake things up. Needless to say, when I completed the design and called my client, she was surprised and delighted that I'd been able to create a design that used only white-flowered and non-flowering plants.

The yard is not yet complete as of this writing, but I am fully confident that the combination of medium green tones with a mix of textures, leaf sizes and plant forms and heights – and, of course, lots of white flowers – will provide my client



with the sophisticated, elegant garden she'd been envisioning.

revelations

My point in recounting this story has little to do with the ins and outs of creating a white garden. Rather, it has to do with the fact that, as designers, we tend to lean on tried-and-true design techniques that work for us. There's no problem with leaning on things that get the job done on a consistently high level, but what I learned through this process is that it's undesirable to block out the possibility of trying something new just because you have a knee-jerk reaction to it.

Whether it's a single-color garden or the use of a particular hardscape material you previously rejected, whether it's about being flexible in using line and flow patterns within a design or lining a pool with a distinctively colored plaster or pebble finish, what's important is to allow your mind to entertain these possibilities – particularly in the concept phase of a design process.

Ever since my encounter with the white garden, I approach my design work from a different angle. Instead of always talking about color with a client first, for example, I keep my eyes open and look for reasons to talk about plant forms or textures first to see what responses they elicit from my clients.

It may seem a small thing, but by forcing ourselves into territory that may seem uncomfortable, we expand our creative potential and find all sorts of new ideas and opportunities presenting themselves. Bottom line: Keep an open mind on any ideas your clients present, because the result may surprise you in highly positive ways.

Stephanie Rose runs Stephanie Rose Landscape Design in Encino, Calif. A specialist in residential garden design, her projects often include collaboration with custom pool builders. Stephanie is also Editor of LandShapes magazine and an instructor on landscape design for the Genesis 3 Design Group. If you have a specific question about landscaping (or simply want to exchange ideas), e-mail her at sroseld@earthlink.net.



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tisherman: detail 69

By David Tisherman

Corner Control



ith some details, seeing is believing.

That's certainly the case with the one we'll consider in this column, where the images will do much of the work in defining a simple but elegant way of making a statement with any raised bond beam or wall. Yet again, it's testimonial to the good things that happen when watershapers know how to control materials and infuse their work with visual appeal.

Most of the time when pool people build small or medium-size walls, they'll automatically be topped with some form of coping or capstone – anything from poured-in-place concrete or stone to brick or some pre-fabricated coping. Many of these walls are finished either with tile, stacked ledger stone, plaster or some other type of material that's appropriate for vertical surfacing.

The detail I'll cover here is about a way we can make these vertical and horizontal elements interact in subtle ways that can set our work apart.

In this case, the project involved the straightforward renovation of a 15-by-30-foot rectangular pool – the same pool, by the way, I put on display in my October 2006 column on page 24 to illustrate a favorite vertical-coping treatment. The customer wanted a clean, simple, architectural look with a sense of understated elegance – something that embodied design sophistication down to the finest points of the detailing.

The customer wanted a clean, simple, architectural look with a sense of understated elegance – something that embodied design sophistication down to the finest points of the detailing.

beyond ordinary

The standard approach to the detail in question would have involved carrying the cap or coping – in this instance a two-inch-thick Leuters limestone paving – over from the deck and across the entire top of the wall. This would have worked in most settings, but in this case, my client asked me for "something gorgeous," so I took a different path.

What we have here are intersections of materials – points of perpendicular interface – in which a beautiful blend of glass tile (made by Boyce & Bean of Oceanside, Calif.) shows off its visual qualities on both the horizontal and vertical planes and provides varying reflective and refractive qualities in response to the sun's angles. In addition, the tile picks up the green of the pool's plaster finish, creating highlights that will change as each day progresses.

Making this sort of effect work is all about care in the design process – and *absolute* care in construction.

In the design phase, this means knowing the materials and basing the dimensions of the step and beam structures on those materials before anything is done on site. Just as I described in last month's column, it's about knowing the tile's exact measurements – in this case, just over one inch square – and accommodating the need for grout lines as well as the need to have the horizontal grout joints in perfect alignment.

To get it right, you must establish the height of the wall and steps in a way that will see the tile butt up under the coping, turn the corners and cover the top of the wall without any cuts for clean, square corner details. That same level of planning goes into every other plane on which the tile appears, whether it turns a corner or terminates at the margin of another material – that is, over pretty much the entire structure.

Continued on page 26



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tisherman: detail 69

In addition to the exterior dimensions of the tile and the width of the grout lines, you also need to consider the tile's thickness as well as the thickness of the float. I firmly believe that these dimensional calculations absolutely must be in place before construction begins. Otherwise, you will invariably find places where you'll end up with half tiles and cuts that will blow the visual effect.

If you want things to line up, in other words, *plan* it that way. If you don't, the client will spend money on materials that aren't being used to their best effect – and in my book, that's just not right.

just so

The beam pictured here wound up being just over 12 inches tall, a measurement based *entirely* on the size of the tile and the space dedicated to the grout between those tiles.

If you get the dimensions of the tile field right, installation is little more than a matter of setting the tiles and lining



This detail is all about the interaction of finish materials at points where everything intersects – as in this corner. The glass tile is beautiful on horizontal and vertical planes that take advantage of its reflective and refractive qualities – both under the water and on the exposed wall. In this case and knowing the material and its dimensions, we set things up with a precision that made it possible to install the tile without cuts for the cleanest possible look – and lost no time whatsoever in having to make the tile fit an inexactly established space.





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tisherman: detail 69

them up – a much easier job than arises in those situations where spaces aren't established properly and the tile setter ends up spending hours slicing partial pieces to make the material fit. In other words, it's more labor-intensive to do things the wrong way, and the results *never* look as good.

Doing it my way, the "cost" is mak-

ing certain the structures are designed in accordance with the materials, and I see it as an easy investment in visual precision, overall beauty and, ultimately, client satisfaction.

Doubling back to last month's detail, I was advocating a similar sort of approach in setting up structures both within and beyond the pool – in this case, in

Doing it my way, the 'cost' is making certain the structures are designed in accordance with the materials.

developing exact dimensions for the wall (to allow a clean transition from the tile to the vertical coping) and the steps (to allow for placement of full-dimension stone veneers).

Here and elsewhere, these finishes and their dimensions determine the size of the raised bond beam and/or the concrete masonry units we use to create walls: They must be set up to accept the dimensions of the tile and grout lines as well as the depth of the float. Miss on any of these elements and the corner tile detail



All too often, builders and installers who don't fully understand what they're doing get in over their heads, and the result is that their clients lose, suppliers associated with the project lose and, ultimately, they themselves lose. This hurts the industry, and it's happening in an environment in which increasingly sophisticated clients know what they're after and won't settle for anything less than visual and functional perfection.

In the case of the detail discussed in the accompanying article, knowledge of materials is absolutely crucial to success: You can't enter the picture casually and expect to produce results that will satisfy the discriminating client.

My motivation in bringing up these issues is all about changing situations in which clients, suppliers and homeowners all come out as losers into win-win-win situations: It's all about knowledge we all should have and gaining an appreciation for the fact that decisions we make as watershape designers have significant ramifications we should be able to anticipate as projects unfold.

- **D.T.**





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tisherman: detail 69

I'm describing here simply will not work visually.

Let me hit a key point one last time: With this sort of detail, materials selection *cannot* be an afterthought and is instead integral to the design of the pool's structure.

I wish I could leave it at that and move on, but it's never been my observation that the majority of operations in the pool industry look at planning in so "detailed" a way. Tile in particular is chosen all too often as an afterthought, and don't even get me started in a discussion of the way some builders jam materials and details into template designs.

To a great degree, using the dimensions of veneer materials in the way I'm advo-

cating here defines a fundamental and enduring distinction between production and truly custom work.

client connections

In working with clients, I find that they almost all see the value of working with the fully integrated approach I follow and become immediately and passionately engaged in considering materials. They know from what I share with them that their choices will in no small way determine the appearance of the finished product.

This is the inverse of the standard poolindustry approach in which a salesperson persuades homeowners to select a pool shape from a template book, turns the project over to the drafting depart-

Color Play

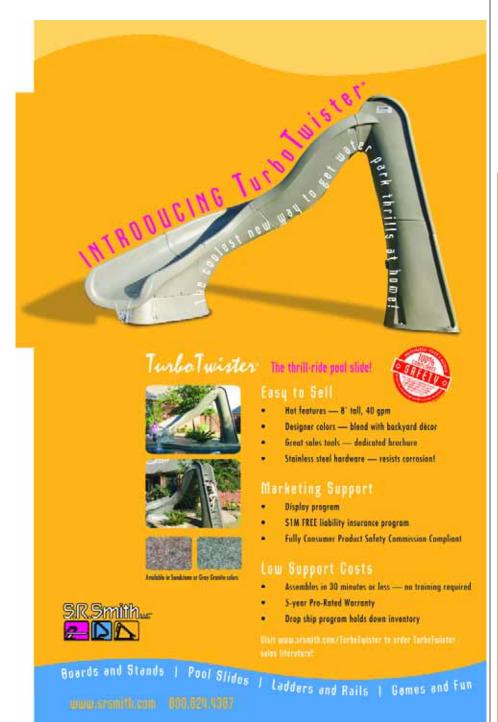
If you're working with transparent glass tiles (including the Boyce & Bean tile I used in the project described in this column as well as some lines from Sicis, the Italian glass-tile company), there's a possible opportunity to work with colors in unusual and, with proper execution, exceptionally beautiful ways.

For this project, I used a pure-white bonding agent to highlight the tiles' subtle textures and play up the blend I developed. In other contexts, it would be just as possible to add a pigment to the bonding agent. In this way, you substantially alter the apparent color of the tile and can devise just about any look you want.

This approach, however, is not for the casual builder: If you don't have a good grounding in color theory and the ways in which colors interact, for example, it's easy to get yourself in trouble with pigments. And if you overshoot and add too much pigment, you can destabilize the bonding agent and run into a nightmare with tile falling off the wall.

If you're confident in your abilities – and in those of your tile installers, of course – this is yet another approach to producing "something gorgeous."

-D.T.



In working with clients, I find that they almost all see the value of working with the fully integrated approach I follow and become immediately and passionately engaged in considering materials.

ment for plan generation – and then, almost invariably, the pool is built without finish materials having been selected.

Indeed, homeowners are usually called on to select tile, for instance, only after the shell is completed and usually after the decks are done. At this point, homeowners are usually pitched with upgrades – nicer ceramic tiles, for example, or maybe even glass tile – to finish raised bond beams or walls, but this comes at a point when the pool has already been built to accommodate a standard modular system. The upshot: All too often the new selection just doesn't quite fit the layout.

The detail I've discussed here seems simple when you look at the outcome, but it *does* require a level of precision and planning that *cannot* be achieved if materials are selected as an afterthought. It all needs to be worked out before construction begins.

In this particular case, it all started with the glass tile, a custom blend I mixed using clear, iridescent and colored glass. Because of the way they're made, each tile piece has a subtle concentric-circle pattern within the glass that lends an unusual, compelling, internal dimensionality to the material that is ever-changing and a constant source of beauty and interest.

There's also a neutral-color limestone along with a rich, green plaster – and, behind the tile, a pure-white bonding agent that accentuates the tile's colors. (For more on color and bonding agents, see the sidebar on page 30.) As I see it, the juxtaposition of the rigid-looking limestone against the warm, inviting and visually dynamic tile material offers a great look – especially set against the landscaping.

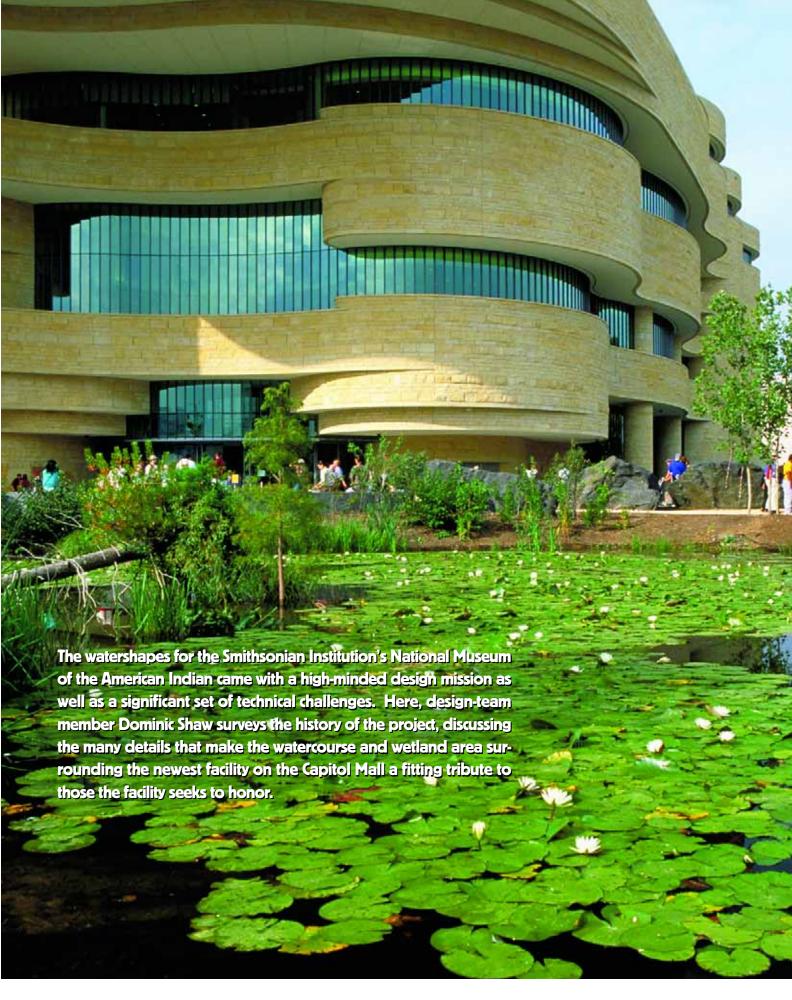
What appeals to my clients (and me) is that this is a look that doesn't jump out and proclaim itself: Rather, it makes a sculptural statement that becomes more complex and beautiful the more you look at it.

Next, we'll return to this project and look at a wall-spillway detail that finishes off the composition.

David Tisherman is the principal in two design/construction firms: David Tisherman's Visuals of Manhattan Beach, Calif., and Liquid Design of Cherry Hill, N.J. He is also co-founder and principal instructor for Genesis 3, A Design Group, which offers education aimed at top-of-the-line performance in aquatic design and construction. He can be reached at tisherman@verizon.net



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By Dominic Maw

Whether we function as designers or builders or both, we watershapers tend to be flexible folk: We mold ourselves to projects and situations and tasks when we're called on to apply our skills and experience, and this often leads us to perform in unanticipated ways. This sort of adaptability is a way of life for most of us: It's a talent we use to produce success.

But even the most adaptable practitioners of the watershaping arts will, every once in a while, encounter a project that shocks the system, alters all formulas and breaks down familiar parameters. In these rare cases, just surviving the process is an accomplishment that brings a sense of relief as well as a sense of amazement that both you and the project made it through to completion.

I was recently fortunate enough to be part of just such a project – a fascinating set of challenges now known as the Smithsonian Institution's National Museum of the American Indian in Washington, D.C. It's the last museum that will be placed on the Capitol Mall (at least in the foreseeable future), set between the Air & Space Museum and the National Botanical Garden within an easy walk of the nation's Capitol.

It's a spectacular installation, one that combines the highest expressions of naturalistic as well as architectural watershaping.

Gehry's extraordinary work in Bilbao, Portugal – and certainly stands out among the other classically styled buildings on the Capitol Mall or anywhere in Washington. It's a striking exercise in organic modernism, one that evokes Native American influences as well as refined 20th-century design sensibilities.

Indeed, the building's unique design and the degree to which it contrasts with its surroundings have been the sources of considerable controversy. That's a detour we won't pursue here other than to say it complicated the project's path to completion and led at one time to the dismissal of the entire design team - subsequently rehired.

The process began in 1993, a few years before I joined EDAW, the giant, San Francisco-based landscape architecture firm. My work on the museum's watershapes began in 1997, by which time some of the turmoil had subsided. Nonetheless, it was a creative environment filled with challenges, diverse ob-



The wetlands associated with the Museum of the American Indian in Washington, D.C., was intended to be as natural-seeming as possible – a key characteristic of the design

Given the site and the naturalistic goal, we decided to line the watershapes with natural Bentonite rather than a conventional fabricated liner. Beyond that, the systems were fairly conventional: biofilters, aeration in the storage cistern and a bacterial-injection system were deployed to assist in the maintenance of water flowing through the heavily planted wetland area.

-D.S.

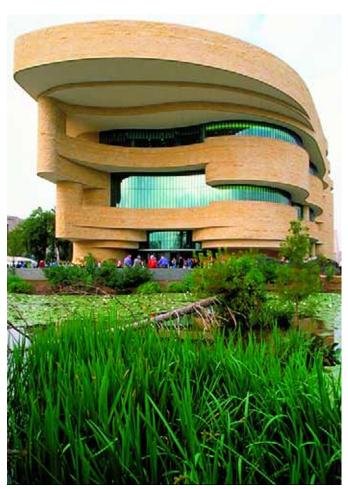
jectives and discussions that swirled around our work all the way through the construction and commissioning processes.

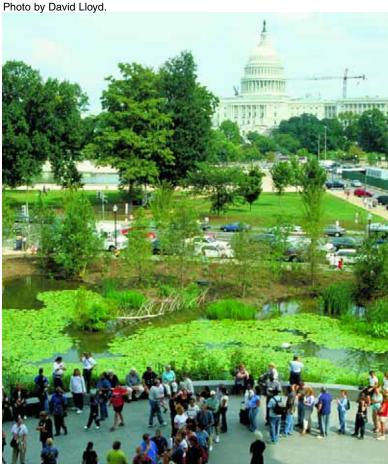
What was always clear was that there were two separate and distinct water elements on the project, one a constructed wetland at the east-facing entry to the building, the other an architectural fountain and watercourse that started at the building's northwest corner and was meant to flow along its north side.

The original design symbolically connected the watercourse and wetlands across the entry plaza to the building, but because of the scale and projected uses of that space, it was agreed that any sort of visual connection between the two bodies of water would be lost on pedestrians entering the museum or taking in ceremonial activities outside the museum's entrance. As a result, the visual connection was abandoned, leaving us to treat the two bodies of water as completely separate.

With all this sort of give and take, the design process itself is as much part of the story as is the finished project and came with its share of surprises on its own. By the time I came on the scene, for instance, the design team consisted of not one but two architecture firms; various representatives of civil, mechanical and structural engineering firms; and landscape and advisory architects from EDAW and Jones & Jones Architects & Landscape Architects of Seattle.

The last pair of firms in the team listed above set up an interesting relationship in that EDAW and Jones & Jones typically compete with one anoth-







er but were in this instance asked to cooperate and collaborate.

As the scope of work was arranged, the Alexandria, Va., office of EDAW became responsible for the design of the landscaped areas around the building (including the wetland), while Jones & Jones took charge of the watercourse and stone outcropping that ran alongside and was, for all intents and purposes, part of the building. Indeed, most of the watershape structure adjoined the building's exterior wall, shared finishes with it and sat on a structural slab that formed the roof of a sub-grade loading dock.

The waterfeature studio in EDAW's Fort Collins, Colo., office (for which I was responsible) was charged with detailing and documenting all systems associated with the wetlands as well as the watercourse's hydraulic, filtration and electrical systems. In addition, its staff coordinated the architectural details having to do with critical water elements including the weirs, ledges and overflow devices.

This division of labor put our Colorado team in the unique position of working with our own company's Alexandria office for the wetlands and with Jones & Jones for the watercourse. At each step of the design process, lead architects at Detroit-based Smith Group had to weigh in on the interaction of the fountain and building structure.

In addition to all of the design, engineering and technical talent, the design team also included a group of Native

The Muleum of the American Indian is about as daring a structure as could be imagined for Washington's Capitol Mall, with its undulating architecture a stark contrast to the Classical, Victorian and Modernist buildings that surround it. Given that daring intrusion, the wetlands area seems right at home adjacent to the museum's grand entry plaza – a primeval oasis in the visual shadow of the nation's Capitol Building.

American professionals from across the continent who had been asked to guide the project and define it as a collaboration of their people. This input to the process was always important, but what they were after was often difficult to define – as will be described a bit later on.

The team was large enough that outside observers might have viewed it as unwieldy at best and unworkable at worst, but the fact of the matter is that we coalesced around the tasks at hand and moved forward, each component of the team with a sense of high purpose and ambition to see the project through to success.

Weller Wellands

As mentioned above, one function of my project group had to do with the land-scaping of the overall site and the composition of its wetland area.

In this, much of our focus was on assembling a planting scheme for the land-scape and the wetland area based on native species as well as plants commonly used by Native Americans. We also began our work with the concept that, like a truly natural system, the wetlands should dry up during the appropriate season to show how working with nature in all its diversity was a fact of life for early Americans.

This idea soon became the subject of debate within the design team, as the dry season locally would begin midsummer and would include most of July – one of the Capitol Mall's busiest tourist months.

After some discussion, we resolved the apparent conflict by providing a means of raising and lowering the water level in the wetlands, thereby visually accomplishing our design intent without completely drying up one of the most prominent features of the museum's entrance.

As we progressed through the design of the wetlands, we looked for opportunities to minimize our use of municipal water on site. This led us to establish a water-reclamation system in which rain falling on approximately one-third of the museum's roof area is collected for storage in a large, underground cistern.

This required a good bit of planning, as the quality of the stored water had to





match the quality of the water in the aboveground systems the cistern was meant to supply.

The solution was reasonably straightforward: Instead of maintaining the cistern system separately, we integrated it into the wetlands' circulation system. This means that, in addition to being aerated, the water in the tank is constantly in motion and fits in as part of the watershape's biological-treatment cycle.

This arrangement also facilitated our desire to change water levels in the wetlands on a seasonal basis, with the capacity of the cistern serving as storage for "excess" wetland water. This enabled us to manipulate water levels without sending any water to waste, with relative levels in both vessels controlled by turning a few valves.

Desple 4 difficult project evolution, the nature of the site and the artistic intent of the watershapes made for some intensive pre-planning and engineering. Sleeves for our lines, for example, had to be placed in the museum's substructure at a time well before final plans for the watershapes had been prepared, and the emergent desire to put the watercourse's stonework on display led to design of large, long inlets that help the system perform with relatively little turbulence.

The nearby fountain and "architectural" watercourse came with its own set of design requirements - a mass of details that made the work difficult to define and articulate.

One substantial challenge, for example, came in reproducing different "voices" of water that one might hear from the cascades and riffles of a natural watercourse. This voicing was one of the strong desires of the Native American participants on the design team and led to a complex process of defining sounds in ways that could be communicated first to the architects and designers and then to the contractors in the form of details that could actually be built.

Helpfully, our staff has lots of experience in designing weir profiles and cascade elements that use different flows to change the mass of water – a process that, in turn, changes the sound water makes as it collides with stone or water. The cascades we worked with ranged from about three meters (as a government project, the job was executed using the metric system) to just three-quarters of a meter in height and fell onto stone boulders or shelves or into shallow pools.

In writing the extensive specifications, we noted that extensive "tooling" of the weir surfaces would be required - a roughening of the stone that would create different patterns on the waterfalls and result in different voices. In addition, we placed numerous stones and boulders in the watercourse's lower pools to deflect and reflect water and create voids, all by way of manipulating the way the water sounded as it moved.

This stone detailing was at its most intense around the cascades, with multiple weirs in the same pool set at different elevations to create different flows of water from a single source. Moreover, each stone situated in and around the cascades had to be detailed on the drawings to ensure its proper fit on the undulating face of the watershape and along the building's Kasota limestone façade. (Because of the porous nature of the limestone, we



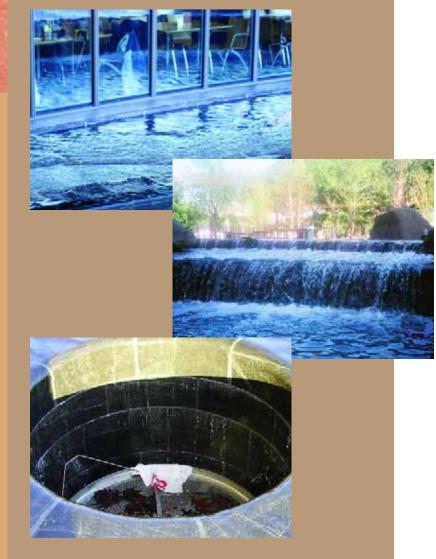
windows look out over a fountain that cascades directly toward the windows in a way that makes the outdoor waterfeature a direct part of the indoor experience.

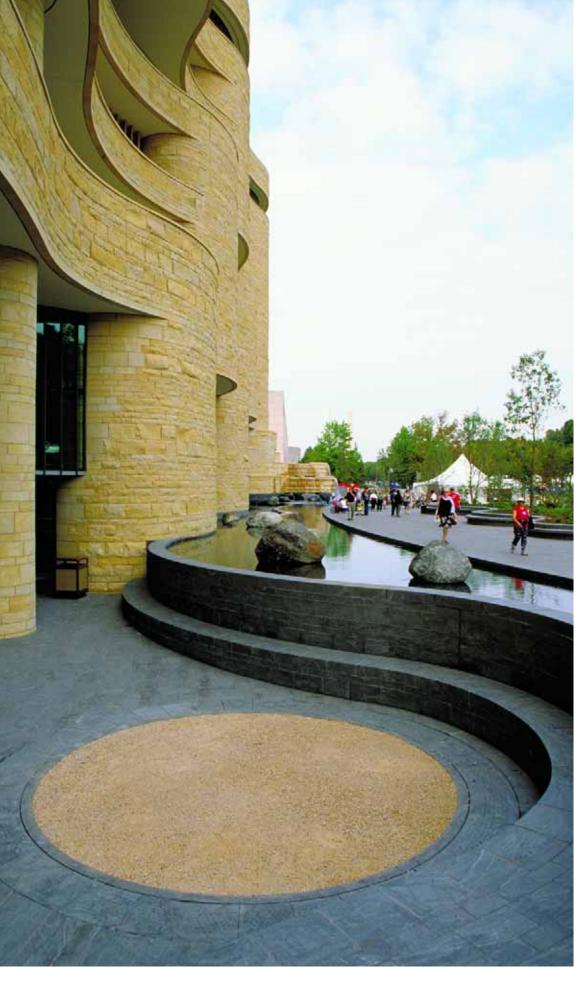
The positioning of this detail made for complications in the overall design: The multiple water levels and the placement of the windows in the middle of the watercourse raised issues in making the water flow, as planned, from west to east.

To make it work, we introduced a low-level terminus element at the east end of the watercourse next to the main entry. Here, the water slips into a granite-lined "hole" in the middle of the pool, creating a radial flow pattern on the water's surface. We knew this would become a target for coins, so we designed a removable coin basket in the depression that would catch a majority of the coins while letting other debris pass.

This was a gravity-driven system, which meant that all return piping had to be planned and accommodated as part of the building's design and structural engineering. In other words, all the drainage sleeves had to be installed, with proper slopes, more than a year before we began any of our work on the watercourse.

-D.S.





building from west to east, a sleek, curvaceous watercourse snakes its way across the plaza while creating special areas for pedestrians and museum visitors to relax and appreciate the stonework and the water's passage to its terminal well.



Panting Pains

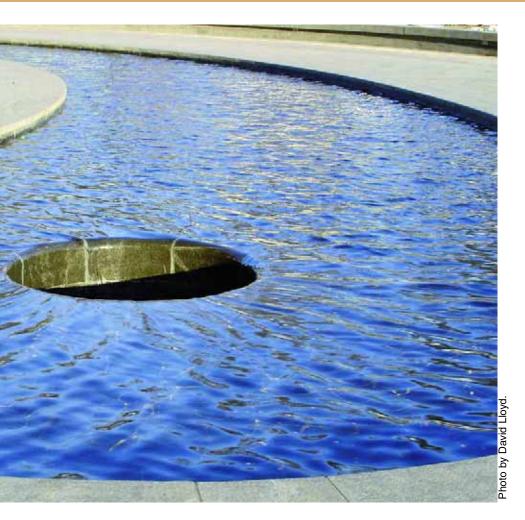
They say when you work in Washington, D.C., you never know what will happen – and that was certainly true for some aspects of this project. With the wetlands area, for example, once it was planted and started looking less like a construction site and more like a natural watershape, a group of ducks took up residence.

But these were no ordinary ducks. Rather, they were federally protected ducks that adopted the wetlands as their new home. This is exactly what we hoped would happen, but it came too soon and the upshot was that ducks we couldn't mess with in any way all feasted on the shoots we'd painstaking planted to bring the wetlands to life.

To say that the landscape contractor was miffed is an understatement and doubtless many a day was spent hoping some federally protected foxes or coyotes would find the watershape in time to balance things out a bit.

long, ducks took up residence in the wetlands and on the watercourse and wreaked particular havoc on the young plants in the wetlands area. They may have shown up prematurely, but their presence confirmed that we'd achieved our aim of developing a truly 'natural' wetland scene.



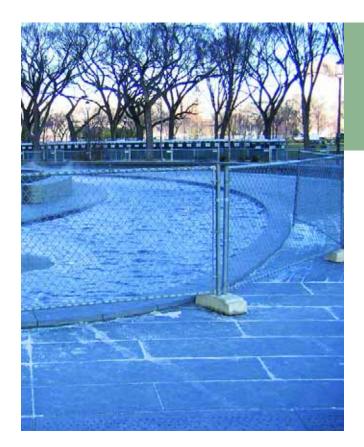


used a similar-colored granite in the wet areas of the fountain pools.)

To highlight the stone, the design called for water depths not to exceed six inches in all visually accessible pools. This desire for visibility of the stone finishes made clarity a substantial issue. Given the system's 7,000 gpm flow, this meant we had to design all of the inlets for extremely slow velocities to avoid surface disturbances and to avoid having mechanical systems disrupt the perception of the setting's naturalism. To that end, inlets were imbedded into walls and trimmed in granite, while drain fittings were masked with cut-granite stones.

The pools were too shallow for use of conventional suction arrays, so a system of overflows and gravity-fed drain piping was used to move water from the pools and basins to a surge tank placed in the museum's basement. Much detailing went into setting up these overflows in a way that allowed the water to be maintained at the same level as the sidewalk near the building's northwest entry — as well as having the water flowing down and toward the building at two cafeteria window wells.

The openings for these overflows had to be visually unobtrusive, but they also



had to be large enough to allow debris into the piping and then into the surge tank for collection in large basket strainers on all three of the system pumps.

Lold bellow

By design, the watercourse and fountains are to operate year 'round, which led us to set up a heat exchanger on the filter loop to keep the water from freezing in winter. This task was facilitated by the fact we could tie our system into the building's boiler-based heating system.

Our aim was to maintain the water at about 40 degrees when local air temperatures slid below freezing, but as it turns out, the temperature wasn't set when the museum opened in September 2004. That first winter, the water temperature proved to be too high, so steam billowed from the fountain, floated away from the basin and condensed over the walkways as snow and ice. Once the temperatures were adjusted appropriately, the steam and snow went away.

In addition to this heating issue, another unique lesson had to do with the amount of water that ended up flowing into the surge tank when the watercourse was shut down.

We had calculated that a rise to about the three-meter mark could be expected in the tank, which was 2.7 meters wide, 4 meters long and 5.5 meters tall. When we shut the fountain down, however, an extra meter of water flowed to the tank. After rechecking our calculations and confirming they'd been correct, we were left to find the source of the additional water.

A simple adjustment took care of the issue, but during the first winter of operation, we discovered that the water, which was purposefully warmed using the museum's boiler system so it would flow freely year 'round, was just a little too warm – the result being the creation of a dense fog over the water that precipitated as ice on the surrounding stonework and decks.

The answer had to do with the granite material we used to create the weirs in the shallow pools – monolithic blocks with split-face finishes. Because of the variability of the splitting process, these stones come with generous plus-or-minus tolerances.

In surveying the system, we found a single joint along more than 95 total meters of weir stones had a greater minus tolerance than the rest of the stones and allowed an extra 40 millimeters (about an inch and a half) more water out of the pool and into the tank than we'd anticipated. Happily, the tank had the capacity to handle the extra water, so we were able to leave well enough alone.

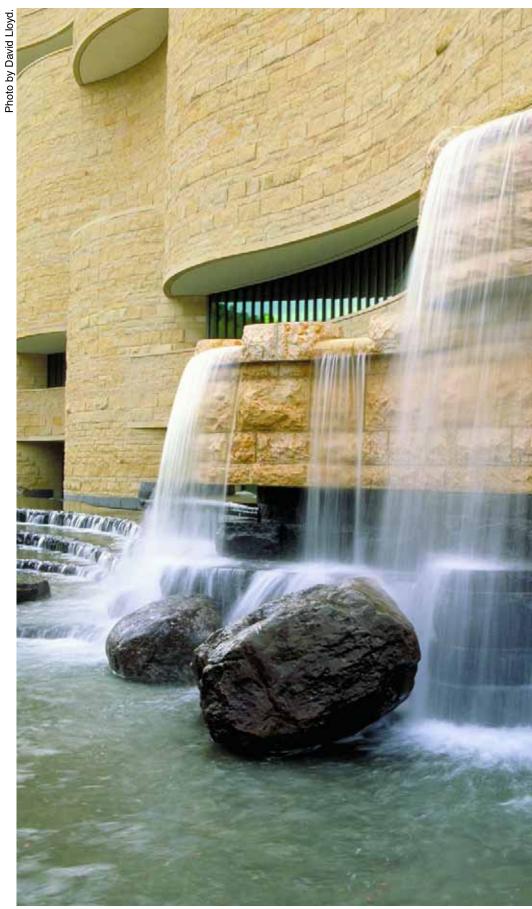
This experience did, however, teach us a lesson about how some of the smallest details in the construction process can have a great effect on the operation of mechanical systems. This is the sort of lesson watershapers always seem to learn in big projects, where unexpected consequences become the building blocks for increased skill and expertise.

Photo by David Lloyd.



The waler all and cascades of the Museum of the American Indian have been infused with great significance through the participation of Native Americans who worked with us to 'tune' the sounds of the falling water through meticulous, painstaking placement of rock and boulders in the cascades and watercourse and through detailed tooling of the weir edges. The outcome is both a visual and aural treat.











By Mark Holden & Donovan Brown

There are some things that are better seen than described.

In the case of pool and spa equipment, for example, there are situations in which manufacturer instructions or two-dimensional plan drawings simply do not give the installer all the information needed to get things right the first time. As a result – and as everyone who installs equipment sets knows full well – the plumbing and layout of the equipment usually requires some level of on-site improvisation.

In our work of designing hydraulic systems for complex watershapes – everything from commercial pool facilities to interactive waterfeatures and fountains – we've seen the need to find a way to specify *precisely* how we want our equipment sets to be installed. No two-dimensional plumbing schematic or manufacturer-supplied manual does that part of the job. That is, they do not completely delineate the way combinations of components should all go together.

The shortcomings in this documentation have to do with the fact that the illustrations don't show equipment arrays in three dimensions, despite the fact that pumps, filters, heaters, chemical systems, control systems and everything else that collides on equipment pads is plumbed in three dimensions. This is why plumbers so often have to improvise.

This is also why, to address that gap, we began developing representations of equipment sets that give information that simply can't be communicated with flat, two-dimensional renderings.

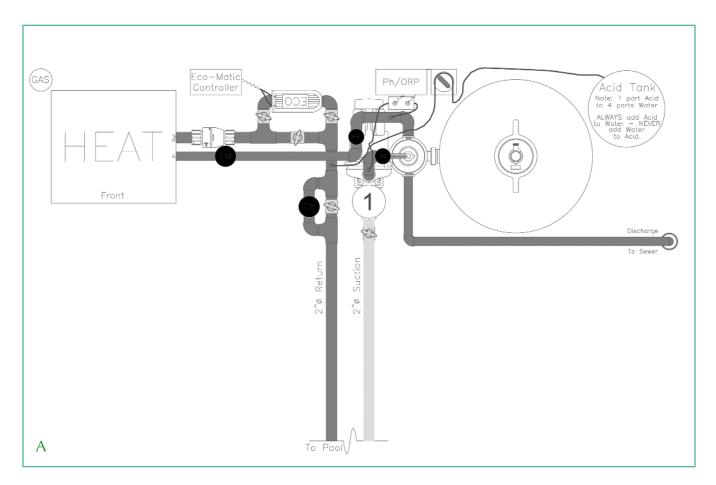
Reasonable Measures

We headed in this direction for two main reasons: First, we wanted to provide tight specifications that defined tasks at hand down to the finest level possible. Second, we wanted our systems to be plumbed a certain way. Without firm guidance, there was simply no way to ensure that what we designed would be installed as specified.

What we'd been running into was the fact that, with the advent of new technology, plumbers were often asked to install pieces of equipment they'd never seen before. In an ideal world, the installer encountering an unknown device would sit down and read through all of the installation instructions to make certain he or she understood critical installation factors – but that's simply not the reality of the process.

Occasionally, of course, things are done the right way and instructions will actually be followed, but

Illustrations by Richard Ceja & Donovan Brown.

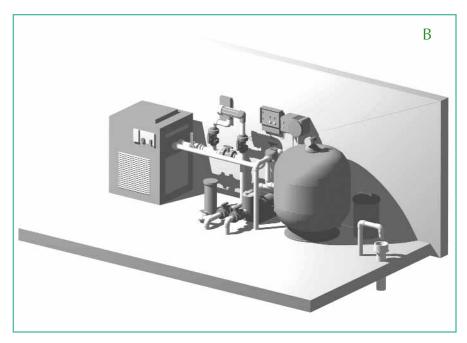


nine times out of ten, that's just not the case. Given a situation in which we don't know how much the installers will be willing to read or even if they read or speak English, we decided that we were leaving too much to chance in a critical, functionally significant area of our projects.

In our observation, most watershapers simply make the assumption that the equipment installation will be handled competently, but these days, and given the increasingly critical operations of modern watershapes, we see that a hands-off approach simply leaves too many issues to chance – an unacceptable state of affairs.

For us, the question became: How are we going to communicate with our clients' plumbers? Assuming the worst – that is, that they do not read the information available to them – the solution seemed obvious: What we really needed to do was to make the documentation for plumbing installations *pictorial*.

Our thinking was, if the installers were looking at a three-dimensional image, it was far more likely they would be able No matter how clean the two-dimensional illustrations we generated for our equipment sets were (A), they never gave plumbers and installers all the information they needed to follow through on the job site in a direct, sensible way. When we added a third dimension, however, spatial relationships were dramatically clarified (B) – and the layout and installation processes became radically simplified.



to visualize exactly what they needed to do. After all, these images tell the whole story – of how the valves are oriented, for example, and the way the fittings go together or the manifold should look when it's finished.

In short, such a pictorial rendering would show them the proper orientations of all the major pieces of equipment in one neat, entirely visual package.

Space Savers

As we considered these possibilities, it also occurred to us that three-dimensional plans might help us out in a number of additional ways. The space required for equipment is, for instance, a major issue that three-dimensional renderings helped us resolve.

In many situations, architects, landscape architects, general contractors or developers will assign "space" for an equipment pad without knowing the size of the actual set. As best we can tell, these spaces are typically allocated as a matter of guesswork based on past jobs or, perhaps, projects seen elsewhere.

It's no secret that many of these designers want lots of functionality in their watershapes but really haven't a clue what type of equipment is involved in making it happen, let alone its size or physical orientation of that equipment relative to other devices on the equipment pad. In two-dimensional drafting, we can show a great deal of detail related to basic equipment dimensions, pipe sizes and component connections, but experience

shows that these flat plans are inadequate as on-site guides.

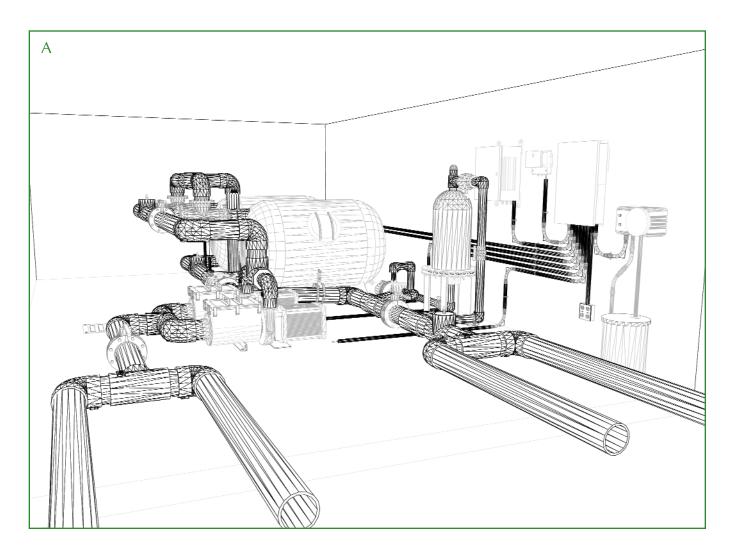
By contrast, three-dimensional views bring us much closer to the way things actually look and go together in the field. This clarity enables specifiers to nail down actual space requirements with great precision, thus avoiding the need for changes on site where space comes at a premium – especially if the equipment is to be installed inside some kind of building or structure. When things go wrong, options such as moving walls or changing the way the system works because of unalterable space limitations are far from desirable.

With three-dimensional views, objects have the same "volume" they have in the real world, so we're able to plan the space for maximum efficiency and with great confidence in the space solutions we develop. We know for certain, for example, if we'll have enough straight piping to install a flow meter. And if we have two pieces of parallel plumbing and one is to include a check valve, we can see how close together they are and make allowances for the fittings — details that make a huge difference in the field and that can become problems if plumbers improvise.

Or consider ports on heaters, which are typically very close together: If they're

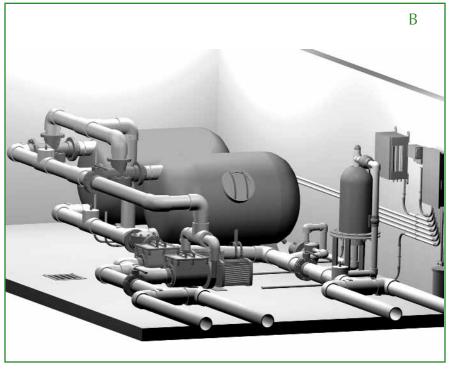


The improper installation of one of these salt-chlorination cells is what led us to get involved in detailing our equipment sets in three dimensions. (Notice that one cell is installed in the correct upright position and that the other is at about a 90-degree angle, despite the supplier's recommendation.) Working in three dimensions, we were able, without taking up any additional space, to illustrate a better way to get the job done and allow both cells to produce the same level of chlorine.



plumbed with straight pipes only, no problem, but as soon as you add a check valve or some sort of directional valve, things get far more complicated. We've spotted issues in our three-dimensional drawings – such as the arm of a valve not having adequate room for complete rotation – and have been able to address them at the schematic stage rather than on site. The adjustments may only involve fractions of inches, but in terms of basic functionality, they can be extraordinarily important.

When we started down this path, our method involved creating two-dimensional schematics first – still a necessary step for health and building inspectors. What we found, however, is that we were changing so many details in the two-dimensional plans as a result of what we were seeing in the three-dimensional renderings that we now prepare our three-dimensional schematics first – then work



back to the flat plans for the inspectors.

Fleshed Out

Developing three-dimensional images for equipment arrays is nothing new in other industries, but as far as we can tell, it hasn't found wide application in the pool and spa realm.

The process is straightforward: We render the images in a CAD program that's

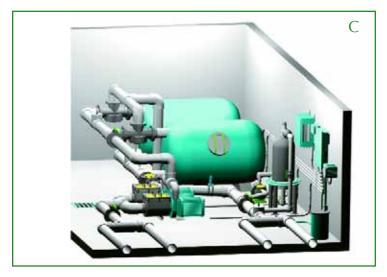
used for exactly this type of application across a wide range of design disciplines. But where those who design everything from automobiles to landscapes can refer to Internet sites loaded with stock images they can use, we've had to go to great lengths in obtaining the accurate dimensional data required to generate the glossary of images we're using.

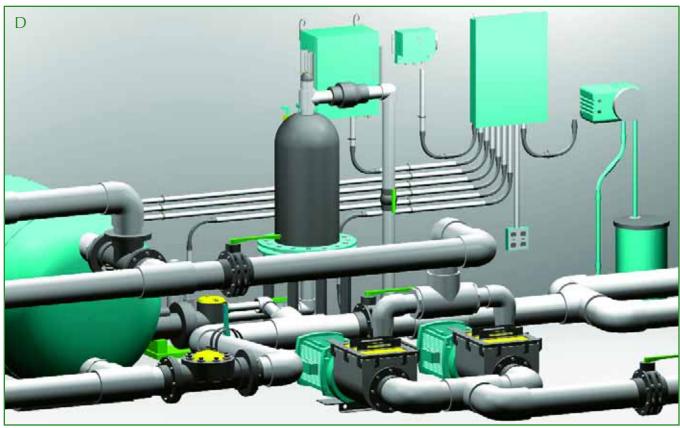
In many cases, we've gone to manu-

facturers to obtain original design drawings they used to make their various pieces of equipment. In others, we've been able to find what we need in product specifications. The basic point is that we had to go well beyond the kind of information found in a typical catalogue or brochure.

We need two key pieces of information to generate our images: correct dimensional information on the object it-

The world of three-dimensional drafting starts with the assembly of wire-frame models (A) that are subsequently surface-rendered to produce final textures (B) and colors (C). Once this information is captured, we can make alterations in networks without having to start from scratch. Moreover, because we can see how everything fits in dimensional terms, we can make the equipment set as compact as possible while still maintaining a focus on serviceability. Best of all, we can generate drawings from different perspectives (D), moving around the set to give complete, detailed guidance to plumbers and installers – and in this case noticing an issue with routing of the return lines that we resolved before anyone else saw the drawings.





self as well as exact locations of the inlets and outlets for plumbing and electrical connections. Everything else in the image is incidental or cosmetic and makes no difference so long as the key dimensions are correct. Just the same, we try to pin the volume and shape of the objects as close to reality as possible as a visualization tool.

Accuracy is most critical with new products installers haven't seen before (such as the saltwater chlorinating systems mentioned in the sidebar on page 49). It's also unusually important with electrical conduit and control boxes, especially given the fact that more and more equipment can be tied to control systems these days. If we're able to show conduit layouts exactly, installation will go faster, look neater and seem more "professional" because the installers know how everything should look.

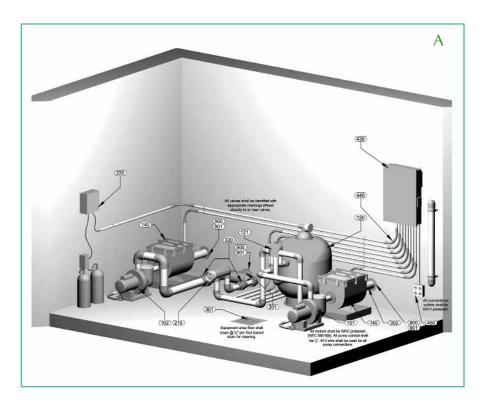
The level of detail is indeed fantastic. We can clearly define routes for chemical-injector tubing, for example, that prevent problems of pinching or crimping that can arise when installers improvise in the field. With our drawings, we show the installer that the tubes run through their own conduits, effectively creating double containment that will prevent damage and ensure proper operation.

Of course, all of this can be spelled out in a specification or represented in two-dimensional drawings, but showing it in three dimensions enables us to illustrate *exactly* where and how the tubing and conduit should run relative to everything else on the pad. As a result, the odds in favor of proper installation increase dramatically.

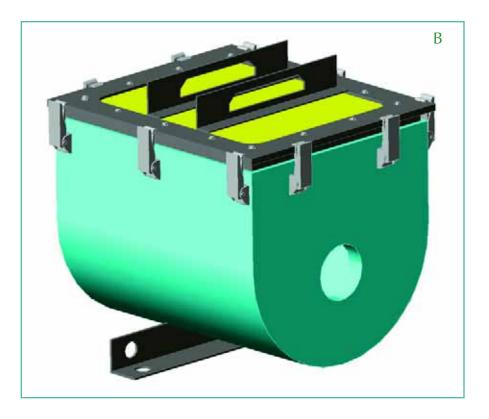
Tighter Bids

Another benefit to this type of drafting is that it enables contractors to develop extremely accurate bids. If so inclined, you can measure the required plumbing to the fraction of an inch and make spot-on counts for fittings and other important components.

In most cases even these days, bidding on construction of equipment pads involves a great deal of guesswork and inclusion of fudge factors that cover items that can't easily be measured or counted without the sort of detailed rendering



Even small, residential waterfeatures can benefit when we illustrate their equipment pads in three dimensions, basically because we leave nothing to the imagination so there's no guess-work at installation time (A). So far, few manufacturers are ready to supply us with three-dimensional images, so we generate our own using their two-dimensional drawings and plug them into our set drawings when needed, as with this strainer (B). It can be a time-consuming process, but we see it as being well worth the investment.



we're pursuing. We don't like guesswork in our projects, and this system effectively eliminates it.

Finally, because we can ensure proper installation of system components, the reliability of those pieces of equipment increases substantially. We're not spending much time in troubleshooting at start-up as a result, and the frequency of replacement or warranty work has dropped dramatically because almost everything is being installed as specified for optimal efficiency.

When problems arise, we often spot the trouble simply by comparing the actual pad to the three-dimensional rendering, greatly diminishing the need for time-consuming detective work. To be sure, this approach has required an investment in the technology and in developing a roster of images. But already, the benefits to our business have far outdistanced the expense and hassle of getting up to speed with this type of drafting.

We see this as an evolutionary "next step" for the watershaping trades — one that stands to benefit everyone from equipment suppliers and designers straight through to installers and end users. It's an approach that seriously reduces frustration at every level and dramatically increases the possibility that equipment will be installed properly the first time around.

It's a positive development for all project participants – and another operational function we no longer leave to chance.

Salty Solutions

As watershapers and designers of hydraulic systems, we are expected to be up to date with all of the newest products available on the market.

Among new devices gaining a strong foothold in the marketplace, salt chlorination units are among the hottest – but they come in such an array of configurations and with such a wide variety of installations specifications that it's difficult for installers to keep up.

We've run into lots of issues with the plumbers who install salt cells and their housings every which way, even when presented with detailed instruction manuals. Their willingness to improvise frequently leads to incorrect installations and poor performance, and it's a plain fact that our former two-dimensional mechanical plans weren't of much help in conveying the intricacies of the installations.

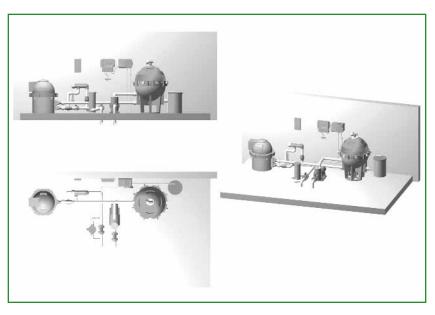
We've corrected the situation with three-dimensional details that show plumbers exactly how to arrange things and avoid the conflicts that arise when certain cells are, for example, set too close to heaters. (This conflict changed our standard detail and caught the attention of the device manufacturer's technical representatives, who had never contemplated the complexities of working around a heater header.)

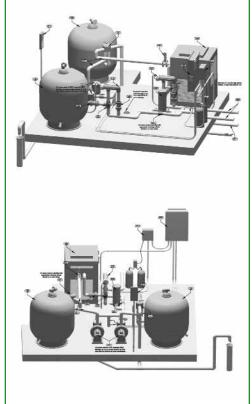
The illustration shown here indicates the way the pipe had to be bowed in this case to allow the connection of the cell – a case in which a three-dimensional rendering cleaned up a potential problem and is helping the manufacturer eliminate heater problems with future projects.

-M.H. & D.B.

A key advantage of the three-dimensional approach is the ability it gives us to rotate the image on screen and generate drawings of every key angle a plumber or installer might need to consider. This ability to see interactions between products and piping

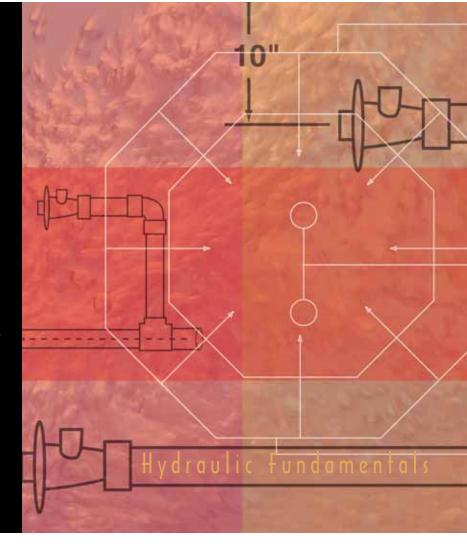
was never possible before – except on site, by which time the undesirable improvisations had usually begun. Now we can virtually fly into a set of equipment, navigate around potential issues and make certain what we're after is completely buildable – first time, every time.





Over the Edge By Steve Gutai

Common to a huge percentage of watershapes, weirs play starring roles in the performance of everything from vanishing edges to naturalistic waterfalls. But common does not mean simple, says hydraulics expert Steve Gutai, who takes this opportunity to explore the physical characteristics of weir types, the ways they influence hydraulic design and basic approaches watershapers can use to keep things straight when pushing water over an edge.



rom the grandest waterfall to the smallest courtyard fountain, water flowing over an edge is one of the most compelling of all watershaping "looks." Whether it's a vanishing edge or a slot overflow or a trough, runnel or waterfall, these effects all use one common concept – that is, the *weir*.

Simply defined, a weir is a barrier or dam placed in a channel behind which fluid backs up and then falls through a notch and down the face of the weir. In most watershaping applications, water travels over the weir's edge or brink and into some kind of lower basin, trough or pool.

Physically and visually, water flow is driven by gravity in these systems. Once the water rises to a critical level above the weir's edge, gravity takes over and atmospheric pressure forces the water down the face of the weir, creating a low-pressure differential between the lower surface of the water and the surface of the weir.

Determining proper weir flow rates can be a challenge, but following a few simple steps – that is, determining proper weir design; calculating the required flow rate to achieve the desired effect; and establishing a circulation system that operates with the required flow rate – can take you a long way toward ensuring success in your designs.

As one might expect, there are complex formulas and mathematical processes that can be used to pinpoint the right details. Well beyond any such exercise, however, the nature of weirs requires an understanding on the part of the designer or builder of how they work and how they can be used to generate desired effects.

ON THE SURFACE

For all the hydraulic science that can go into setting up a weir, it's clear that the main reason they are used in watershaping projects has to do with aesthetics. For that reason, I've noticed a distinct tendency among designers and builders to

approach weir design with casual, ballpark calculations of required flows and, later on, rely heavily on valves and upsized pumps to mask inefficiencies in (or the absence of) hydraulic design.

Such approaches come up short, and I would argue that these systems should always be designed to come as close as possible to a defined, targeted flow.

Consider a typical vanishing-edge pool: Such a system requires separate pumps to drive the circulation system and the edge effect, an engineered catch basin and a weir over which the water flows to create the effect. Without care in system design, it's likely you will overbuild the system (at considerable extra expense) to achieve sufficient flow over the edge, or that you will undersize either the plumbing or the catch basin and produce a system that performs poorly. If things go wrong here, the result might be flooding or some other form of property damage.

Why would you want to send too much

water over a vanishing edge, thus requiring construction of a larger-than-necessary catch basin? Why would you create too much flow in a slot-overflow system, necessitating use of an upsized surge tank? Simply answered, it's always better to design these systems so that proper flows are maintained and associated structures are properly sized.

Thus, to achieve the effects our clients crave without the problems and inefficiencies that plague over- or undersized systems, anyone working on weir-based watershapes must have a clear understanding of the principles involved. And this applies across the board with everything from vanishing edges to naturalistic waterfalls: Although they look different and achieve distinctly different visual effects, the basic design ideas are all the same.

The water or fluid that falls through the notch of a weir can be measured in terms of *head*. The height or head of the water moving downstream over the weir is called its nappe – that is, the thickness of the wa-

The discharge over a weir depends on three factors: the dimension of the notch (its shape and length), head of the fluid (based on the difference between the head at the crest and at the surface of the liquid), and the approaching velocity of the water

ter that can be measured (typically in inch-

es) from the top of the weir crest to the

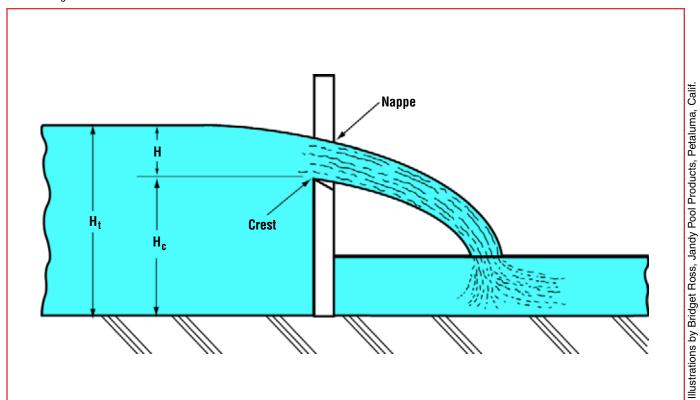
surface of the water (Figure 1).

as it enters the weir. Knowing precisely what's happening at this place – and anticipating what will happen visually once the water breaks the plane – enables a watershaper not only to enhance efficiency, but also to control aesthetics.

CONSIDERING CONTRACTIONS

Before we go on, let's run through some of the terminology hydraulic engineers use in discussing weirs. There's a distinct possibility these terms will never be of use to you in discussing projects with clients, subcontractors or anyone else involved in your projects, but I find it useful to look at things the way the engineers do as a means of understanding what they conThe nature of weirs requires an understanding on the part of the designer or builder of how they work and how they can be used to generate desired effects.

Figure 1: An illustration of *nappe* and *crest* - key terms used in measuring the flow of water through the notch of a weir.



WaterShapes · November 2006

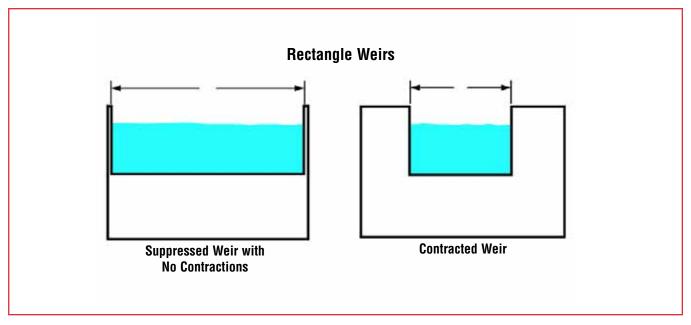


Figure 2: Of all weir types, rectangle weirs are those most commonly used in watershape applications.

Gravity of the Situation

Weirs are very different from other common features that create visible flows of water: Where jumping jets and fountain sprays are driven by pumps, weirs rely mainly on atmospheric pressure and the force of gravity to get their aesthetic work done.

Yes, a pump raises the surface of the water over the edge of a weir, but it is gravity that causes the water to flow over the edge from one level down to another. In hydraulic systems, the head or resistance a pump must overcome to make water flow is a huge factor. In a weir, however, that head only exists up to the point where water crests over the edge: From that point on, gravity is the only operating factor.

-S.G.

sider to be important.

In their world, rectangle weirs (the most common sort) fall into two basic categories, the first known as *suppressed weirs*, meaning they have no *end contractions* enclosing them at their sides – the most familiar example in our work being perimeter-overflow systems (Figure 2). By contrast, *non-suppressed weirs* have *contractions*, with vanishing edges, troughs and runnels falling into this category (Figure 3).

All weirs add to head in varying degrees. Weirs with end contractions often generate more resistance than do those without contractions – small differences, perhaps, but significant nonetheless because they are related to the head (or resistance) that a given system includes. The number of contractions is sometimes factored into weir formulas: If a watershape is designed with many runnels, for example, each one has two contractions and all of these contractions must be accounted for in a weir formula.

Contractions of any sort or degree come into play in a practical sense in that they accelerate the flow rate by narrowing the notch or channel through which the water flows. In that sense, their performance resembles plumbing in which, given a constant amount of pressure or vacuum, water will flow faster through a smaller pipe and more slowly through a bigger one.

In the case of a vanishing edge or slotoverflow pool, that acceleration of flow is miniscule because the contractions are so minor compared to the overall width of the weir. In a narrow runnel, however, the contractions dramatically increase the rate at which water falls over an edge.

In generating visual effects, you can assume that if you want the flow to be fast and vigorous, what you need to do is narrow the channel. If, by contrast, you want to slow the water down, you need to widen the channel. That's a very different way of thinking about or manipulating flow than is simply relying on an upsized pump — which is what too many people do *regardless* of the physical characteristics of the weir they're using.

ON THE BRINK

The first step in designing these systems in a formal way involves establishing the flow required over the edge of the weir. Remember the steps: Choose a flow rate that will work for your design, calculate that flow rate, and finally, design a system to accommodate it.

Without doubt, we could use mathematic coefficients to express these steps, but it's easy enough to grasp the issues on an intuitive level: We know that water flowing over a rough surface (an exposed

aggregate finish or stone) will inherently provide more head than will a smooth surface (tile or glass). Nonetheless, those differences are relatively minor in all but the most extreme cases, so digging deeper here isn't usually necessary as part of system design.

Ultimately, it's all about resistance and learning to work with and manipulate it. With a vanishing edge or perimeter overflow, for example, your aim is to create a precise, sharp edge that holds back as much water as possible right up to the point where it crests over the weir's edge. In a runnel or waterfall, your goal is exactly the opposite: You want to create as little resistance behind the weir as is possible.

In other words, the physical design of the weir has as much to do with generating the visual effect as does the flow rate over the edge. You can make water *appear* to have a very high flow rate just by configuring and orienting materials at the edge: A quarter inch of water flowing over a knife edge is going to look quite different from that same quarter inch flowing from the end of a runnel or notch, as in the spillover from a raised spa.

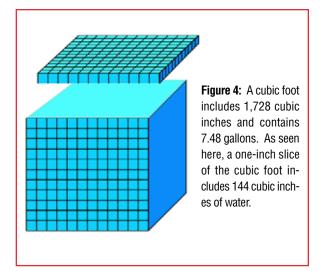
CALCULATING FLOW RATES

In the pool and spa industry, we typi-



Figure 3: The weirs in slotoverflow systems have no end contractions enclosing their sides (A), while those in vanishing-edge pools have contractions that affect the way water flows across the weir (B).





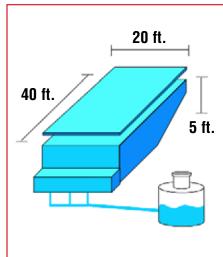


Figure 5: In this vanishing-edge pool, the surface area is 800 square feet. Knowing that, you can multiply 800 square feet by 144 cubic inches and get 115,200 cubic inches. Dividing that by 1,728 inches, you come to 66.7 cubic feet — which, multiplied by 7.48, translates to 499 gallons. If you divide that by four, you know that displacing a quarter inch of water sends about 125 gallons over the weir.

cally describe head dimension in raw physical terms as "a quarter inch of flow over the edge" or "an eighth of an inch of flow over the edge" – or whatever thickness of water there needs to be at the crest of the weir to achieve the desired visual effect. In this case, a quarter inch represents 4.5 gpm per linear foot.

The challenge of calculating weir flow rates gets more interesting depending upon the type of the weir and its shape, pitch, surface material and more. There are formulas that can be used with triangular, parabolic and trapezoidal weirs, to name a few, because all of them have different flow characteristics. Happily, we in watershaping deal primarily with rectangle weirs, which are not nearly as complicated as some of the systems you might encounter in, say, industrial materialshandling systems.

In fact, calculating the flow over a weir is not difficult once you understand the basic principles and learn to apply some calculations that should already be familiar to watershapers.

In doing so, you can take one of two paths: the Francis Equation or basic water-displacement calculations.

Both have limitations: On the one hand, the Francis Equation only accounts for the flow at the weir and does not accommodate a swimming pool's displacement or water in transit. (This water-displacement factor is important because it lets you know if the surge capacity is large enough to handle the flow of the weir and all of the water in transit.)

On the other, water-displacement calculations are quite simple, but they are limited because they only work if the reclamation time of water displacement matches up with the pumps.

SCHOOL FIGURES

For detailed information on the Francis Equation, see the sidebar on page 55. As for water-displacement calculations, they use the fact that a cubic foot of water is equal to 1,728 cubic inches (figuring the volume of a cube 12 inches high by 12 inches long by 12 inches deep creates a "vessel" that holds 1,728 cubic inches). Moreover, we can look at that cubic foot of water has having 12 layers that cover 144 cubic inches each (Figure 4).

To determine the volume of a quarter inch of displaced water, do the following calculation: Multiply 144 cubic inches by the surface area of the pool, then divide by 1,728 to determine cubic footage, then divide again by four to get down to a quarter inch of water. Now multiply by 7.48 to translate the quotient into gallons (Figure 5).

This is important to understand, because basing your weir flow rate on water-displacement calculations can be risky: As mentioned above, it only works if the reclamation time from the surface area of the pool matches the pump's flow. Thus, a pump with an output of 90 gpm can flood a 20-linear-foot weir wall (that is, raise the water a quarter inch) by generating a flow of 4.5 gpm per linear foot (see

the table in the Francis Equation sidebar).

If the surface area of the pool is about 578 square feet, the 90 gpm flow will lift the surface of the pool the requisite quarter inch and the pool will reclaim itself within about a minute. At this point the pump and the pool surface area are said to reclaim each other.

If the pool's surface area doubles to 1,156 square feet and you still want a quarter inch of water to flow over the edge, it would be incorrect to double the flow to 180 gpm. This is the subtle difference that leads many watershapers to oversize their pumps and plumbing. The point is, the weir design always dictates the flow rate: In that respect, even though water-displacement calculations are an integral part of these watershape designs, the Francis Equation is needed as an accurate means of determining the flow rate of the weir.

SIMPLE STEPS

Focusing on simplicity, consider what it takes to make water rise a quarter inch over the edge of a swimming pool and thus spill over a vanishing edge or into a slot.

All that's needed here is a determination of the weir flow rate in inches and then ultimately in gallons. If you can do these simple calculations, the great thing is that the same process can be used to manipulate and gain control of the type of effect created by the flow over the weir. If, for example, you wish to create a more vigorous flow, then use a half an inch as

A Formulaic Approach

Civil engineers use several equations to determine flow rates of flumes, canals and rivers by simply measuring water depths at weirs. The most important of these was developed by James B. Francis (1815-1892), a British-American engineer and founding member of the American Society of Civil Engineers.

His contribution, rightfully named the Francis Equation, says: $Q = 3.33(LH^{1.5} - 0.1 nH^{2.5})$

where

Q = Flow rate over the weir in cubic feet per second (ft³/sec)

L = Length of weir opening in feet (ft)

H = Head of water in feet (ft)

n = Quantity of end contractions (usually 0 or 2, but maybe more*)

Here's the same equation, expressed in more user-friendly units for watershapers:

 $q = 36Lh^{1.5} - 0.3nh^{2.5}$

where

q = Flow rate over the weir in gallons per minute (gpm)

L = Length of weir opening in feet (ft)

h = Head of water in inches (in.)

n = Ouantity of end contractions (usually 0 or 2, but maybe more*)

* If the weir is contracted, use 2 as the value for n because there are two contracted ends.

In the world of watershaping, the formula works out as follows: \square Assume a 20-by-40-foot, rectangular, slot-edge pool was designed to operate at 1 gpm/ft. The pump is selected to provide 1 gpm/ft x (20 feet + 40 feet + 20 feet + 40 feet) = 120 gpm total. After operating for several months, however, the pool has settled and measurements show the flow is one-sixteenth of an inch

too low in what is now a dry part of the edge. What additional flow rate is required to get the entire edge wet again?

Using the Francis Equation, $q = 36Lh^{1.5} - 0.3nh^{2.5} = 36(120 ft)(1/16 in.)^{1.5} - 0.3(0)(1/16 in.)^{2.5} = 67.5 gpm. In other words, we must now increase the flow rate by approximately 56 percent to keep the edge wet. This will increase friction, however, and actual energy usage will probably double.$

 \square A five-foot-wide waterfall is required to maintain a clear, unbroken sheet for a vertical drop of 5.5 feet. What flow rate is required? From the tapered weir design, it is determined that a head of one inch is required to maintain a clear, unbroken sheet for a vertical drop of four to six feet. Here, $q = 36Lh^{1.5} - 0.3nh^{2.5} = 36(5 ft)(1 in.)^{1.5} - 0.3(2)(1 in.)^{2.5} = 179 gpm.$

**

It is generally accepted that the Francis Eqaution has approximately a two-percent margin of error. This is basically negligible in system design, because there are other variables (such as friction loss in the plumbing) that otherwise affect the selection of a pump.

In addition to the limitation mentioned in the accompanying text, another limitation of the Francis Equation is that it requires the approach velocity of the fluid behind the weir to be low. This is not an issue for spa spillovers and edge systems, but it may result in prediction of lower flow rates than are actually measured when channels or runnels discharge over a weir. This is common with single spa spillovers.

Note as well that triangular, trapezoidal and circular weirs do not follow the Francis Equation. When designing custom weirs other than flat ones, it's probably best to get the help of an engineer.

- S.G. with David Peterson

, additions, a		N, O
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Head (h) in inches	Flow Rate (q) in gpm per foot of weir length
1/1/	0.5/
1/16	0.56
1/8	1.59
3/16	2.92
1/4	4.5
5/16	6.28
3/8	8.26
7/16	10.4
1/2	12.7
9/16	15.2
5/8	17.8
11/16	20.5
3/4	23.3
13/16	26.3
7/8	29.4
15/16	32.6
1	35.9
2	101

the basis of your calculations rather than a quarter inch. And if you're working on a waterfall, use a full inch or even two or three.

These are all simple calculations, of course, but there's more to the task at hand when it comes to producing required flow and desired aesthetic effects. In fact, I'd say that the physical configuring of the weir with respect to materials of construction as well as slope, direction and pitch are *at least* as important as getting the flow rate correct.

Through the years, I've often worked with Skip Phillips on weir designs for his vanishing-edge and slot-overflow pools and spas. The owner of Questar Pools & Spas in Escondido, Calif., co-founder of Genesis 3 and well-respected expert on the practicalities of hydraulic systems, he has been building vanishing-edge pools globally for more than 20 years.

Through those years, he's developed some touchstones for weir design, saying he keeps his flow rates on vanishing edges in the vicinity of five gallons per minute per linear foot of edge, while with slot overflows that rate can be as low as two gallons per minute per linear foot.

To him, however, it's at least as much about edge tolerance and understanding a specific weir's configuration. He uses charts for flow-related guidance (Figure 6), but generally speaking, Phillips says, "The sharper the edge, the lower the flow; the larger the radius at the crest of the weir, the more flow will be required."

While such touchstones are useful, approaching this part of watershaping as a science rather than as a casual exercise can have its advantages in developing systems that perform well (and as expected) and won't end up costing more than they should.

The point here is, no matter what type of weir you're working with and no matter what sort of visual effect you're striving for, understanding the hydraulic principles that make them work can greatly enhance your ability to create those visual effects with the greatest possible efficiency and at the least cost.

There's certainly more to weirs than meets the eye, but to clients enjoying their watershapes, those considerations should vanish like a river falling from view over the edge of a cliff.

The author gratefully acknowledges the assistance and support of David Peterson (Torrey Pines Engineering & Construction, Carlsbad, Calif.) and Skip Phillips (Questar Pools & Spas, Escondido, Calif.) in assembling this article.

TAPERED WEIR

Tapered Wers are generally cast in place or are formed with cap stones. They require more water than other weir types because of low velocity at weir edge.

Verticle Drop of Water	Head or Nappe Thickness
0' - 2'	1/2"
2' - 4'	3/4"
4' - 6'	1"

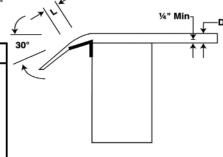
5°-15

Not recommended over 6 feet high

METAL EDGE WEIR (BEST)

Metal Edge Weirs are the most effective of all smooth sheet weirs. They can be ajusted to produce a perfectly level weir.

Verticle Drop of Water	Head or Nappe Thickness
0' - 2'	1/4"
2' - 4'	3/8"
4' - 6'	1/2"
6' - 8'	3/4"
8' - 10'	1"
10'-12'	1 1/4"
12'-14'	1 1/2"
14"-16"	1 3/4"
16'-18-	2"

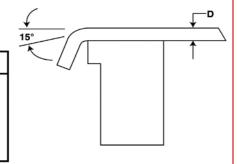


Not recommended over 6 feet high

FLAT WEIR (BETTER)

Flat Weirs are very effective in creating smooth sheets and are generally formed using a cap stone.

Verticle Drop of Water	Head or Nappe Thickness
0' - 2'	3/8"
2' - 4'	1/2"
4' - 6'	3/4"
6' - 8'	1"
8'-10'	1 1/4"
10'-12'	1 1/2"
12'-14'	1 3/4"
14'-16'	2"



Not recommended over 6 feet high

Figure 6: These charts can be helpful in determining flow rates for water-in-transit details – one of many tools available to watershapers.

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What Siguities as this

As renovation projects go, this one was far from ordinary. It started with a fantastic setting and great clients frustrated by eight years of searching for just the right watershaper and came to a satisfying conclusion when they teamed up with David Tisherman, who saw what they were after and was able to deliver on all counts. Let's take a tour of a project where fun and children at play take their place alongside great beauty and true sophistication.

Many of the projects I tackle are largely about beauty and elegance and striking just the right balances between my watershaping and the setting, the architecture of the home and the character of my clients.

In the case of the project depicted here, however, a couple of other considerations jumped into the mix – including impulses for fun and excitement as well as an overriding need to raise the visual energy level to align with the clients' personalities and a glorious setting. The result is an exquisitely adorned watershape that stands as one of the purest expressions of whimsy and unbridled joy I've ever produced.

Truly, it all flowed from the clients and the setting. The clients are quite educated, well-traveled and sophisticated and had both the resources and the desire to do something special. Moreover, they're about as nice a couple as you could ever hope to meet and have refined tastes to match. As for the setting, we're talking beauty in the

extreme: The home is a modern masterpiece perched atop a bluff in Malibu, Calif., with 180degree ocean views and spectacular distant vistas.

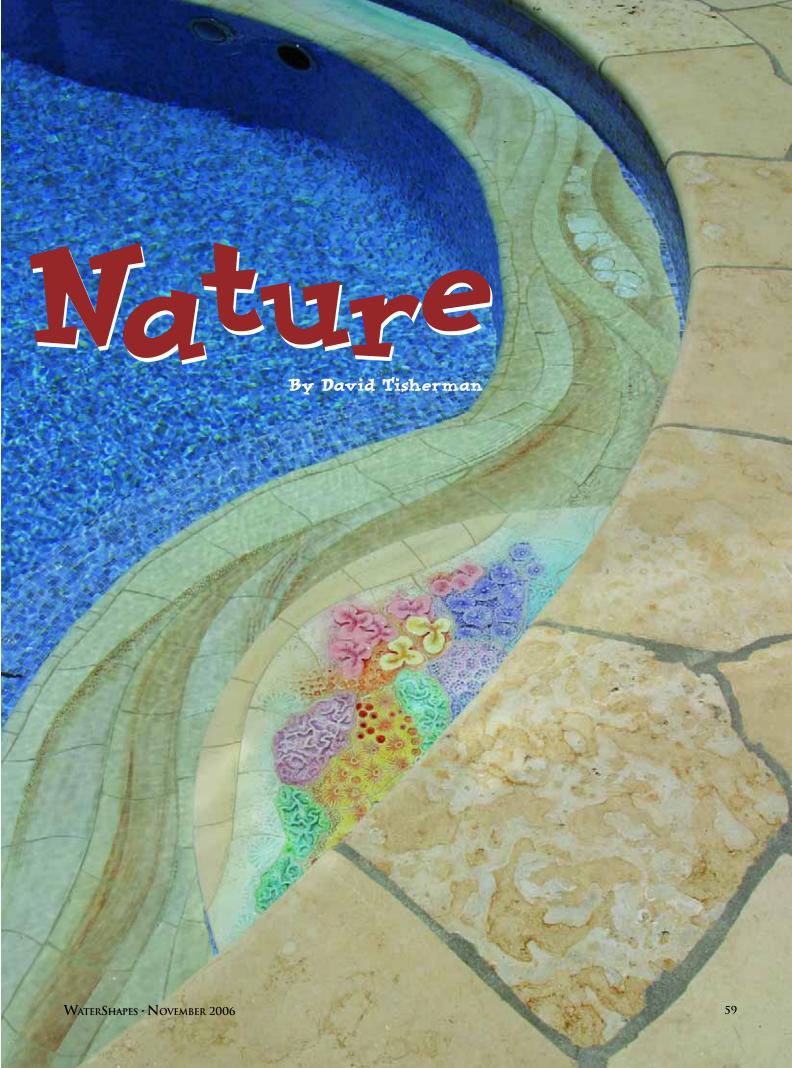
The only clinker on the property was the existing pool and the surrounding decks – an aggressively plain, kidney-shaped drag surrounded by equally boring decks. It was time for a change.

But Not So Fast

These homeowners, of course, knew what was wrong and had an idea of what they really wanted to do. Their problem, through eight long years of trying, was finding a watershaper who shared their sense of what the backyard could be. This is why, by the time I came in contact with them, they had interviewed and rejected no fewer than 50 pool designers and contractors.

I was finally brought to their attention by a landscape designer who was working just across the street from a Bel Air property on which I was building a pool I'd designed. He stopped by on numerous occasions and, after conversations with several of my subcontractors, saw the possibility of a fit and passed my name to his Malibu clients. (Talking with subcontractors is, by the way, a much better way to gauge a builder's capabilities than reviewing a résumé or portfolio.)

Our initial meeting lasted about 45 minutes and focused almost entirely on my background and some preliminary thoughts about what might be done in their backyard – nothing spe-





The original pool was plain vanilla, a clunky waste of materials in a fabulous setting (A). We stripped the finish, broke out the decks, cleared access for a new skimmer, plumbing lines and electrical conduit and began a detailed process of reconstruction on the original footprint (B). Inside the pool, we raised the floor and added new benches and a thermal ledge. Around the pool, we set a heavyduty sub-base. What you see in (C) is the second of three pours that support and compensate for the different thicknesses of the large slabs of Hillsboro stone we used as coping (three inches thick) and as the deck material (gauged at three quarters).



cific, just general ideas.

Before my next visit to the site some time later, I focused entirely on the color palette and materials I thought would work. I set up some glass-tile samples and things started to gel quickly because they liked what they saw and immediately opened up. From that point on, we talked mainly about how they wanted to use the backyard as a source of fun and frolic for their grandchildren, family and friends.

That input, coupled with impressions derived from their home décor and their buoyant personalities, made it clear that, in addition to being appropriately gorgeous and done up with the finest possible materials, this design had to be all about play and excitement.

They didn't balk at all when we talked about various material options and their relative costs – ceramic or glass tile, plaster or pebble finish, stone or concrete decking. In fact, they liked just about everything they heard and wanted to keep all options open pending a design proposal. So I went back to my studio and began mixing up tile samples and researching various material options.

Under the Sea

Seeing real potential in both the project and the clients, I contacted my friend

Nick Powell of Craig Bragdy Design Ltd., an art tile supplier based in Denbigh, Wales. His firm specializes in entirely customized, highly decorative, extremely colorful and fully textured ceramic works of art – bold statements in every square inch.

We discussed several ideas and came up with a scheme that would involve finishing the pool in a combination of glass tile and ceramic imagery that would depict underwater scenes highlighted by fish, crabs, lobsters and seashells in a textured beach motif.

Personally, I've seen scores of "underwater scenes" in tile and dismiss them for the most part as garish and way over the top – stuff that makes me cringe. With this supplier, however, I knew that if the client decided to pursue this route that Powell's artists would come up with something unique, beautiful and fun.

Given the setting, the clients had run into lots of designers and contractors who told them that a vanishing edge was the best possible approach — with all sorts of waterfalls, leaping jets and every conceivable bell and whistle to boot. I knew, even given my brief acquaintance with them, that these clients wanted their fun to come via different means.

I created a sense of whimsy using elegant materials that, in a sense, tell a story.







The decorative ceramic tile we used in both the pool and the spa is an artful combination of color and texture. Master installer Paul Kelly (seen here) flew in from the supplier's headquarters in Wales to get the job done. The images in the highly detailed tile were made with the contours and dimensions of this specific pool in mind, so perspectives are always correct and 'natural.' Note the detail at the top of the spa: The materials intersect in a way that creates no protrusions that might poke anyone in the neck or shoulders as they sit and relax in the spa.







The ceramic-tile images, all produced by Craig Bragdy Designs of Denbigh, Wales, are truly ethereal and go a long way toward telling the pool's story. The top of the dam wall (A) displays the dimensionality of the tile, and you can see the way the texturing produces tiny ripples reminiscent of waves washing across a sandy beach. The sandy colors applied to the steps, benches (B) and thermal ledge (C) – almost all of the pool's and spa's horizontal surfaces – make the interior surface seem like a submerged, shimmering extension of the sand-colored coping and decking.



In that light, there was no need for much-overused water-intransit details or fire effects or deck jets; instead, we used traditional elements that were much more appropriate to the site, the architecture and the clients, adding personalizing touches at every opportunity.

Before long, I'd generated a design based on the use of a glasstile field accented by patches of an underwater oceanic scene in ceramic, and from then on there was no looking back – although there was a fly in the ointment in that Powell's local distributor simply didn't "get it" and was spoiling everyone else's good time.

Happily, Powell recognized the problem and took ownership of the project, soon providing us with exactly the help we needed to turn things around in the form of the company's tile-installation wizard, Paul Kelly, who flew in from Wales to get the job done. After a few dicey weeks, we were right where we needed to be – a real tribute to Powell's professionalism and Kelly's attention to detail.

The Hand Dealt

As for our work on site, we knew going in that it would be best to leave well enough alone so far as the old pool was concerned.

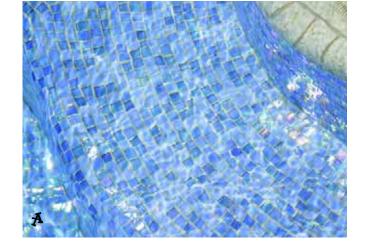
As mentioned above, the property sits on a bluff overlooking the Pacific Ocean, which places it under the jurisdiction of the California Coastal Commission and subjects it to a whole raft of restrictions and regulations. To remove and replace the gunite shell – which certainly would have been my preference – almost certainly would have involved years of bureaucratic wrangling, incredible expense and extreme, mind-numbing frustration.

Early on, we decided to dodge that problem entirely by leaving the kidney-shaped structure in place and working with the hand we'd been dealt. This meant that all of our aesthetic "moves" had to happen within the existing shell and would reach no farther than removing and replacing the decks and equipment – no increase in deck area, no tinkering with the pool's shape, no addition of complex waterfeatures.

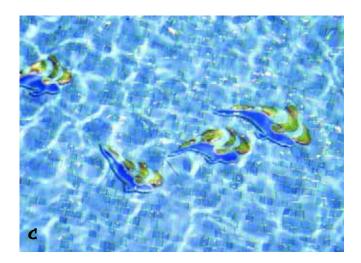
The new deck features a stone called Hillsboro that, with the help of my friends at Malibu Stone of Malibu, Calif., we brought in from the Midwest, and every drain head, skimmer lid and corner was painstakingly detailed for uninterrupted visual flow. To ensure long-term stability, a new 30-inch-deep footing was tied to elements of the pool's original structural deck. To handle the multiple thicknesses of the unusually large pieces of stone, the concrete sub-base we prepared is more than 14 inches thick in places and includes several mats of steel and wire.

As luck would have it, the shell itself was sound. We didn't break into it anywhere, didn't alter the bond beam, didn't in any way tinker with the structure. *Inside* the shell, however, we changed things considerably, adding a bench that encircles almost the entire perimeter of the pool and raising the pool's floor. (These additions made it possible for us to add new plumbing and lighting as well as an underwater sound system.)

We also left the large raised spa alone structurally, although we completely redefined the transition between spa and pool







The pool's blue field is a custom blend of iridescent glass tile from Sicis of Ravenna, Italy. No trim pieces are available with this material, so we rounded over the edges of the steps and folded the tile over the contours (A). This glass material was chosen for the way it catches and reflects sunlight and helps create a vivid underwater world in which ceramic fish swim freely. The fish, shown before the pool was filled (B), stand proud of the pool's bottom and have ceramic shadows that give them an even greater sense of dimensionality. Under the water, they come alive and play in a shimmering field of blue (C).



by shaping a softly sloping dam wall (to minimize the noise of the flowing water) and placing a wide thermal ledge between the spa and the pool. This area was the focus of much of the ceramic tile work and also displays two large rocks that look like coral.

The equipment set was completely replaced with components from Jandy Pool Products (Petaluma, Calif.). We also switched out skimmers as well as the electrical systems and control equipment.

Making MagicOnce these modifications were made, the fun of executing the aesthetic details began.

The basic idea was to drape the sandy colors and textures of the Hillsboro stone onto all of the horizontal surfaces of the watershape, starting at the top of the dam wall, stepping down onto the thermal ledge





From the deck above pool level, we see some of the touches of whimsicality that characterize the entire project as well as the personalities of the homeowners (A). There's no denying the beauty of the setting (B), and comparison of the 'before' image to the revised appearance of the spa with its new dam wall and thermal shelf shows the way in which the remodeled watershape settles more gracefully into its surroundings (C).

and then reaching into the pool and onto the steps and benches and, in places, sliding down the walls into the field of glass tile.

The interior surface beyond the ceramic scenery is covered in a custom blend of glass tiles from Sicis (Ravenna, Italy). The mix I developed includes subtle blues and silvers with all sorts of iridescence – the idea being to reinforce the impression of shimmering, jewel-like water as a foil for the beach-like scenes.

Unlike many suppliers of illustrative ceramic tiles (and largely because they do made-to-order work on watershapes of known configurations), the artists at Craig Bragdy Design work with perspective and appreciate the angles at which their undersea creatures will be viewed. Throughout the pool, we scattered dozens of fish, shellfish and shells as well as aquatic plants – all seen at realistic angles, meaning top-down views of fish on the pool's bottom.

This is the area in which I've so frequently been disappointed by off-the-shelf tile mosaics. It's always struck me, for instance, that when you show a full profile of a fish on a horizontal surface, it looks as if the poor creature must be dead. Not so in this pool, where everything is visually consistent and, to my eye, does a great job of "selling" the narrative that this is a sandy underwater paradise.

One of the things I love about the ceramic surfaces is that they have fantastic texture and relief details in addition to being beautifully composed, rendered and colored. The beach area atop the spa's dam wall, for instance, has small ridges in the tiles that make the water ripple as it flows. Not only does this detailing make for safe footing, but it also has a magical visual effect — especially in the context of the aquatic appearance of the Euphorbia plants that flank the spillway on both sides.

And then there are the details just for the children, including raised fish with drop shadows on the bottom of the pool that they can swim down to and touch and will almost certainly end up giving names – great fun. From the adult perspective, the composition may be showy, but it happens in ways that are also casual, extraordinarily expressive and perfectly suited to the setting.

To be sure, the "attitude" expressed by this project stands out from much of the work I do, and I'm proud to think I was the one who finally spotted what was needed by these fabulous clients and was able to deliver once the ideas began to coalesce. *Fun* and *frolic* may not be watchwords for every client, but in this case, they were perfect – and the result has been joy all around without any apparent limits.







Overall views of the pool, spa and deck complete the tale of whimsy and indicate the degree to which the project befits the homeowners and their ambition of creating a substantial slice of a safe, fun-filled undersea world, from the aquatic appearance of the plants to the coral-like rocks of the dam wall to the minute details of the ceramic-tile vignettes.



The following information has been provided to WaterShapes by product suppliers. To find out how to contact these companies, look for the Product Information Card located on page 77.

WATERPLAY PRODUCTS

Circle 135 on Reader Service Card



SCS INTERACTIVE introduces HexDek, a six-sided deck platform designed to maximize the play areas of small pools. Compact at just four feet high and spanning only eight feet, the platform features interchangeable colored railings and a blend of slots on each

side of the structure to add interactive and non-interactive play elements as well as six overhead spots for waterfeatures. **SCS Interactive**, Englewood, CO.

POND WATERFALLS

Circle 136 on Reader Service Card

ATLANTIC WATER GARDENS has introduced Big Bahama FilterFalls. The biological waterfall filters are made with heavier-duty polyethylene and offer twice the filtration media of previous



models. Designed for even water flow through the filter media, the units have spillways ranging from 14 to 48 inches in width and flow rates between 2,400 and 12,000 gallons per hour. **Atlantic Water Gardens**, Mantua, OH.

Brass Lighting Fixtures

Circle 137 on Reader Service Card



ORBIT/EVERGREEN OUTDOOR offers Model B126, a 12-volt, solid-brass uplight for use in outdoor lighting applications. Offered in antique brass, antique bronze and aged green finishes, the units feature 20-watt MR-16 bulbs (with a capacity to 50 watts); oversized, non-corrosive ground stakes; and long, preinstalled leads and connectors for easy installation.

Orbit/Evergreen Outdoor, Los Angeles, CA.

MISTING TOWER

Circle 138 on Reader Service Card

MOST DEPENDABLE FOUNTAINS offers the Model 515 SM Tower Mister. The unit comes in 17 colors, stands 90 inches tall and has 12 misting heads mounted at 45-degree angles that operate on water pressure of 60 psi with no electricity required. It also has quick-opening/slow-closing metered valves that may be set to run the system for up to two minutes with one push. **Most**



Dependable Fountains, Arlington, TN.

Continued on page 70



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OF INTEREST

TRELLIS SYSTEM

Circle 139 on Reader Service Card



FEENEY ARCHITECTURAL PRODUCTS offers two models in its CableTrellis line. Featuring aluminum frames and stainless steel cable, rods and fittings for residential and commercial uses, Somerset is a wall-mounted system in seven expandable-width packages from 4 to 10 feet tall, while Greenway is a freestanding, expandable-width kit that stands 6 feet tall. Feeney Architectural Products, Oakland, CA.

CONTROL SYSTEM

Circle 140 on Reader Service Card

INNOVATIVE POOL PRODUCTS offers Smart Touch for pools and spas in two models: Model 620 manages up to 6 pool/spa control devices and 20 additional home-control functions such as landscape lighting, while the Model 840 han-



dles up to 8 devices and 40 home-automation functions – all with no additional wiring because it operates through a home's electrical system. **Innovative Pool Products**, San Clemente, CA.

DECK TREATMENT

Circle 141 on Reader Service Card



DECK-O-SEAL offers Deck-O-Grip, an acrylic-based, high-solids, transparent, easy-to-apply deck treatment. Providing a clear, non-yellowing, flexible and durable abrasion-, stain- and slip-resistant film as well

as improved resistance to most common pool chemicals, it is also designed to retain and enhance the appearance of concrete, colored concrete, exposed aggregate, pavers and tile. **Deck-0-Seal**, Hampshire, IL.

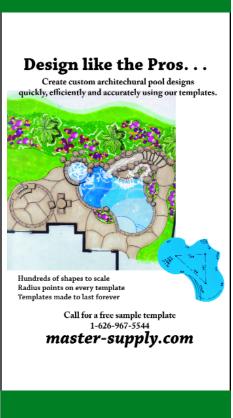
SOLAR LIGHTING

Circle 142 on Reader Service Card

INTER-LUX offers Wagner's Premium Class, a line of solar-powered lighting products, in North America. Using LED technology, high-grade materials (such as stainless steel and teak) and a stylish functionality suited to poolscapes, gardens and patios, the weather-proof, low-maintenance fixtures have no need for wiring: Solar cells collect sunlight during the day and power the lights at night. Inter-Lux, Columbia, MD.







Circle 34 on Postage Free Card

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WATERFALL PUMPS

Circle 143 on Reader Service Card



EASYPRO POND PRODUCTS offers large-volume waterfall pumps designed for higher-head applications and continuous, heavy-duty use. The compact pumps come in two models (with flow rates, respectively, of 8,000 and 10,000 gallons per hour) and are built of stainless steel and cast iron with corrosion-resistant aluminum impellers and double seals for maximum durability. **EasyPro Pond Products**, Grant, MI.

POOL CLEANER

Circle 144 on Reader Service Card

AQUA PRODUCTS offers Aqua Jet, a hosefree pool-cleaning system that vacuums in water at 80 gallons per minute and directs it out the back of the unit to propel the device over any pool configuration from floor to waterline. A portion of the water



flow is channeled back to the pool's surface to hydro-scrub calcium, powder, silt and sand into the intake ports for collection in a mesh filter bag. **Aqua Products**, Cedar Grove, NJ.

LED LANDSCAPE/FOUNTAIN LIGHTING

Circle 145 on Reader Service Card



BRONZELITE has introduced Luxflo LED Systems, a full line of high-brightness LED luminaires that offer energy efficiency and long service lives as well as design flexibility. The low-voltage fixtures – fountain, in-grade, bullet and path lights – provide brilliant white light and enhanced design flexibility by alleviating voltage drop concerns. Line-voltage step lights are also available. **Bronzelite**, Littlestown, PA.

POND LINER

Circle 146 on Reader Service Card

FIRESTONE has introduced MultiLiner RPP Geomembrane, a heat-weldable, polyesterreinforced membrane designed for use as



a liner, floating cover, water-conservation measure and more. Ideal for applications in ponds and aquacultural settings, the highly flexible membrane is available in many sizes and is resistant to punctures, chemicals, ultraviolet rays, ozone and oxidation. **Firestone**, Indianapolis, IN.

Continued on page 72



HEAT-PUMP SIZING GUIDE

Circle 147 on Reader Service Card



PENTAIR WATER POOL & SPA has developed a heat-pump sizing program. The CD-based package is designed to identify the ideal heat pump model for a particular pool and/or spa in any climate by processing seven simple pieces of information that define the vessels' basic char-

acteristics. This is compared to 30 years of weather data to calculate the best pump for the job. **Pentair Water Pool & Spa**, Sanford, NC.

FLEXIBLE WATERFEATURES

Circle 148 on Reader Service Card

HADDONSTONE has added two waterfeatures to its Arcadian line of products, both set up for design flexibility: AquaStack has a number of oval sections (as few as seven, as many as 12) that can be fitted over a copper pipe to create a variety of shapes, while AquaSource allows for choice in the arrangement of a sequence of wide,



shallow bowls that gradually deliver water into a pool. **Haddonstone**, Bellmawr. NJ.

DECK REVITALIZER

Circle 149 on Reader Service Card



RENOSYS offers RecDeck as a watertight, long-term solution to problems with existing decks. Made with a felt-backed, 85-mil PVC, the product may be applied to almost any substrate in virtually any recreational set-

ting in which slip resistance, durability and easy maintenance are primary concerns. Ideal for pool decks and as a covering for coping, the material comes in 6-foot-wide rolls. **Renosys**, Indianapolis, IN.

COMPACT POOL SLIDE

Circle 150 on Reader Service Card

S.R. SMITH has introduced Cyclone, the smallest in its line of pool slides. The low-profile unit is only 4 feet, 5 inches tall and requires a water depth of just 42 inches, so it can be positioned almost anywhere around the average pool. The four-piece



kit is easy to assemble and fits into a compact box for easy storage and handling. Made of rotomolded plastic, the slide requires no plumbing connections. **S.R. Smith**, Canby, OR.

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SAFETY FENCE

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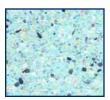
QUAKER PLASTIC has introduced Silent Watch Dog, a safety fence for pools. The removable barrier consists of rigid posts and 48-inch-high sections connected with latches that make it possible to enclose pools of any shape or size. The lightweight system rolls up for storage and fea-

tures a weatherproof, tear-resistant mesh fabric and optional self-closing, self-latching gates. **Quaker Plastic**, Mountville, PA.

SMALL-PEBBLE POOL FINISH

Circle 152 on Reader Service Card

MAGIC TECHNOLOGIES has introduced Aqua Pearl, a pre-blended pool finish made up of specially selected pebble aggregates and fortified white Portland cement. Designed to combine the durability of pebble finishes with the increased smoothness of smaller pebble aggregates, the product is available with



color-fast ceramic pigments that offer limitless variety in pool design. **Magic Technologies**, Apopka, FL.

DECK SUPPORTS

Circle 153 on Reader Service Card



BISON DECK SUPPORTS offers adjustable deck-support systems for use in waterfeatures. The devices can be used with wood, stone, pavers, metal grates and more, with heights adjusted to desired levels using a screwjack de-

sign that easily levels the surface with a twist of the wrist. Water flows through gaps in the decking to the open area below for collection and recirculation. **Bison Deck Supports**, Denver, CO.

GLASS-SAMPLER KIT

Circle I54 on Reader Service Card

AMERICAN SPECIALTY GLASS now offers a free Terrazzo & Landscape Glass Sampler Kit. The package includes chips of glass intended to add sparkle, depth and beauty to any decorative-concrete or landscape application. The kit includes open samples of



#1-size glass in 24 vibrant colors as well as six sealed packets of fines and 00 sizes, four color mixes and much more. **American Specialty Glass**, North Salt Lake City, UT. Continued on page 74



MULTICOAT. **PRODUCT** SYSTEMS



WATERPROOFING FOR WALLS &





Circle 84 on Postage Free Card

OF INTEREST

WALL SYSTEM

Circle 155 on Reader Service Card

VERSA-LOK RETAINING WALL SYSTEMS has introduced Mosette, a new random-pattern wall system that gives watershapers a variety of design options. Freestanding walls up to 24 inches tall can be used as borders along patios and walkways – or for perimeter seating around fire pits. The blocks can also be used in lightweight retaining walls up to 18 inches tall. Versa-Lok Retaining Wall Systems, Oakdale, MN.



GLASS PRODUCTS

Circle 156 on Reader Service Card

HIRSCH GLASS CORP. has published a catalog covering its line of glass products for commercial and residential applications. The 32-page, fullcolor booklet covers large panels for screens, tabletops, dividers and other decorative uses as well as art-glass tiles and mosaics in a wide range of colors and visual textures for a variety of indoor and outdoor applications. Custom sizes are available. Hirsch Glass Corp., Secaucus, NJ.









Circle 74 on Postage Free Card



Need More Information?

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POOL/SPA/WATERFEATURE PUMPS

Circle 157 on Reader Service Card



JANDY has introduced the Stealth, PlusHP and MaxHP pumps in one- and two-speed models for powerful, quiet and efficient operation of, respectively, pools, spas and waterfeatures. Easy to

operate and maintain, the devices have large trap baskets, ergonomic cam-lock lids and quick-connect unions as well as ultra-efficient water movement that reduces energy consumption and operating costs. **Jandy**, Petaluma, CA.

SOLIDS-HANDLING PUMP

Circle 158 on Reader Service Card

SAVIO ENGINEERING offers Water Master, a solids-handling pump that works with the suspended debris of a pond habitat. Reliable in non-stop, 24-hour-a-day service, the pump has an oil-less design that's good for the environment and safe for fish, plants and other aquatic life. It also features a corrosion- and breakage-resistant polymer housing and seals that extend the life of the pump. **Savio Engineering**, Santa Fe, NM.



SAND-SET PAVERS

Circle 159 on Reader Service Card



ARTISTIC PAVERS MFG. offers a brochure on its array of sand-set pavers. The 8-page, full-color literature highlights Stonelock, Corallock, Shellock and Tumblelock, which, respectively, have the look of stone, coral, fossilized rock and cut stone. They are available in sizes from 4-by-8 to 24-by-24 inches with a wide range of single-, double-, triple- and

four-sided bullnose copings. **Artistic Pavers Mfg.**, North Miami Beach, FL.

RAILING SYSTEM

Circle 160 on Reader Service Card

TIMBERTECH has developed a new railing system to complement its line of low-maintenance decking and railing products. Each section of RadianceRail is made from an en-



gineered composite capped with durable, pure-white vinyl and features a clean look with no exposed hardware or mounting collars. Available in 6- and 8-foot kits, the product works with straight sections, angles and stairways. **TimberTech**, Wilmington, OH.

Continued on page 78



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OF INTEREST

POOL PUMP

Circle 161 on Reader Service Card



WATERWAY offers the Champion pump for inground pools, pool/spa combinations, infloor cleaning systems and various waterfeatures including waterfalls. Made with an innovative impeller and diffuser design,

the self-priming pump is designed for quiet operation, high efficiency and a long service life. It also features a large strainer basket with a cam-lock lid for easy cleaning. **Waterway**, Oxnard, CA.

AERATING FOUNTAIN

Circle 162 on Reader Service Card

OTTERBINE BAREBO offers its Large Aerating Fountain. Designed as a compact, cost-effective solution for watershapers who need large decorative patterns combined with strong aeration and water-qual-



ity-management capabilities, the devices come in 7.5- and 10-hp models with 6 fountain patterns, operate in 40 inches of water and are light enough for handling by just two people. **Otterbine Barebo**, Emmaus, PA.

POND-SUPPLY CATALOG

Circle 163 on Reader Service Card



INTERNATIONAL POND SUPPLY has published an 80-page, full-color catalog on its easy-care pond products. Coverage includes new products, filters, pumps, pond liners, fish-care products, pond kits, plumbing (fittings, pipes, valves and accessories), lighting, maintenance products and water treatments. The catalog also covers outdoor-living amenities

and has an index. International Pond Supply, Santa Fe, NM.

SOFTWARE UPGRADE

Circle 164 on Reader Service Card

STRUCTURE STUDIOS has upgraded its Pool Studio design software with two new and useful features: Yard Slope Stage gives designers the ability to indicate simple elevation changes in their projects, while Material Phase's previous multiple stages have been condensed into a single stage, giving users the ability to customize materials easily and apply



any material to any surface. Structure Studios, Las Vegas, NV.



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POOL ALARM

Circle 165 on Reader Service Card



RJE TECHNOLOGIES has introduced AquaGuard, a consumer-friendly, easy-to-install pool-safety alarm system. Designed for performance and reliability and tested to the highest performance standard in the world (AFNOR-Europe).

the device is immune to high winds, can't be turned off by kids, features "armed" visual and audio indicators and comes with a two-way portable remote. **RJE Technologies**, Irvine, CA.

DECORATIVE-CONCRETE GUIDE

Circle 166 on Reader Service Card

PERMA-CRETE has published a product guide for its additives and treatments for concrete. The 12-page, full-color brochure describes the company's matrix mixes, bonding additive, sealers, epoxies, urethanes, cleaners and colorants; depicts 170 standard colors; defines a broad range of applications; offers pattern- and epoxy-installation guides; and covers vertical applications and installation. Perma-Crete, Nashville, TN.



FLEXIBLE ABRASIVES

Circle 167 on Reader Service Card



3M offers diamond abrasives in five grades and five disk sizes to help pool builders and plasterers deliver smooth, consistent finishes. The disks are designed to finish and polish uneven sur-

faces made up of hard-to-grind materials including ceramic, glass, pebble and the company's own Colorquartz Crystals. They also knock down rough spots on plaster quickly and easily to maximize bather comfort. **3M**, St. Paul, MN.

LED POOL/SPA LIGHTS

Circle 168 on Reader Service Card

SUPER VISION INT'L has introduced the SaVi pool/spa lights. Engineered to provide clean light in the purest colors, the product features 9 color modes – 5 static colors and 4 programmed "shows" – and can be used with up to 49 color/show combinations when multiple lights are



used. Both the pool and spa lights fit spa niches; a retrofit plate allows for mounting in standard pool niches. **Super Vision Int'l**, Orlando, FL.

Continued on page 80

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WATER-PURIFYING SYSTEM

Circle 169 on Reader Service Card



PARAMOUNT POOL & SPA SYSTEMS offers the ClearO₃ water-purifying system. The unit creates ozone that breaks down organic wastes, reduces

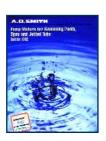
demand for standard pool chemicals by up to 70 percent and allows chlorine to work more efficiently. The ozone is generated by an ultraviolet bulb and is capable of handling pools holding up to 55,000 gallons of water. **Paramount Pool & Spa Systems**, Tempe, AZ.

PUMP MOTORS

Circle 170 on Reader Service Card

A.O. SMITH has published Bulletin 1082 on its line of pump motors for swimming pools, spas and jetted tubs. The 12-page booklet includes a motor-replacement guide, mounting dimensions, connection diagrams, a pictorial replacement guide and information on single-, two-speed and three-phase C-flange and square-flange pool motors as well as pool-sweep motors, spa motors and more.

A.O. Smith, Tipp City, OH.



MINIATURE MOSAIC TILES

Circle 171 on Reader Service Card



OCEANSIDE GLASSTILE has introduced a miniature mosaic field tile to its Facets glass-tile line. Available in three sizes – 1/2 by 1 inch and 1/2- and 1-inch square – the material comes in offset joint and random modular patterns and is made to order using a selection of 44 iridescent and non-iridescent colors in Ocean or Earth colors. The tile is face-

mounted on paper in 12-by-12-inch sheets. **Oceanside Glasstile**, Carlsbad, CA.

SPRAY PUMP

Circle 172 on Reader Service Card

RFI CONSTRUCTION PRODUCTS offers the model RSP rotor/stator spray pump. Designed for pond, pool and artificial-rockwork applications, the system is designed to handle fine-grain mortars, plaster, GFRC, grouts and textured paints. Powered by a vari-



able-speed air or electric motor, the unit comes with various nozzles and has a pumping capacity of up to 6 gpm. **RFI Construction Products**, Farmingdale, NY. Continued on page 82







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FILTER MEDIUM

Circle 173 on Reader Service Card



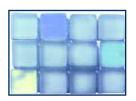
ADVANCED AQUACULTURE offers Perma-Beads, a material designed to replace sand in any sand filter. The egg-shaped beads eliminate clogging, channeling and compaction. Unlike filter sands, they have no flat or porous surfaces that might make them stick together. The shape also creates large interstitial spaces that trap large amounts of debris, thereby extending fil-

ter cycles. Advanced Aquaculture, Brandon, FL.

GLASS MOSAIC TILE

Circle 174 on Reader Service Card

BOYCE & BEAN offers the Beach Glass Mosaic line of tiles. The 1/2-inch-thick product has an opaque, sea-green color and comes in an array of shapes and sizes and is designed for use inside or out on walls, floors or counters and in pools and spas. The field tiles come in



four standard sizes, and custom sizes up to 12 by 12 inches may be ordered. Liners and medallions are also available. **Boyce & Bean**, Oceanside, CA.

LIMESTONE PRODUCTS

Circle 175 on Reader Service Card



COLD SPRING GRANITE now offers Kasota Valley Limestone. Quarried in Minnesota's premier dolomite limestone region, the rich, warm goldencream-colored stone is known for

strength and beauty and, as a dolomite, has lower moisture absorption and is less porous than the common oolitic limestone. It is also abrasion-resistant, making it suitable for many applications. **Cold Spring Granite**, Cold Spring, MN.

CONCRETE STAINS

Circle I 20 on Reader Service Card

BRICKFORM offers the Freestyle line of solid-color concrete stains. The breathable, completely opaque material reacts with itself, not the concrete, so the coloring doesn't alter the concrete's texture. It's also completely changeable: If a new color is desired, just stain over the existing coat



without stripping – as many times as is desired with any of the line's 40 available colors.
 Brickform, Rancho Cucamonga, CA.







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LED POOL/SPA LIGHTS

Circle 121 on Reader Service Card



O'RYAN INDUSTRIES has introduced the PoolStar2500, a 12-volt lighting system with a durable plastic dry-niche housing and bright 72S LED technology. The units arrive self-contained, complete with UL-listed transformers and 70-foot cords, and fit 3-7/8-inch wall openings. Compact and easy to install, they're designed for use in

pools, spas, rock features, waterfalls and fountains. **O'Ryan Industries**, Vancouver, WA.

DIGITAL HEAT PUMP

Circle 122 on Reader Service Card

AQUACAL has introduced digital versions of its IceBreaker heat pumps in both the HeatWave and AeroTemp lines. These devices, which use a titanium heating process to transfer ambient heat from the air to a pool in temperatures down to 32 degrees Fahrenheit (and can also be used to cool a pool's water), now have digital readouts and control panels that are easier to understand and operate. AquaCaI, St. Petersburg, FL.



COMPOSITE DECKING

Circle 123 on Reader Service Card



TREX manufactures composite decking, railing and landscape components. Deck planks come in 2 by 4 and 2 by 6 formats, and there are fascia and trim pieces as well as risers; railings and fence systems feature a number of profiles and styles; and landscape timbers and edging are available. The materials come with or without wood graining in a variety of colors

in weathered and unweathered styles. Trex, Winchester, VA.

DECORATIVE FOUNTAINS

Circle 124 on Reader Service Card

LITTLE GIANT offers the Classical Fountains line of decorative waterfeatures. The versatile, portable, self-contained units are designed to bring old-world charm to any setting, indoors or out, along with the sound of moving water. They are molded from polyethylene for durability and also feature integral planters that are set up in such a way that soil won't clog the fountain's pump.

Little Giant, Oklahoma City, OK



Continued on page 84





Circle 69 on Postage Free Card



Circle 55 on Postage Free Card

BACKFLOW PREVENTERS

Circle 125 on Reader Service Card



WILKINS offers the 375A series of backflow preventers for large-scale applications. Available with 4-, 6- and 8-inch diameters, the devices consist of a pressure-differential relief valve positioned between two independently operating

spring-loaded check valves. Made with lightweight epoxy-coated ductile iron, the assemblies are easy to install and feature a relief valve and four test cocks. **Wilkins**, Paso Robles, CA.

PLANT-INFORMATION RESOURCE

Circle 126 on Reader Service Card

HORTICOPIA offers Horticopia Professional (Version IV), a comprehensive software reference containing pictures and data for ornamental plants. Used by landscape professionals, arborists



and growers, it is a digital reference tool for plant information and has significant applications in development of design proposals, plant care sheets for clients and handouts for employee training. **Horticopia**, Purcellville, VA.

SOFTWARE UPDATE

Circle 127 on Reader Service Card



NEMETSCHEK NORTH AMERICA has updated its VectorWorks software system to version 12.0.1 – a maintenance update for VectorWorks Designer, VectorWorks Architect, VectorWorks Landmark and other CAD sys-

tems. Free to VectorWorks 12 users, the update offers improvements to section views in perspective projections among many other upgrades. **Nemetschek North America**, Columbia, MD.

EXTERIOR LIGHTING

Circle 128 on Reader Service Card

ATOM LIGHTING offers an array of landscape lighting fixtures for use with xenon and halogen lamps. Designed for easy installation, simple maintenance of fixture mechanisms and reliable, long-term performance, the line includes directional, below-grade, pathway, architectural, suspended and submersible fixtures along with accessories, power supplies,



lenses and cables and connectors. Atom Lighting, Scottsdale, AZ.

Take it Outside Introducing the Arris-WFSS 26" Outdoor HDTV with its water-resistant stainless steel finish and glare free glass. This state-of-the-art TV will provide you with years of enjoyment in your backyard or next to your spa. The innovative design allows you to simply plūg it in and watch TV outdoorsl

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GARDEN SCULPTURE

Circle 129 on Reader Service Card

TREVI has published a catalog on its line of fountains, planters and garden statuary. The 36-page, full-color brochure focuses mainly on fountains and includes designs inspired by cultures and civilizations from around the world, many updated with contemporary looks to complement modern architectural styles. All products are available in a variety of standard colors or with custom finishes. **Trevi**, Las Vegas, NV.



HAND-HELD CLEANER

Circle 130 on Reader Service Card

WATER TECH offers the Catfish cleaner for use with small pools, spas and hot tubs. The handheld/extended-reach device cleans every area (floors, walls, stairs and steps, drains, corners and in and around ladders) and is both lightweight and maintenance-free. It removes virtually all debris, including leaves, pine needles, sand, bugs,



pollen, human and pet hair, pebbles, coins, twigs and acorns. **Water Tech**, East Brunswick, NJ.

COMPACT EXCAVATOR

Circle 131 on Reader Service Card



BOBCAT has introduced the Model 323 Compact Excavator. The unit features a retractable undercarriage, impressive breakout force, a digging depth to 7 feet, 6 inches and a reach to 12 feet, 10 inches in addition to a hydraulic-piston pump for fuel

efficiency and long service life. It also has auxiliary hydraulics for driving a variety of tools, including augers, clamps and hydraulic breakers. Bobcat, West Fargo, ND.

ROBOTIC POOL CLEANER

Circle 132 on Reader Service Card

SMARTPOOL offers Dynamic Pro X, a tough, intelligent robotic cleaner for mid-size public pools. Designed for durability, the unit features reinforced components, self-learning software, dual motors and an indicator that tells the operator when the filter bag is clogged. It scrubs, brushes, vacuums and filters floors, walls and



the waterline in less than six hours for pools up to 25 meters long. SmartPool. Boca Raton. FL.

Concrete Stain

Circle 133 on Reader Service Card



MULTICOAT offers Multi-Stain, a concrete stain designed for residential and commercial applications including pool decks, patios, driveways and interiors. Available in 12 colors from terra cotta to gray, the material is best applied with a pump sprayer and works with just one coat. When the stain is dry to the touch, a clear gloss

filler is applied to complete the job. Multicoat, Rancho Santa Margarita, CA.

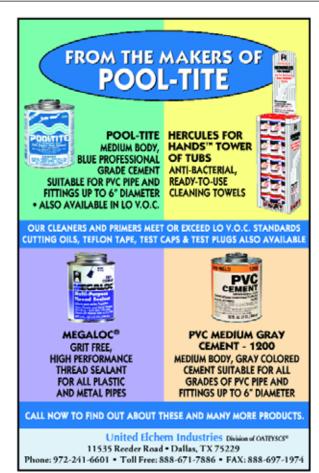
CONCRETE-PUMP ATTACHMENT

Circle 134 on Reader Service Card

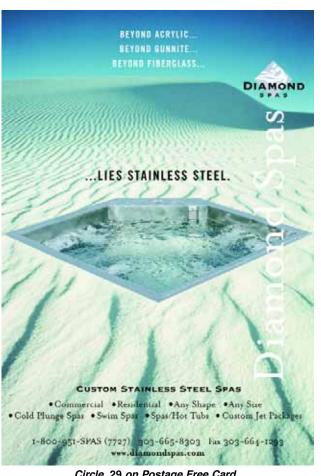
BLASTCRETE EQUIPMENT CO. has increased the output of the attachment for its hydraulic concrete pump from 18 to 25 yards per hour. The model RD6536 now features a 3-inch hydraulic squeeze pump with infinitely variable pump



speeds from 0 to 25 yards per hour. The attachment enables the pump to move concrete with up to 3/4-inch aggregate and shotcrete with 3/8inch aggregate. Blastcrete Equipment Co., Anniston, AL.



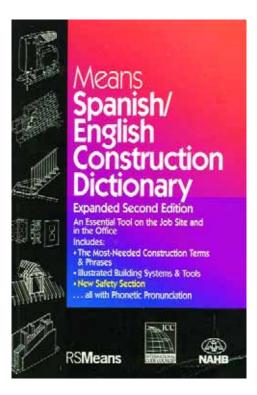
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Circle 29 on Postage Free Card

By Mike Farley

En Español



t's a plain fact: In many regions of the United States these days, the vast majority of construction laborers speak Spanish.

That's a big deal because, as watershapers, it is our responsibility to convey the design mission for our projects as well as all-important client wishes to these talented craftspeople – not to mention the basic, general communications that come with managing the work of individuals and small groups of people.

Where I work in Texas, this is the simple reality – and I know it's true as well in California, Arizona, Florida, Nevada and many other parts of the country. As a consequence, I think it makes sense for those responsible for guiding the overall efforts of these workers to be able to communicate with them in their own language. After all, these are the folks who are installing the details we've so carefully designed and engineered.

For my part, I'm trying to elevate my communications skills by becoming functionally fluent in Spanish. As time passes, I'm seeing more and more that doing the best work I can with the greatest possible efficiency means speaking Spanish to the point where I can describe what needs to happen on site without relying on a translator who may or may not "see" what I'm after.

I took Spanish in high school but, unfortunately, didn't keep it up, so I've been been forced to seek out ways to brush up on the basics and reach the required level of fluency. The problem I've run into is that most educational resources are based on common language and usage and don't offer me the

vocabulary I know I need in the working world of watershaping.

Much to my relief, I have discovered an amazing little book that I'd imagine any speaker of English communicating with Spanish-speaking workers would find useful: *Mean's Spanish/English Construction Dictionary* (Reed Construction Data Publishing, 2006) is concise, well conceived and well organized – the best of all possible finds.

I picked up the expanded second edition and truly believe it is *exactly* what people on both sides of the language divide need to improve communication in the field. For starters, it's organized in mirror form from both the English and Spanish perspectives – basically two books in one. Half reflects the English speaker's perspective, then you flip it over and the exact same information appears in reverse form on the Spanish side.

Both halves cover basic construction terminology in alphabetical order, defining every construction term I could think of during my fairly careful review. Then it moves onto general terms used in everyday conversation, which includes colors, descriptions of weather, directions and basic tables of measurement.

The next section is all about tools and tradespecific language (organized by big topics including grading, structures, concrete, carpentry and more) and includes an array of construction details labeled in both English and Spanish. Finally, there's a helpful section (printed on yellow pages for easy reference) on safety and emergency issues.

It's clear to me that the publishers put tremendous thought into assembling this book. Frankly – and way beyond any discussion of who should learn whose language on job sites – I can't imagine a better resource for practical people who see a need to bridge this key communications gap.

Mike Farley is a landscape architect with more than 20 years of experience and is currently a designer/project manager for Gohlke Pools in Denton, 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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