

WATER SHAPES

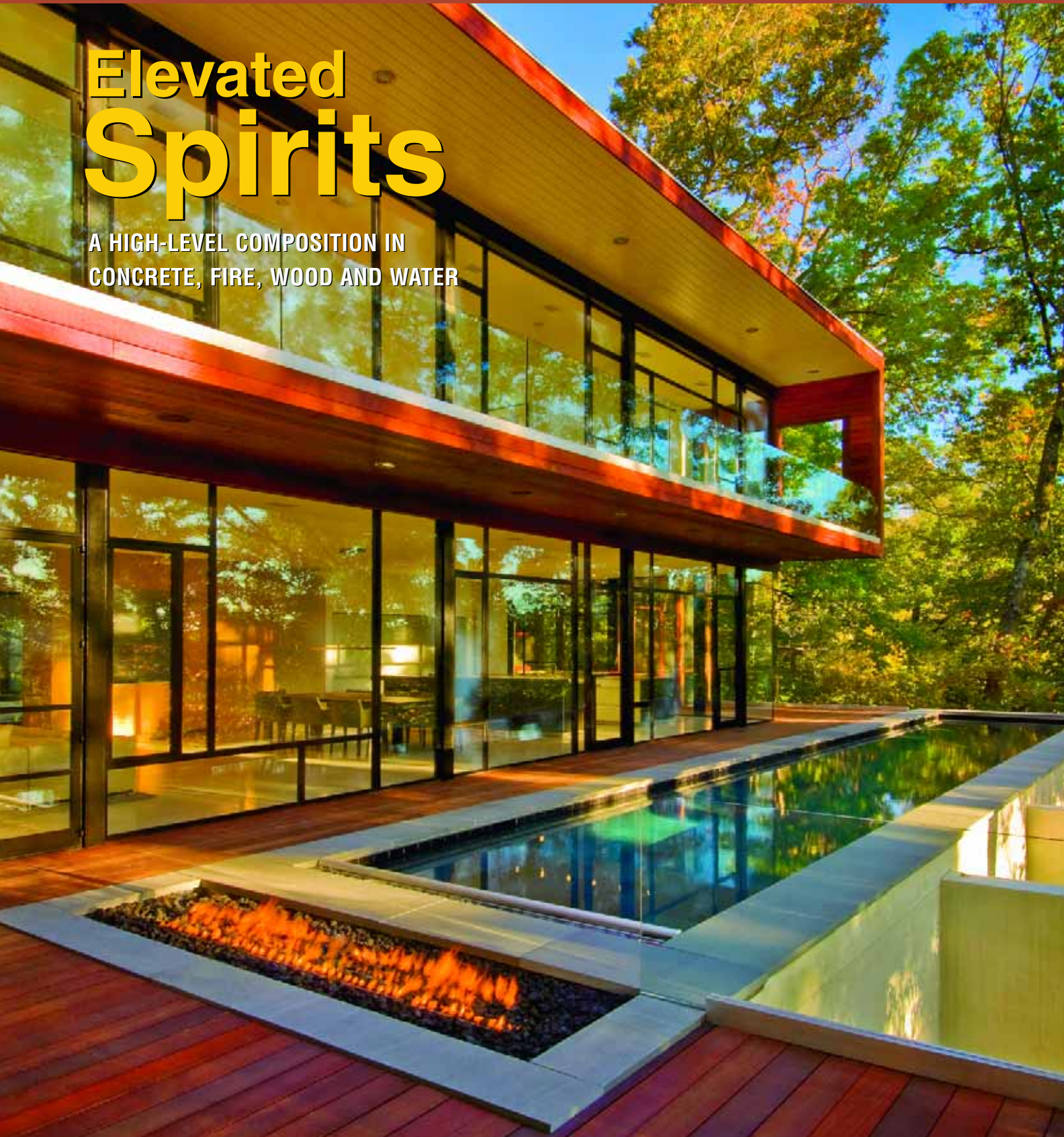
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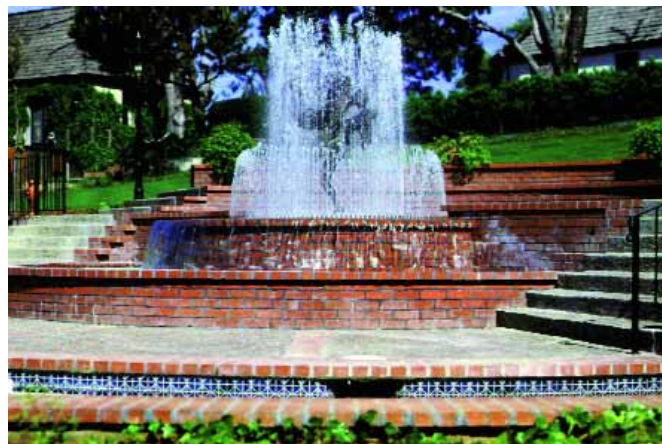
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On the Cover: Photo by Maxwell MacKenzie, Washington, D.C., courtesy Alpine Pool & Design Corp., Annandale, Va.

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Joy and Glory

By Eric Herman

Just recently, I had the pleasure of spending the day with a long-time *WaterShapes* contributor – and my good friend – Dr. William N. Rowley. Just a year ago this month, Bill was one of the first recipients of the McCloskey Prize, and as we noted at the time, he has from the start of the magazine been a tireless supporter of our efforts to build pride and professionalism into the watershaping trades.

I always enjoy the time I spend with Bill: His passion, expertise and humility are infectious, and his sense of humor is always, given the seriousness of his engineering-oriented business, a graceful and gracious delight.

During our most recent visit, he took me to see two of his recently completed California projects: a nautilus-shaped spa at the Palos Verdes Beach & Athletic Club and the refurbished pool at the Annenberg Community Beach House in Santa Monica – the latter watershape originally designed and built by Julia Morgan, the architect most famous for designing Hearst Castle. (Rowley discusses both projects and more in his latest feature, “Heritage Trails,” beginning on page 40.)

It was a beautiful Thursday, with skies as clear as could be following an early-spring rainstorm and stunning vistas beyond both beachfront facilities. As we toured each site, Bill gave me a complete rundown on each project, both of which involved more than a decade of his overall participation. In each case, he told me, these were community efforts to revive historic properties and provide a means for locals to enjoy beautiful surroundings while having fun and exercising.

Bill’s story offers plenty of detail I won’t recapitulate here. What I do want to mention, however, is the youthful exuberance he demonstrated for his work – this from a man with nearly four decades of experience in designing some of the world’s most prominent aquatic facilities. Every nuance was a point of pride, and along the way we met some of the people he’d worked with in bringing these projects to fruition.

Among these encounters was a late lunch shared with pool builder Fred Weiss of Condor, Inc., the construction firm that executed much of the restoration work at the Annenberg facility. He grew up in a family of pool builders, and listening to him and Bill reminisce about decades’ worth of industry experience was fascinating, to say the least. They share a love of watershaping at its finest and have both spent careers dedicated to the achievement of true excellence.

As I drove home late that afternoon, I couldn’t help feeling honored to be able to use these pages to shine a light on their collaboration. It was another of those moments when I simply know that I have the greatest job in the world.



In a similar spirit, I must point out that this issue carries a feature by Anthony Archer Wills – another recipient of the McCloskey Prize and, to be sure, another long-time friend and supporter of *WaterShapes*.

This time around, Anthony discusses the techniques he uses to introduce water into ponds and streams (see “Beginnings,” which starts on page 30). As does Bill Rowley, Anthony works at the highest level of his craft and does so with unvarnished enthusiasm and palpable joy.

In both cases, I see these practitioners plying their trades in ways that bring inspiration, credibility and professionalism to watershaping in all of its many forms.

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In This Issue

June's Writers

Anthony Archer Wills is a landscape artist, master watergardener and author based in Copake Falls, N.Y. Growing up close to a lake on his parents' farm in southern England, he was raised with a deep appreciation for water and nature – a respect he developed further at Summerfield's School, a campus abundant in springs, streams and ponds. He began his own aquatic nursery and pond-construction business in the early 1960s, work that resulted in the development of new approaches to the construction of ponds and streams using concrete and flexible liners. The Agricultural Training Board and British Association of Landscape Industries subsequently invited him to train landscape companies in techniques that are now included in textbooks and used throughout the world. Archer Wills tackles projects worldwide and has taught regularly at Chelsea Physic Garden, Inchbald School of Design, Plumpton College and Kew Gardens. He has also lectured at the New York Botanical Garden and at the universities of Miami, Cambridge, York and Durham as well as for the Association of Professional Landscape Designers and the Philosophical Society. He is a 2008 recipient

of The Joseph McCloskey Prize for Outstanding Achievement in the Art & Craft of Watershaping.

William N. Rowley, PhD, is founder of Rowley International, an aquatic consulting, design and engineering firm based in Palos Verdes Estates, Calif. One of the world's leading designers of large commercial and competition pools, his most notable projects include partial designs for the competition pools used in the Olympic Games in Munich (1968) and Montreal (1972), and he acted as aquatic consultant for the design of the Olympic Pool Complex in Los Angeles (1984). His projects also have included a wide range of non-competition pools, including the White House pool in Washington, the Navy Basic Underwater Demolition Training Tank in Coronado, Calif., and the resort pool at the Hyatt Regency at Kaanapali Beach on Maui. Rowley is involved in a range of local, state and federal entities, consulting on construction and safety-code requirements. He is also a fellow of the American Society of Mechanical Engineers as well as the



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recipient of The Joseph McCloskey Prize for Outstanding Achievement in the Art & Craft of Watershaping.

Paolo Benedetti is founder and principal at Aquatic Technology Pool & Spa (Morgan Hill, Calif.) – a firm dedicated to the design and construction of luxurious residential watershapes and exterior environments. He earned a degree in business management from California State University, San Jose in 1984 and has continued his education in watershape design and construction through courses in materials science, art history, architecture, color theory and many other topics. Among his varied accomplishments, Benedetti was one of the first designers to be certified by the Society of Watershape Designers through the Genesis 3 Design Group. He has performed countless forensic case studies involving failed pool structures, consulting for property owners and contractors alike, and is also a prolific writer, having written numerous technical articles for pool and construction trade magazines, including numerous past contributions to *WaterShapes*.

Benedetti is currently an instructor in the Genesis 3 construction schools and is a Genesis 3 Platinum member.

William Bennett is co-founder and general manager of Alpine Pool & Design Corp., a custom watershaping firm based in Annandale, Va. He has worked in the pool and spa industry in the greater Washington, D.C., area for nearly 30 years, functioning in a variety of construction and management capacities. He founded his current firm with Walter Williams in 1987, responding to the impression that the market in their area was ripe for a firm dedicated solely to sophisticated, custom designs for affluent residential properties. **Walter Williams** is co-founder and principal designer for Alpine Pool & Design Corp. A graduate of Western Washington University, Williams has more than 30 years' experience in the construction industry and has partnered with William Bennett since their firm's inception in 1987. Williams now focuses primarily on technical and aesthetic design work, serving as the clients' ongoing consultant through all project phases.

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Aqua Culture



Plain Silly

By Brian Van Bower

I have my opinions – some of them quite strong – but I’m also what I would consider to be a tolerant, open-minded guy: I weigh a broad spectrum of ideas in forming my perspectives, and I try my best to judge people by their thoughts, actions and merits.

Every once in a while, however, my reserves of patience get pressed to the limit. When that happens, I believe it’s valid and useful to stand up and call things as I see them.

Let me cut to the chase: On February 25, 2009, *The New York Times* ran a piece in the paper’s Home & Garden section by Kimberly Stevens titled, “Fireplaces Step Out for Air.” In it, she relates the story of a southern California couple who decided to install an outdoor fireplace and dining area in their backyard.

That was all well and good, except for a comment offered at the beginning of the article by the couple’s landscape architect, Jay Knowlton, regarding the decision to forgo a swimming

With ‘business as usual’ so far off balance, the media have become positively overwrought, dealing in all sorts of hyperbole about the environment, the economy and political swings.

pool: “Anyone with a conscience right now,” he said, “is not going to dig a hole in the ground, line it with cement, fill it with 60,000 gallons of water and some chlorine and wait for it to evaporate.”

really?

Before I jump on his case about that mind-numbingly silly comment, let’s step back and consider some context.

First, we know that these are difficult economic times – certainly the most trying I’ve witnessed in my lifetime. With “business as usual” so far off balance, the media have become positively frothy and overwrought, dealing in all sorts of hyperbole about environmental doom, global economic collapse and our country’s political swings. Apparently, this has also become an opportune time for some people to speak out against swimming pools.

Second, atop everything else that challenges our industry these days, we’re also facing the public handwringing and regulatory gridlock surrounding the Virginia Graeme Baker Pool & Spa Safety Act. As has been widely reported, this legislation, intended to protect children from suction-entrapment incidents, has mainly resulted in difficulties in compliance and reports of the closure of some public swimming pools.

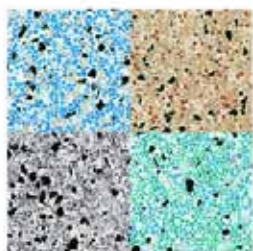
(The Act mandates the use of drain fixtures that weren’t available on the market at the time the legislation passed; to my mind, it’s a classic example of the government getting involved without a full understanding of the situation in the real world. Nobody in the watershaping industry opposes the elimination of suction-entrapment incidents – or any other form of water-related mishap, for that matter – but legislation of this sort only makes things worse by adding layers of confusion.)

Third and finally, we all live in a time when everything under the sun is “turning green.” Public concern over ecological issues has led to the evaluation of virtually every product we use through the lens of its effects on the environment. Again, just as I believe pool safety is a critical issue, I agree that protecting our environment is of the utmost importance as well.

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At the same time, I think the near-religious zeal with which some people are approaching these issues is overblown and perhaps even counterproductive.

The result of these three streams of concern that are influencing the general public – that is, the economy, safety and the environment – is that some people find themselves indulging in feverish, uncompromising, short-sighted rhetoric. That is *exactly* the slippery slope this landscape architect stepped onto by prefacing his remarks with the phrase, “Anyone with a conscience.”

If there was ever a counter-argument against the old saying that “ignorance is bliss,” this statement is it!

blissed off

Now, if this comment had come from someone from well outside the watershaping industry – some sort of passionate (yet uninformed) environmental extremist – I could overlook and even forgive the silliness.

But when I consider the fact that this came from a landscape architect providing an exterior environment for the home of an affluent couple who wanted a slice of the good life in their backyard – someone who is ostensibly in the same sort of business that I am – I’m simply stunned that he would cop this attitude about swimming pools or any other type of watershape.

The New York Times story covers the clients’ decision to opt for a fireplace in their backyard. No harm done – indeed, perfectly fine, because I think outdoor fire features are wonderful. But for their design professional to be quoted as asserting that stepping away from a swimming pool is a matter of “conscience” stands as one of the most absurd, self-righteous and uninformed statements I’ve ever heard.

I assume, based on his quips about evaporation and chlorine, that his moral outrage about swimming pools stems from deep-seated environmental concerns, so let’s look at those two issues specifically.

Yes, chlorine has long been a bane to environmentalists, and there’s no doubt that some chlorine byproducts and derivatives are *not* good for the environment or the human body. When it comes to water and the forms of chlorine used to treat it, however, we cannot forget that it was the introduction of chlorine to water at the turn of the 19th Century that virtually eliminated waterborne diseases.

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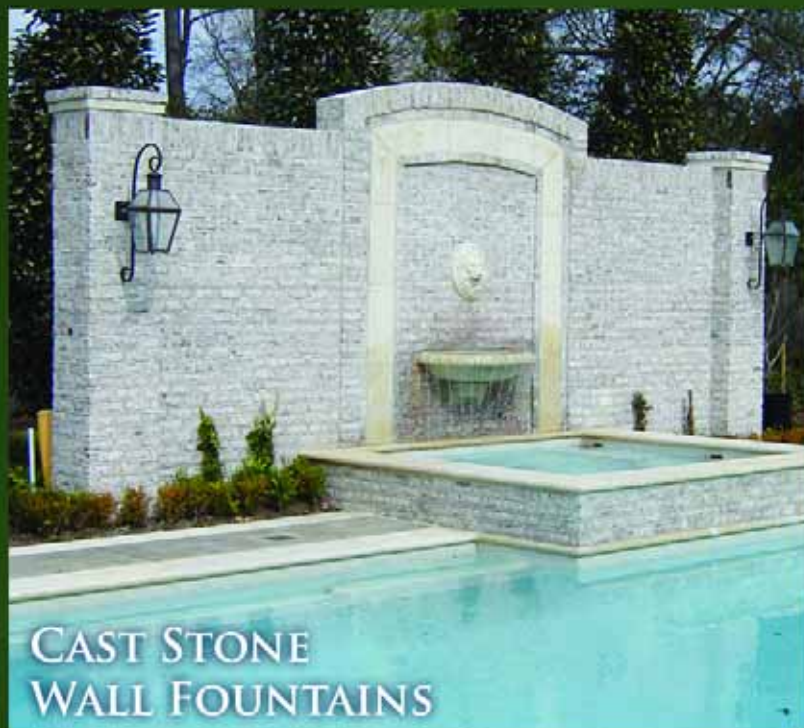


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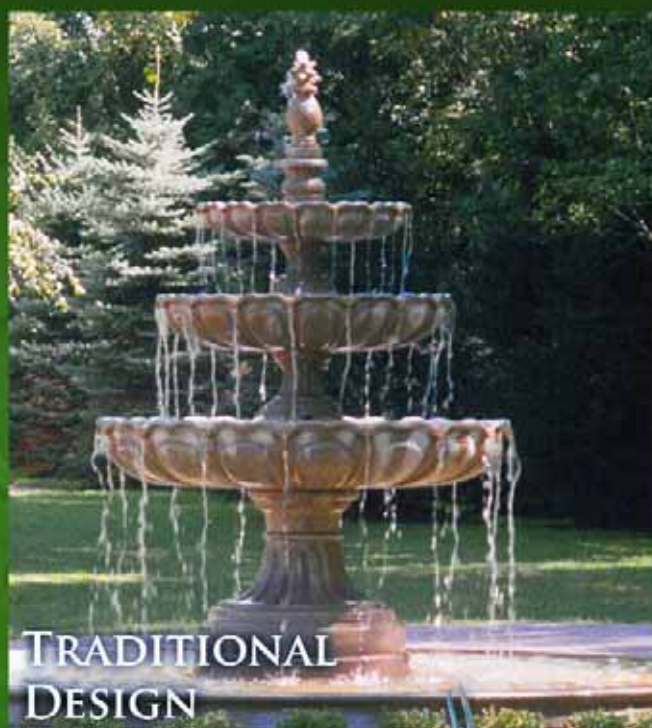
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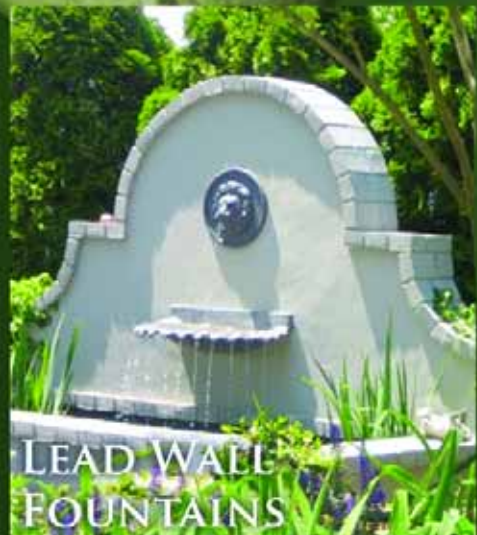


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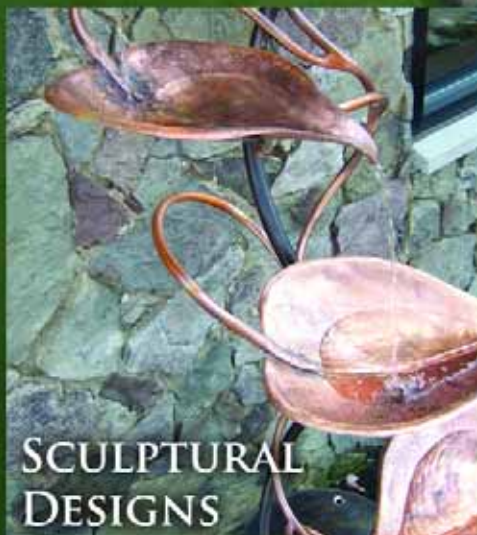
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To this day, in fact, most regions of the United States owe the safety of their drinking water supplies to the careful, measured use of chlorine. On that level, it's almost beside the point that modern methods of chlorinating watershapes have overcome past associations with bad odor, green hair, eye irritation and faded swimsuits. Furthermore, there are other methods of sanitizing pool and spa water his clients might have heard about that don't involve chlorine at all!

As for evaporation, well, yes, water in swimming pools and spa does evaporate. But so does water used to irrigate landscaping, especially lawns. Yes, we should be wise in our consumption of water – but to suggest that evaporation from any type of watershape somehow threatens our supply of fresh water is gross exaggeration. It's similarly absurd to say that watering plants is a bad idea, and it's my guess that Mr. Knowlton did

not suggest eliminating plantings from his clients' exterior design.

Furthermore, I would argue that if you want to look at the environmental effects of recreational activities, you could make a good case that a family staying at home to have fun and relax around a pool has a far smaller carbon footprint than that same family would in flying to a resort or driving across country in a recreational vehicle to enjoy quality time by a lake, ocean or river.

missing the point

Granted, I'm expending a lot of energy addressing one comment from one designer in a single newspaper article. I do so because I know that Mr. Knowlton is not alone in his dismissal of swimming pools or in his apparent ignorance of their value.

In March 2009, for example, Vice President Joe Biden added another item

to his long registry of silly side comments: When asked about the stimulus package that was under debate at the time, he said, "There are no swimming pools in this bill." Presumably his comment was a rhetorical means of asserting that there was no frivolous spending in the bill (which, frankly, I have trouble believing), but in his comment he revealed that he, like Mr. Knowlton, doesn't recognize the true value of swimming pools.

For starters, let's consider the social worth of public swimming pools. In many cases, municipal aquatic centers are places where kids who wouldn't have any other way to escape summer's heat can go to cool off, socialize and engage in healthful play. These children learn to swim, which reduces their lifetime risk of drowning; they also burn energy that in some cases might be put to less constructive or even destructive use in other settings; and they work at building stronger, healthier bodies.

And as we all know, pools and spas are used to heal the sick and rehabilitate the injured; serve as venues for athletic competition; attract tourists to resort properties; and provide employment for tens of thousands of lifeguards, service technicians and more. In backyards, pools give families places to be together in the security of their own homes. Commercial or residential, these watershapes are gathering places where life happens and some of our fondest memories are forged.

Then there are the benefits that flow from the use of swimming as a form of exercise. As has been reported in the pages of this magazine, researchers are finding that swimming, if not *the* healthiest of all exercises, is certainly one of the best forms of physical activity. And this news comes at a time when our population is aging, the cost of healthcare is a major public concern and rising rates of obesity, heart disease, hypertension and diabetes are increasing concerns.

Just imagine if every single person in the country swam regularly: How much healthier would we be as a nation? How much longer would we live? How much better would we feel? How much more productive might we be in the other facets of our lives? All I know is

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that swimming and other forms of aquatic exercise increase life spans, reduce disease and add to an overall sense of well-being.

And swimming is *fun*. When I watch people jogging or lifting weights, I very often see faces twisted in anguish because of the great exertion involved. For most participants, by contrast, swimming is an activity in which the predominant facial expression is a smile: Being in water makes people feel good because it's fun.

And, finally, there's the fact that so many of us plain enjoy being around water, even when we don't get wet ourselves. Is there really anything immoral or *unconscionable* about appreciating the beauty of a reflection, being soothed by the sounds of moving water or delighting in its presence in a landscape?

With all that in mind, I would argue that our products are not a luxury, they're a *necessity*!

lifting spirits

As I see it, there's an undercurrent in these public flagellations of swimming pools: that is, an insidious message that when times are tough, we should stop enjoying ourselves.

Yes, most of us have tightened our belts. Yes, we all have a social and moral responsibility to be caretakers of the environment and resolute participants in economic recovery. Yes, as producers of consumer products, we must dedicate ourselves to making them as safe as can be. But, no, I do not believe anyone who doesn't want to should be told to seek an austere life, vacant of joy.

In fact, the thought that things are bad (or good, for that matter) is one of the factors that drives the economy as well as social trends. Being in a positive mood and having a good attitude in tough times doesn't mean ignoring reality or sticking your head in the sand, but it also doesn't mean giving up on the things that make you happy.

Again, returning to Mr. Knowlton's comment, if his clients had really wanted a swimming pool, I can't help wondering if he would have berated them for their lack of conscience – or if he would simply have found a way to give them what they wanted and believed would make them happy.

The fact is, when designed and built properly, our products make this world a much happier and healthier place – points that anyone with a conscience can see. **WS**

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

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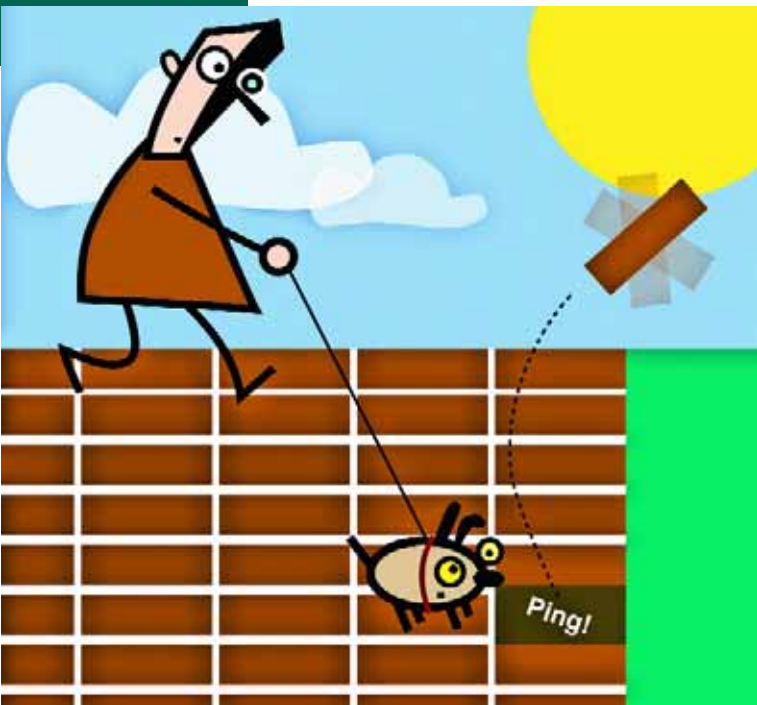
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On the Level



Sturdy at the Edges

By Bruce Zaretsky

In just about every profession, it seems that there's one thing or another that goes unnoticed and underappreciated because it is overshadowed by more visible or sensational elements. In the watershaping and landscape trades, for example, I see foundations as being among these unsung details despite their obvious significance.

They're so important that I always talk with my clients about them and the role proper preparation plays in the success of everything atop them. After all, I say, a home can have wonderful tile work in the kitchen, but it really won't be worth much unless the home itself has a good, solid foundation.

Likewise in the landscape: If we're working on a deck, I know my clients will be more impressed by a great railing detail than they ever will by the unseen and invaluable substructure upon which it stands. And the same holds true for the underpinnings of barbecues or planting areas or irrigation systems – or for the item I'll address here, which has to do with

Cars, trucks or heavy equipment moving over a brick driveway exert *tremendous* lateral pressure, especially when the tires are steered. If the paving is not adequately contained, the materials will want to slip sideways.

the edge restraints for dry-laid paving.

That's not a sexy subject, as I think you and most of my clients would agree, but as I explain to anyone who will listen, the improper use (or absence) of edge restraints cuts a clear path to project failure.

To be sure, most contractors and even many designers know about the value of setting a good base for paving materials including bricks, concrete pavers and smaller paving stones: If you don't prepare a proper base, the paving material will settle, usually unevenly. Fewer, it seems, are aware of the importance of properly retaining the edges of these structures – perhaps because they simply don't see them as "structures" in the usual sense.

stepping down

In my work, by contrast, I *always* see paved areas as structures requiring appropriate foundations. I do so because all areas that are walked upon or driven over are subject to downward forces and a proper base is required to prevent the paving materials from settling.

Especially in cases where there will be vehicular traffic, these areas are subject not only to this *vertical* pressure, but also to *lateral* movement. Indeed, cars, trucks or heavy equipment moving over a brick driveway exert *tremendous* lateral pressure, especially when the tires are steered. If the paving is not adequately contained, the materials will want to slip sideways. This results in the opening of gaps in the surface and ultimately leads to paving-system failure.

I never want that to happen, so I always restrain paving edges and do all I can to prevent lateral movement.

What's a good foundation in these cases? In my business, we extend the base for the paving materials out well beyond the final, formal edge of the paving. Where we work, we use crusher run (a basic mix of #2 stone and stone dust) for this purpose, extending it out beyond the planned edge of the paving to an extent equal to the base's depth. Thus, if we provide a seven-inch excavation to prepare for installation of a pedestrian walkway, we extend the base out seven inches beyond the line es-



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On the Level

tablished for the edge of the paving.

As I see it, the last thing we want to have happen is for pavers to start sloughing off the edges. So here in upstate New York, if we're planning on a car-accessible paving for a residential driveway, we'll excavate to 12 inches or more, depending on the soil conditions, then extend the

base out to match this depth. This extension gives us a uniformly compacted sub-base on which we can place our edge restraint.

There are lots of options in edge restraints. I recently read an article (in *another* trade magazine, just so you know) in which the writer strongly advocated

use of the plastic edge restraints available on the market and came down especially in favor of the one his company makes. These edgings are designed to be spiked down into the ground alongside the pavers they are charged with holding back.

These plastic products come in several configurations, but for the most part they have triangular cross-sections and serve to buttress paving materials in place once they are spiked into a substrate of base stone that's supposed to be there (per the discussion above). With precise installation of these products, they can also be used as a screed for the bedding course of sand.

It's not my intention to knock these products. Quite the contrary, because they can and do work well under the right conditions — but not so well, unfortunately, in the conditions we encounter in climates that get as persistently cold and damp as is the case in upstate New York. Here, for example, we can experience stretches during winter in which the temperatures will range from zero to 60 degrees in a short period of time — a level of fluctuation that can destroy any ill-founded paving scheme in no time at all.

cold snaps

Winters here are notorious for the havoc they wreak on all phases and types of construction, and it's not so much about the consistent, bitter cold making work uncomfortable as it is about the repeated cycling between cold and warm and the freezing and thawing that result.

As the ground freezes, it expands to an extent that depends on the amount of moisture it contains. These moisture levels aren't consistent from place to place, so the ground will not expand (or *heave*) in a uniform manner. Then comes a thaw, and the ground (and everything on top of it) settles back down, again to different extents. The edge-restraint system is supposed to settle back down into place as well, but in my experience this is often not what happens.

The issue is simple: Edge restraints heave in a different way and to a different extent than do the heavier bricks they're meant to hold in place. That dif-



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On the Level

ference is critical, because weight is the main reason why brick, paver or stone walkways, patios and driveways return to their previous planes when the winter ends. (This is why so many lawns are rolled in spring hereabouts: The grass gets bumpy from inconsistent frost heave and does not return to anything approaching a level field.)

This issue might not affect a plastic edge-restraint system in the first year or two, but after a few years, the top of the edging will begin to show in places as it rises further and further and settles less and less. Moreover, with lighter-weight plastics, even the movement of the grass or soil alongside it can hold it up – at which point the intrusion of a pebble or a bit of soil falling below the edging is enough to prevent it from finding its way back down.

In most such cases, using a hammer to pound down the spikes only succeeds in slamming the spike right through

the edging!

Manufacturers found a way to solve this problem by putting an extension of the restraint's bottom as a lip extending below the paving. Their reasoning: The weight of the paving material will push the edging back down. But leverage is a factor here, with the long lengths of the edging pitted against the weight of the bricks. So rather than the brick pushing the edging down, the edging actually holds the brick up!

Please: There's no need to send me letters if you live in places where there's no frost heave and your plastic edge-restraint systems are perfectly adequate: All I know is that I have tried or encountered just about every plastic system in the 20 years or so they've been available, and they just don't meet the climatic challenge where I work. As a result, it's my judgment that the best way to restrain paving in northern climates is through proper use of concrete.

hardscape solution

With concrete, all you do is prepare a proper base, as described above. Once all of the bricks or pavers have been placed and all necessary cuts have been made, we carefully scrape away the extended bedding sand by sliding a trowel straight down alongside the paving material to the base stone.

We then trowel concrete along the resulting edge, striking it in a triangular pattern not unlike the one you see in most plastic edging so it ends up about an inch below the top of the brick, sloping back about four or five inches from the edge. In nearly 30 years of installing bricks and pavers both on Long Island (milder but still cold) and in upstate New York, I've never had an edge failure.

The reason for this track record is that the concrete tends to bond to the edge of the bricks or pavers while creating what is in effect a monolithic pour along the length of the paved area. This concrete

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Where I work and the winters get truly nasty, we hem our bricks and pavers in with concrete: The concrete bonds to the edge of the surfacing material and forms a substantial monolithic mass that holds things in place.

will crack perpendicular to its length, but that won't affect its basic integrity as the weight of concrete and the force of the soil alongside it will tend to keep it in place.

(I've never needed to embed rebar in the concrete and haven't seen a reason to do so – and my projects have worked fine without it. I'm sure that there are cases where use of steel-reinforced concrete would be advisable – if, say, a driveway were to be regularly traversed by fire engines or other large, heavy vehicles – but for most residential applications the use of steel is probably overkill.

There are, of course, alternatives to plastic and concrete. Indeed, steel edgings have been used for years with good results and, unlike plastics, can be hammered back down into position quite effectively if they

move. The same goes for aluminum edgings, although I've noticed that some aren't quite strong enough to withstand lateral pressure for the long haul.

As always, your choices will be dictated to a large extent by the conditions you encounter. In my case, concrete is king – and I'll persist in extolling its virtues! **WS**

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

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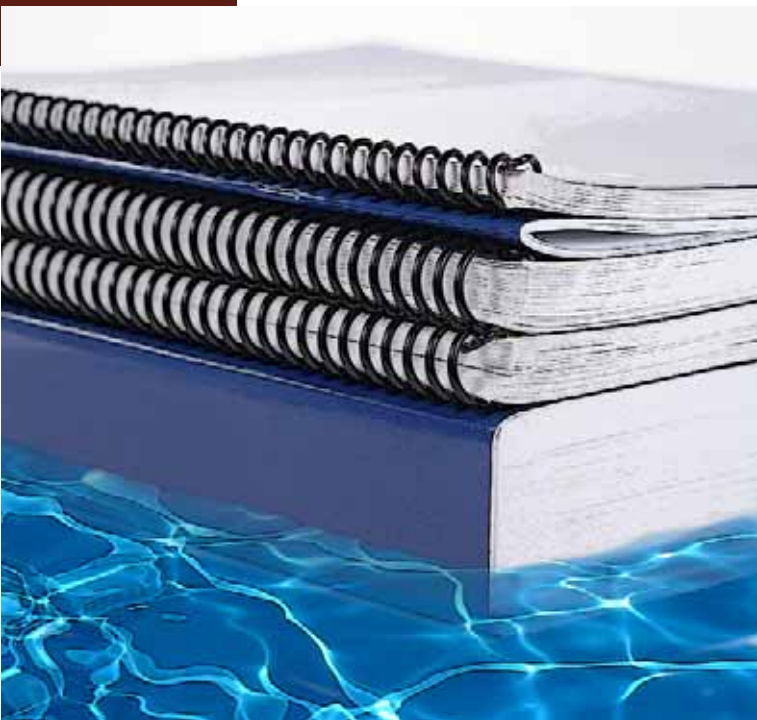
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If you don't already use written specifications, boilerplate or otherwise, now is the time to start – and when you do, keep things *simple*.

Manual Dexterity

By Dave Peterson

Through the past year and a half, I've dedicated an article and three "Currents" columns to the subject of drawing practices and the National CAD Standards. But construction documents consist not only of drawings, but also written specifications – so now I'll shift my attention to Project Manuals – key communication tools used by architects and engineers to uphold quality and establish performance requirements for all of a given project's contractors.

Basically, a Project Manual is a bound book of construction documents prepared to define contractual obligations and govern the requirements involved in building a project. As such, it includes general information, procurement and contract requirements and, potentially, numerous and often lengthy specifications of products to be used, installation practices to be followed and details on a host of other activities.

If you're not familiar with these manuals,

that's not a great surprise: To date, these compilations have seldom been used in the watershaping industry because, until fairly recently, most of our projects were (and still are) done as part of design/build contracts in which the builder designs the project as a component part of a construction contract.

Increasingly, however, these manuals are coming into play. This happens, for example, in projects in which my company performs design and engineering services for owners and the documents are used in turn by project managers to establish elevated acceptance criteria for (and to ensure better-quality results from) their general contractor and all subcontractors.

digging deeper

Most of our residential and smaller commercial projects do not involve formal Project Manuals. For these, we prepare simplified written requirements that add one or more sheets to the drawing set. Our larger commercial projects are in a different league: Here, we typically add a handful of sheets, but we've also added dozens of multi-page sections depending on the client and/or the project's specific needs.

In other words, you may breathe easy for a while longer, because there's still room for some informality and I've seen construction contracts from builders that include no more than preprinted forms with contractual requirements and a series of fields and checkboxes that specify equipment, finishes and even project dimensions. These constitute only rudimentary Project Manuals and are limited in scope, and my sense is that this sort of informality will soon become a thing of the past: Indeed, a time is coming when we'll all need to step up to new levels of specificity in our communications.

So let's grab a real Project Manual and describe it in some detail. With respect to basic appearance, these are volumes of 8-1/2-by-11-inch sheets of paper, often printed on both sides and either spiral or comb-bound so they'll lay flat on a desk or tabletop for easy reading and reference. Depending on the size and complexity of the job, a manual may be a quarter-inch thick or even just a dozen sheets or so stapled together – or it may consist of multiple volumes of two-inch thickness.

The front cover lists project information and is followed by pages of owner certifications, signatures and wet-seals from the architect(s) and engineer(s) – hence these manuals have all

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the weight and legal standing of contracts. The first few pages also usually carry a table of contents and lists of drawings and schedules.

After these sheets comes a long list of documents that may be included in the manual – so many specific possibilities that, helpfully, the Construction Specifications Institute (www.csinet.org) has developed a structure and numbering scheme to keep everything organized and consistent (see the sidebar on page 25).

One benefit of the CSI numbering scheme is that multiple consultants on a project will generally not overlap one another when the Project Manual is assembled by the architect. For example, we recently provided specifications for certain elements of a waterfeature that is to be part of a much larger hospital project. As you might imagine, the manual in this case consisted of several volumes covering everything from excavation to the paint colors of the surgery suites, but it

was all set up in such a way that the electrical engineer's input didn't conflict with the furnishings sections – and neither conflicted with our fountain information.

At first glance, you might be tempted to separate your specifications by Division – that is, putting submerged lighting in Division 26 and plumbing in Division 22 – but that's not necessary if your specifications focus only on watershapes. Indeed, I caution against doing so: If your sheets are to be integrated with those generated by others in a large project, dividing things that way increases chances for conflict and makes it *much* harder to find information.

Consider that the electrical contractor will be constantly referring to Division 26 Sections that may have nothing at all to do with building the watershape. Thus, putting your submerged lighting information in Division 26 might create confusion. Instead, use a Division 13 section number (see the sidebar once again) with a two-digit suffix to divide your infor-

mation into a coherent framework.

why specify?

So we know a Project Manual has several major Divisions and that each contains Sections: What's inside the Sections? Again, CSI has been most helpful in defining these substructures in the form of its "SectionFormat" standard. In fact, they even go so far as to outline the physical presentation of the information via their "PageFormat" standard.

As you know if you've gotten into this on any level, the Sections are divided into three primary parts: General, Products and Execution. For the moment, it's enough to know that this architecture exists: At some point in the future, I'll get around to dissecting Sections and seeing how Parts function within them.

For now, just imagine: You've been asked to build a simple pool and are told that the structural engineer has worked out the details with the soils engineer. All



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Starting in the 1960s, the Construction Specifications Institute (CSI) began organizing all sorts of construction-related information into a collection of Divisions.

Originally, there were 16 of these Divisions covering big concepts such as Concrete, Masonry, Metals and the like. In 2004, however, CSI released its latest “MasterFormat” edition and now includes 34 active Divisions (and 15 additional, unnamed reserved sections), listed below:

- Division 00 – Procurement and Contracting Requirements
- Division 01 – General Requirements
- Division 02 – Existing Conditions
- Division 03 – Concrete
- Division 04 – Masonry
- Division 05 – Metals
- Division 06 – Wood, Plastics, and Composites
- Division 07 – Thermal and Moisture Protection
- Division 08 – Openings
- Division 09 – Finishes
- Division 10 – Specialties
- Division 11 – Equipment
- Division 12 – Furnishings
- Division 13 – Special Construction
- Division 14 – Conveying Equipment
- Division 21 – Fire Suppression
- Division 22 – Plumbing
- Division 23 – Heating, Ventilating, and Air Conditioning
- Division 25 – Integrated Automation
- Division 26 – Electrical
- Division 27 – Communications
- Division 28 – Electronic Safety and Security
- Division 31 – Earthwork
- Division 32 – Exterior Improvements
- Division 33 – Utilities
- Division 34 – Transportation
- Division 35 – Waterway and Marine Construction
- Division 40 – Process Integration
- Division 41 – Material Processing and Handling Equipment
- Division 42 – Process Heating, Cooling, and Drying Equipment
- Division 43 – Process Gas and Liquid Handling, Purification, and Storage Equipment
- Division 44 – Pollution Control Equipment
- Division 45 – Industry-Specific Manufacturing Equipment
- Division 48 – Electrical Power Generation

What’s in these Divisions? They’re actually umbrellas that each encompass multiple numerically identified Sections. For example, Division 00 includes Section 000101 – Project Title Page; Section 000105 – Certifications Page; Section 000110 – Table of Contents and more. There are potentially thousands of individual Sections, but most projects only use a small fraction of them.

Of particular note are several areas in Division 00 that pertain to “available information,” including preliminary schedules, existing conditions, surveys, environmental issues, hazardous materials, and geophysical and geotechnical details.

In other words, if a soils report was prepared for the project, it will be found in this part of the Project Manual. Division 00 also includes contracting requirements, forms, certificates, general conditions and information on policies and procedures affecting revisions, clarifications, modifications and change orders.

CSI has also identified certain Sections within Division 13 (Special Construction) that relate specifically to watershapes:

- 13 01 11 – Operation and Maintenance of Swimming Pools
- 13 01 12 – Operation and Maintenance of Fountains
- 13 01 13 – Operation and Maintenance of Aquariums
- 13 01 14 – Operation and Maintenance of Amusement Park Structures and Equipment
- 13 08 11 – Commissioning of Swimming Pools
- 13 08 12 – Commissioning of Fountains
- 13 08 13 – Commissioning of Aquariums
- 13 08 14 – Commissioning of Amusement Park Structures and Equipment
- 13 11 00 – Swimming Pools
- 13 11 13 – Below-Grade Swimming Pools
- 13 11 23 – On-Grade Swimming Pools
- 13 11 33 – Elevated Swimming Pools
- 13 11 43 – Recirculating Gutter Systems
- 13 11 46 – Swimming Pool Accessories
- 13 11 49 – Swimming Pool Cleaning Equipment
- 13 11 53 – Movable Pool Bulkheads
- 13 11 56 – Movable Pool Floors
- 13 12 00 – Fountains
- 13 12 13 – Exterior Fountains
- 13 12 23 – Interior Fountains
- 13 13 00 – Aquariums
- 13 14 00 – Amusement Park Structures and Equipment
- 13 14 13 – Water Slides
- 13 14 16 – Wave-Generating Equipment
- 13 14 23 – Amusement Park Rides
- 13 17 00 – Tubs and Pools
- 13 17 13 – Hot Tubs
- 13 17 23 – Therapeutic Pools
- 13 17 33 – Whirlpool Tubs

There’s more, but you get the idea. Our master file uses only Section number 13 11 00 with a series of suffixes (more on that in a future article), but we can easily shift things to other section numbers if the project involves something other than a pool.

Some clients require us to use the five-digit numbering system used in the pre-2004 CSI standard. That’s a bit of a pain, but translating things is generally simple because of the ease and speed of handling everything on a computer screen before a manual is output.

–D.P.

necessary permits have been pulled, so you bid the job, win and sign the contract and begin digging. Within hours, however, you hit groundwater that you were not anticipating and engage in a disagreement with the owners about costs.

For their part, the owners think you should have included dewatering within your bid; for yours, you think the owners need to pay for a change order.

This is a situation that could have easily been resolved by the existence of a good Project Manual. For starters, the soils report would have been included (as Section 003132 if CSI's standards are followed). Also, the Manual would normally include policies and procedures to follow for change orders and the like.

(For smaller projects, of course, this might all be spelled out in the contract itself, but for larger commercial projects, the manual itself becomes the point of reference for all contract requirements.)

Beyond such basic, contractual details,

the specifications may also carry information on such points as test procedures and quality control measures that are not defined in the drawings. For example, the drawings might show a 1.8 million Btu/hr heater with routings for certain water and gas plumbing connections, but the written specifications expand on that and indicate that the plumber must, for example, install thermocouples in the plumbing and a sediment trap on the gas line just before the heater connection.

The sheet might also require that the contractor retain the services of a technician authorized by the manufacturer to perform startup on the heater "to ensure that everything flows and burns as expected, without soot buildup."

And in cases in which the heater specification might allow for putting various manufacturers in a competitive-bid scenario, the document will likely run to several pages to describe all the performance criteria and startup procedures. This lengthy docu-

mentation does *not* belong in the drawings. Instead, as a contractual, legally binding requirement, it belongs in the Project Manual.

first in line

Generally, in fact, specifications take precedence over drawings if conflicts arise.

Let's say, for example, that the heater specifications say "all heaters shall be installed on level concrete housekeeping pads a minimum of three inches above the sloping floor." The drawings may not even indicate the housekeeping pad, but if the specifications say "shall," then it must be done — absent, of course, another sheet that formalizes change requests made by the contractor and subsequently approved by the owner, architect(s) and/or engineer(s).

Because these specifications are contractually binding, it is important that they be read and understood before you bid on any project that includes them. Case in point: A year ago, a friend of mine lost more than \$50,000 on a project because

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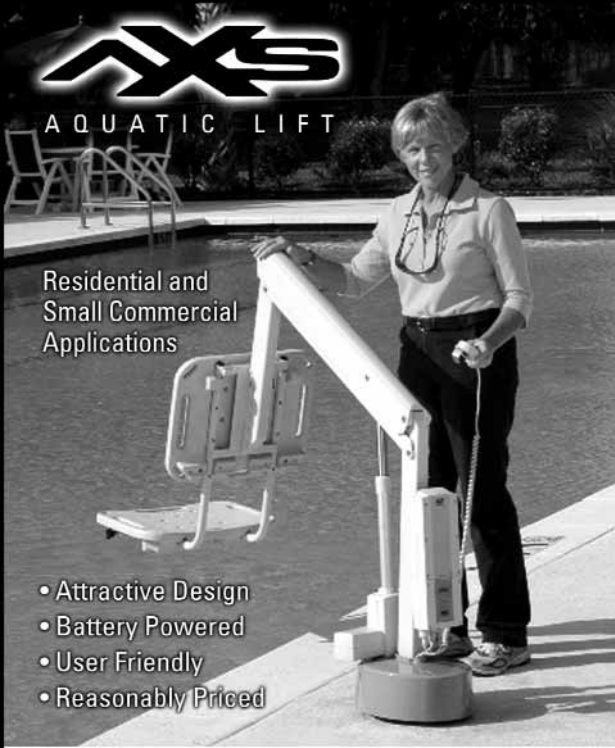
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the written specifications required that he provide one extra piece of each different type of equipment used on the job (pumps, filters, valves and more). He didn't recognize that requirement even existed until his final invoice was rejected: The equipment was not on site and no payment would be forthcoming until it was!

(My friend was only kidding when he said his estimator was going to be buried at an undisclosed location in the desert.)

So even if a general contractor gives you one or two specifications that relate to your own work, be sure to request a copy of the *entire* manual and review everything it contains, basically because the general contractor may not know the extent to which your scope of work is affected by other Sections – particularly the general items defined in Division 00.

I know of some in the watershaping industry who already use these systems and have developed boilerplate specifications they can quickly edit for use on each job.

The basics covered easily here might include concrete mix design, the use of products from certain manufacturers or installation of specific types of valves. You might also establish strict rules for builders and subcontractors with respect to hours, smoking restrictions, radio volume, cleanup requirements, mandatory project reviews and/or job-site safety meetings.

The point is, if you don't already use written specifications, boilerplate or otherwise, now is the time to start – and when you do, keep things *simple*. Begin, for example, by listing the things that have caused problems for you in the past: equipment issues, plumbing configurations, structural issues, client relations, unnecessary expenses and the like.

If you've ever been frustrated by the fact that a small rock has prevented you from pulling the spa-side remote's cable through a half-inch conduit, for instance, then include a line item indicating that no conduits of less than three-quarter-inch diameter are

allowed anywhere on any of your projects. If you do so and your plumber or electrician installs half-inch conduits, you now have the clear ability to order replacements at the subcontractor's expense.

Or say you've been frustrated about check valves being installed backwards or in unserviceable positions: If you begin specifying use of true-union valves or models that can be flipped around using a screwdriver instead of glue and couplings, you have the leverage to make subcontractors play by the rules you've established.

rolling assistance

One of the best things about systematizing your use of written specifications is that these documents are portable and can be recycled for use in other jobs much more easily than they can be transferred as text on drawings. They can be copied, cut and pasted with ease: I just keep a master copy on my desktop, and whenever I think of something I jump to it and pull out details

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to insert into a new project's documents.

I'm always mindful that these are, at root, legal documents, so I focus on using language carefully and find myself using lots of *shall* and *shoulds*. Instead of saying, for example, "Do not use a small, six-inch light in the spa," I'll write: "One or more 10-inch diameter white LED lights shall be installed in all spas in locations and quantities shown in the plans."

The first statement is not specific enough: The goal might be to eliminate small light fixtures, but the wording leaves it open to the builder to install something even smaller than a six-inch light! Moreover, the way it is written may also require rephrasing for the next project, which might not include a spa at all.

The second direction, by contrast, is more specific in that it requires use of a 10-inch LED light – but it is also more general in that it can be left in the specs unedited for the next project even if there is no spa. The use of the word *shall* also reinforces the requirement, and the construction "one or

more" followed by "shown in the plans" encourages the reader to look at the plans to determine an exact count.

This trend toward formalized specifications has caught on to such an extent that some manufacturers are writing their own documentation in CSI format and publishing them on their Web sites so that they may be copied, edited and inserted into Project Manuals. These are usually product-specific items with certain installation, startup and testing or calibration issues and serve two purposes: They are sales tools whose easy use encourages specification writers to include their products, but they also go a long way toward protecting the manufacturer when performance or warranty issues related to proper installation arise – as they sometimes do.

We're far enough along in adapting to this approach that our office now owns a wire binding machine we use to assemble Project Manuals for our jobs – even if only one copy is prepared for the owners at the construction-proposal stage. We include

tabs that separate the contract, the scope of work and a reduced-size copy of the drawings. We also include manufacturer's brochures for everything we plan to use on the project along with copies of our contractor's license, insurance certifications and other credibility-building items.

I confess that we have not yet taken the time to organize all of these sheets in CSI format, but we follow the patterns CSI has established and have found that the simplified format we use works well with residential clients who would rather review colorful product brochures than plain-text versions of the same information.

Our clients are always impressed when we hand them a thick wire-bound book with all the details. They have already paid for and received the design: Now we are bidding against other builders, and the thoroughness of our book affirms that we are both detail-oriented and thorough. **WS**

Next time: We'll crack open an individual specification and investigate its contents in further detail.

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Beginnings



By Anthony Archer Wills

The water has to come from somewhere in pond/stream systems – and that, according to master watershaper Anthony Archer Wills, is precisely where many projects run off course, basically because their injection points are too obviously contrived. Here, he argues instead for taking great care in devising (and hiding) water sources to make them seem as though they’ve been shaped from time immemorial by nature’s own subtle hydrology.



Where do rivers start?

That's a question that has always fascinated me, basically because I know that the Nile, the Amazon and the Thames – as majestic and life-giving as they and many of the world's other great rivers become – all begin as mere trickles.

Indeed, with the notable exception of rivers that erupt from the ground as powerful streams, most great rivers start out as subtle emanations of water that has migrated, globule by globule, through vast areas of porous rock to emerge as tiny rivulets in zones known as “spring lines.” These spaces typically exist between ranges of hills, and the consequences of what happens so minutely at any given point along the line are really quite marvelous to behold.

Of course, many of the world's greatest cities exist along rivers, and there are profound, natural reasons why we've chosen to congregate in these places and organize ourselves there. For all that, residents of these cities seldom give thought to where the water originates because it is simply *there* and the assumption is made that nature has found a way to get things started at some point far removed.

For my part, I differ from the typical urbanite in giving perhaps *too* much thought to the elemental richness of nature's

ways of getting things going. What I've learned provides a background that both inspires and drives my approaches to introducing water into the systems I design.

MATTERS OF DISCRETION

As watershapers, of course, we work on an infinitely smaller scale than Mother Nature, but that doesn't relieve us of the need to find ways of adding water that neither jar the senses nor call attention to the source.

Indeed, while our tasks are small by comparison, the same basic principles apply to our work as they do to great rivers: We, too, create gathering places organized around the presence of water, and just as nature imperceptibly injects moving water into the landscape, so we, too, must think deliberately about how we add it to our own landscapes.

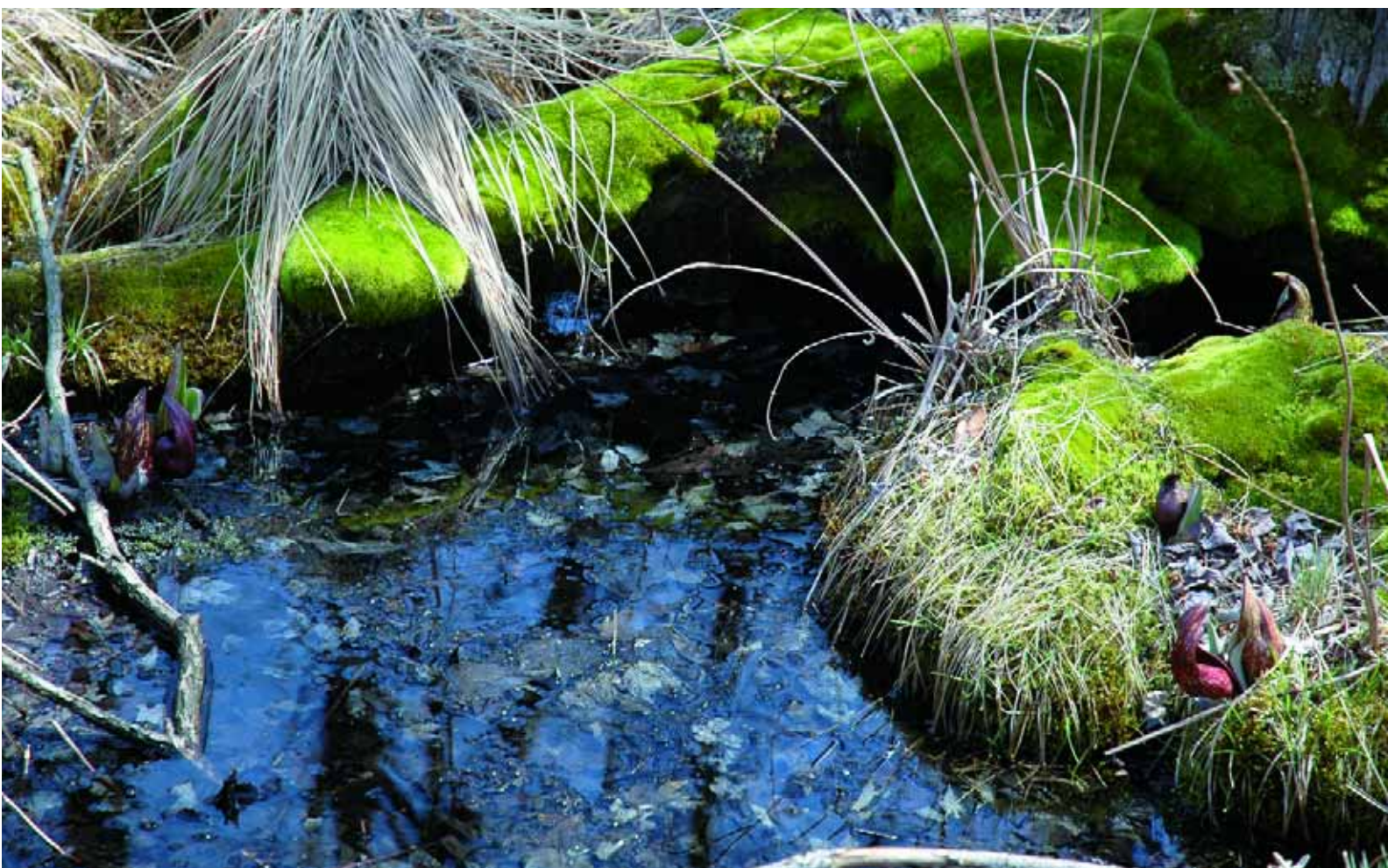
This is why I get upset when I see (as often happens) the common approach of having artificial waterways originate as torrents erupting from the tops of mountains of rock. There simply are *no* examples of such formations in nature, and if we want to do convincing jobs of placing water in our landscapes, we must be mindful that such approaches are im-

plausible and strictly off limits.

Always, as I see it, water must be introduced in subtle, elegant ways so we're not aware of the source. Unfortunately, however, I've seen otherwise convincing streams that disappoint because the watersheder has not considered the fundamental importance of introducing the water discreetly.

Not only do watersheders need to be aware of what's at stake in establishing headwaters for pond/stream systems: Their clients as well must be made conscious of the importance of handling this part of any project with care. Without this understanding and communication

Using plants to hide water-injection points is among the simplest of all available source-concealment approaches. The goal is to create a marsh-like area that functions as a water-collection area that wells up and overflows into a streambed.





The key to the naturalistic illusion with an overflowing source pond is starting with a small flow of water at the top of the system: You can certainly augment that flow further down in the system to create a more dramatic watercourse, but starting out as a torrent rather than a trickle calls unwanted attention to the watershaper's role.

about the issues involved, clients may be left with projects that are never completely satisfactory because something is perceptibly “wrong” – even if the clients note it only on a subconscious level because their watershapes seem “unnatural.”

In traditional stream treatments, I work toward satisfying my clients (and myself) by applying any of a range of key strategies that suggest nature as the source of the water's flow:

- The simplest way to conceal the water's source is by placing plants at the injection point. The idea here is to create an area in the garden that's wet or marsh-like and filled with mosses, grasses, irises or rushes growing out of the water: This gives the impression that the observer has encountered a low-lying point where water gathers and then very gently issues forth into a streambed – not unlike what might be found along spring lines.

In these situations, the water should not appear as a torrent flowing out of the planted area, but instead as a gentle, trickling stream. Then, if you want to create a more vigorous flow lower in the system, you'll need to install separate injection points – hidden, say, in rockwork. It also can be useful to obscure the perimeters of these areas with taller plantings or surrounding rockwork that reach out into the broader landscape.

This is among my favorite strategies simply because it is so commonly seen in nature, particularly where streams originate in areas where there are no dramatic hills or mountains. The Thames, for example, starts in just this way as the gradual outflow from wet meadows (lush with watercress, rushes and marsh marigolds) that feed the streams at its headwaters.

A similar approach involves creating

a pond without emergent plants: Here, the bottom is covered in pebbles and larger rocks and then brims over the edge of the pond to enter into a stream's course. These ponds can be very shallow or a few feet deep: Either way, you're creating an area that gives the impression that the source is a spring or that the pond is a collecting point for runoff from somewhat higher ground.

In these approaches, it's enormously helpful to have an increase in elevation behind the pond, because, as we know, water in nature always flows downhill: It's simply unrealistic to ask anyone to believe that a pond can form at the highest point!

- Another effective water-introduction scheme involves organizing a broad rock face from which water trickles and flows through crevices in fractured rocks or between spaces in rock strata. Again, the idea is to spread out this zone so that

the water's origins are dispersed and the eye focuses on no single point. It's possible as well to create the impression that the water is coming from a source that's well beyond view – in all probability a natural spring that's hidden within the rock formation.

This approach can be very complex, consisting of multiple points where water emerges from a variety of rock structures to gather as a pool below. Further interest can be added by diverting the water into multiple cascades as the pool brims over into the stream before coalescing as a single flow.

► If your design calls for just one source of water, this can be achieved effectively by having the water emerge from a small cave or chasm in some large rockwork formation at the headwaters. This configuration is often seen in nature, particularly in areas dominated by limestone: As is widely known, water has the ability to carve out caves; indeed, people exploring natural caves very often will encounter large flows or bodies of underground water.

Many projects add water to the system by means of a waterfall at the top of the stream. This approach can be very effective if your intent is to make a strong visual statement that will draw the eye to the top of the stream course. The problem, as stated above, is that nowhere in nature do we see large flows of water erupting like volcanoes from the tops of geological formations.

As a consequence, it's absolutely essential in this approach to create a backdrop for the waterfall with both plants and stones. The idea here is to create the impression that the water originates a considerable distance behind the falls, which means that you must have both a vertical rise behind the falls and space enough to establish a scene that creates a sense of mystery while visually concealing the water's source.

More so than with some of the other possible approaches, you have to be cunning in how you create the impression that a stream extends for some great distance behind the waterfall. If the observer looks up to see a fence or a building directly behind the waterfall, you've broken the illusion and announced that



Originating streams through clefts or fissures in rock faces is another naturalistic approach. This makes it seem as though the water is being pressed through whatever gaps it can find in a rock face by a natural spring or other hydrological forces.

the scene is artificial.

► As we all know, many properties have distinct visual boundaries and are enclosed to such an extent that there's virtually no way for water to form a stream or pond in any kind of natural way within their boundaries. In these situations, many times I've created the illusion that a stream flows right through the yard, from one side to the other: Where it emanates from and where it flows to are anyone's guess – far distant and unknown!

These are cases in which it often

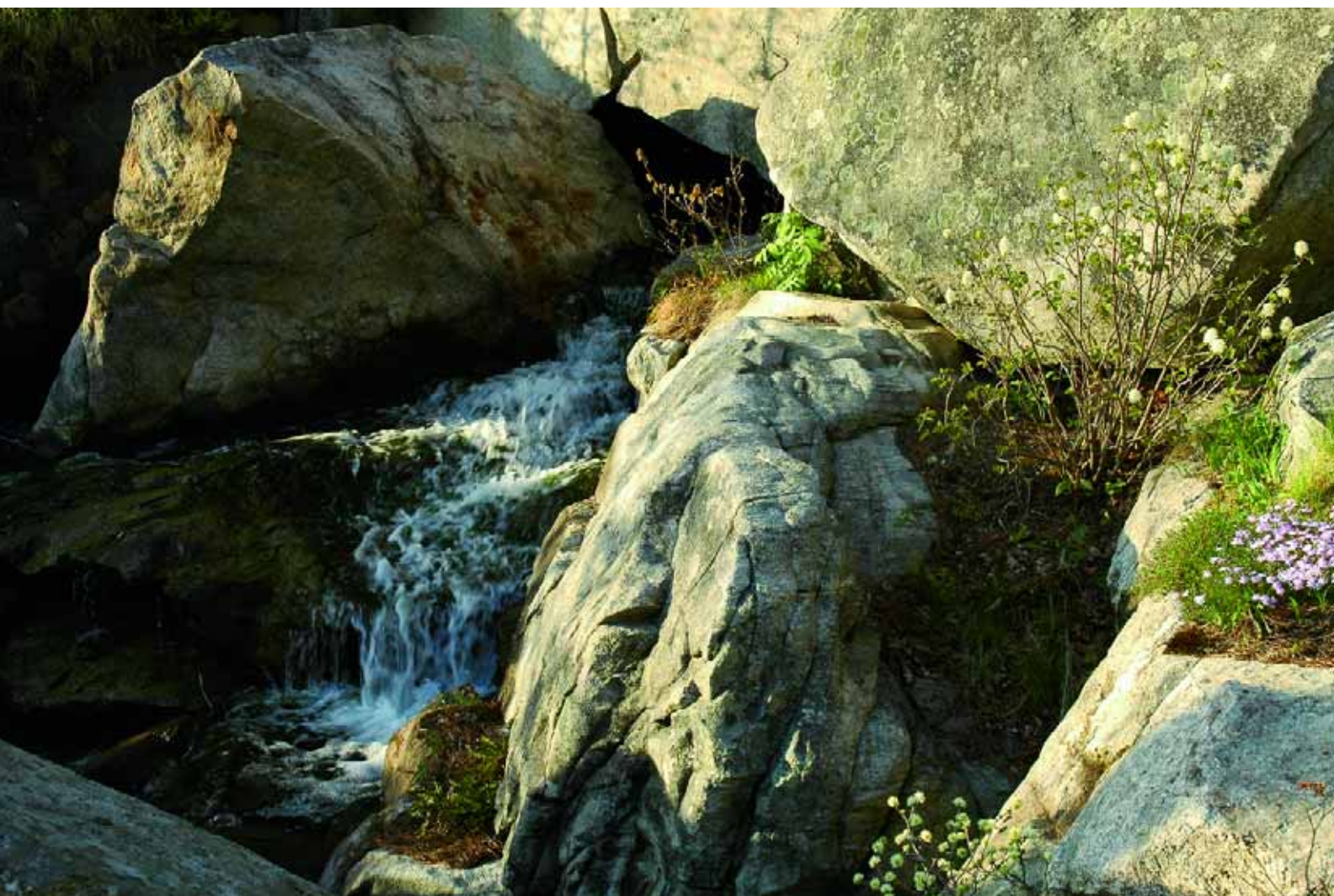
works best to reveal a human role by, for example, installing some type of culvert or pipe that looks as though it had been installed by the municipality decades or even generations past. Here, the water emerges from the artificial opening at one boundary, then flows in its natural-stream state through the property before disappearing again at the far boundary.

Along the stream, you can create areas where the water widens out and is edged with emergent plants and stone – but then narrows again on its

way out of the property, disappearing into another culvert or some other contrived outflow. (While it appears that the water exits the property at this point, it is in fact being recirculated.)

In these designs, I've found it very effective to use stressed material, such as used old brick or rusted, cast-iron pipe – thus giving the impression that the devices used to control the water had themselves been there for decades and are now degrading.

In some cases, a single source of water can be convincingly realistic if it is made to emerge from a cave or a break in the rock face. Indeed, this is frequently found in nature where water, having worked its way through underground passages in limestone, emerges at the surface from the mouth of a cavern or fissure.



IMPRESSION AND SCALE

In all of these approaches, it's extremely important to keep in mind matters of scale. A common mistake is to create water flows that are too aggressive and voluminous relative to the size of the rockwork and the overall space.

As a rule, I say it's always better to be happy with a small flow of water interacting with large rocks rather than the other way around – and this is especially important when considering where the water begins: As mentioned at the outset, rivers and streams always begin with a trickle, which means you can devise far more convincing effects by downsizing the amount of water flowing from a source. The larger and more

active the flow, the harder one must work to make it seem plausible.

It's truly a case of less is more: When working with relatively small flows, you give yourself access to greater sets of believable design options.

When I devise my hydraulic systems, I also make certain the water can be turned up or down to adjust the flow. More often than not, as we adjust the flow when a system is initiated, clients find – especially at the headwaters – that they prefer subtle, gentle flows because they are both more believable *and* more relaxing.

None of this is to say that exuberant water is undesirable: Indeed, my point is that such flows are almost always more

believable at points lower in the system, as though the stream is gaining in velocity and volume as it descends – which again is something that happens in nature. In these situations, I'm a big proponent of augmenting flows downstream, concealing the injection points beneath rocks, plants or even small bridges.

I first started down this path in the 1970s with a project in the south of France: The stream began in an arid forest area with a tiny rivulet emerging from beneath a rock, as might happen with a natural stream. At the bottom of the system, where the slope dropped quite dramatically, the clients wanted a vigorous flow in the form of a waterfall tumbling over a grotto in which their



On properties where there are clear visual boundaries, it's possible to create credible flows by establishing architectural or even municipal sources for the water, as with a culvert seemingly penetrating a wall to continue a flow that starts at some unknown point beyond.



children could play.

In this case, I set up a half-dozen injection points along the course of the stream. By the time the water reached the bottom, the flow had been enhanced by 20 times beyond the level found up on top. By increasing the width of the streambed (and also dividing and recombining flows at various vertical transitions), the fact that the water was being augmented was not obviously apparent: All an observer senses is that the water becomes louder, more vigorous and more complex as it accelerates down the slope.

THE FLIP SIDE

While it's natural and believable to install systems that grow in vigor and vol-

ume as they descend a slope, there are also going to be situations where you'll want to slow the system down to create rhythms and contrasts between active and quiet points along the water's course.

One simple way to achieve this is to widen the streambed so the energy is dispersed. Again, we see this in nature all the time as water widens into pond areas and slows considerably. That's simple enough, but the challenge can be more difficult when you want to have quiet water at the bottom of a large, high-volume waterfall.

Here, I take a page from nature's book and replicate the way many big waterfalls behave at their bases. In most cases, these cascades scour out deep catch

basins at the foot of their falls – and just beyond you'll see heaps of rocks that have been washed downstream by torrential flows. (Perhaps the most familiar example of this is Niagara Falls, where the rock material had accumulated to such an extent by the late 1960s that the river had to be diverted while stones were cleared away to preserve the falls' majestic sheeting effects.)

You can use this strategy in your own systems by creating a zone of rock formations at the base of large waterfalls. In this way, the energy of the falling water is contained at the foot of the falls and is dissipated as the water snakes its way through gaps and convolutions in the rocks, dividing and thereby slowing down.

Opting Out

There are, of course, projects in small spaces where you have no chance at all to conceal the water's source with anything approaching the level of naturalistic discretion I advocate throughout the accompanying text.

In these cases, the best option is to use an obvious, clearly artificial device: We all know, after all, that water is unlikely to emerge naturally in the middle of the patio or a pool deck, so why work against nature and the setting by trying to generate a "naturalistic" effect that is doomed from the start to look artificial?

Why not use traditional fountains or other artificial devices to add water to these scenes? You can even blend the artificial with the natural if you're thoughtful about it.

For instance, I once created a scene in which water emerged from a pair of large terracotta jugs located on a terrace, flowed a short distance and then disappeared into an area of small stones and grasses. I then created a visual break with a dry, stone-strewn streambed and, several feet away, concealed a second injection point with plants and developed a convincingly natural stream.

Depending on the situation, this sort of visual sleight of hand is always possible – but you must be clear in your own thinking and convey those ideas to the client.

–A.A.W.



Of course, one needs to avoid making these structures look like dams! I do it by using rocks that emerge from the water as islands or have them extend from the sides of the stream as though the water has carved a path through some geological formation. I also use rocks that appear to have broken off upstream and tumbled their way down the falls to lodge strategically in place. However you work this effect, the goal is to create a breakwater that will dissipate the wave action and allow the water to flow more gently into the pond beyond the falls.

Clearly, there are numerous strategies for adding water to a system and managing the way it flows. I've covered a few here in words and images, and if I might

offer some final words of advice, let me suggest that all of us benefit from thinking imaginatively about how water is injected into our systems. Think big! We have the opportunity to create all the wonderful complexities found where water emerges and forces its irresistible way into the landscape.

If the situation allows it, you'll always be better off exploring multiple ways to add water to a stream complex, basically because nature has found all the ways you might think of – and a few more for good measure. And consider that there's nothing wrong with starting at the top with one approach (perhaps a small flow welling up in a bog?) and then, downstream, adding

more water through fissures in rocks and somewhere else with water flowing out of a small cave.

In all cases, nature is the point of reference when it comes to managing water flow. Not to oversimplify things (because these issues can be marvelously complex), but the great advantage we all have is that nature provides us with infinitely beautiful examples: If we take the time to see for ourselves where streams and rivers begin, we'll always find strategies we can apply.

Every river starts somewhere: When you seek the source, both literally and figuratively, you're certain to find ways that will help you create works that are believable – and immensely satisfying.

Issues of scale truly matter in creating credibly naturalistic flows, which is why I favor using large rock and small volumes of water. Yes, you can add water downstream to create exuberant effects, but at the source, the larger the flow, the harder you need to work to make a scene convincing.





It's easy to add volume to stream systems once the water has issued with some modesty at the top of its course. This, however, often leaves you to slow down the flow at the system's base to create a tranquil, terminal pond – an effect that can be achieved by widening the stream or, as seen here, by placing rockwork at the foot of the falls to dissipate the water's energy.

Gaining Strength

Systems in which water is gradually added to a watercourse as it moves down a slope require fairly complex hydraulic approaches.

In a typical scenario, I'll install the pump or pumps at the bottom of the system to push water back up the hill. The simplest system would require one pump feeding a manifold from which a number of different pipes would distribute water to different parts of the stream. This requires careful pump selection and pipe sizing to make certain the system will run as efficiently as possible.

A run, for example, that leads to the very top of the system may not require a great volume of water compared to the lower injection points – but will require more pressure. This makes it particularly important to understand friction losses and feet of head pressure in what can be very long runs. When in doubt, always consider upsizing the plumbing!

In this sense, what we do with naturalistic streams is similar to what swimming pool and fountain builders do in pump sizing and pipe selection. In my designs, for example, I carefully determine the desired flow at each injection point and then refer to pump-performance and pipe-friction charts to decide what pump and pipe will create the most efficient system. With multiple injection points, it's also important that each run be controlled by a valve that allows for adjustment of flows once the system is up and running.

In many cases, including a project I'm currently pursuing in Montecito, Calif., we've used multiple pumps to meet system requirements – and it makes sense given the scale.

In this specific case, the water moving to the top involves little volume but unusually high pressure because of the distance and height difference between the bottom pond and the headwaters. By contrast, the lower injection points require much less pressure but much greater volume, so the call here was to install multiple pumps, with the top two or three injection points (about halfway down) on one high-pressure/low-volume pump and return manifold and two lower sets of injection points handled with energy-efficient, high-volume/low-pressure pumps.

In systems in which the differentials in flow and pressure requirements are more even, you can, of course, get by with a single pump. On large systems with big elevation differences, however, it is sometimes more economical to lift water in stages by pumping from the bottom pond to the next one up the slope and then the next one, and so on until you reach the headwaters. Understand what you're asking the system to do – and specify equipment accordingly, because energy efficiency is a growing concern and even the wealthiest of clients will blanch these days at the thought of needlessly squandering electricity!

–A.A.W.

Heritage Trails



The

restoration of historic watershapes can be both exciting and satisfying, says engineer and commercial pool specialist William N. Rowley. But, he adds quickly, it can also be incredibly challenging as well, raising a host of issues few watershapers ever confront in their careers. To highlight these considerations, he discusses three California properties he's recently helped rejuvenate, defining what it took to restore them to their former glory.

By William N. Rowley

The renovation and restoration of historic watershapes and their surroundings is a rather peculiar specialty. After all, such projects don't come along very often and never amount to enough to be considered a primary business focus.

Even so, whenever and wherever they present themselves, those who get involved must always be ready to meet sets of very specific and often unusual challenges.

The fact that these sites are historic, for instance, means that they also tend to be *old*, so they almost invariably come with surprises with respect to how they were originally built, what sort of remodeling and repair work has been done through the years, how they've been maintained and, often, the degree to which they've suffered from neglect or even abuse. Original plans can be hard to come by, so from the start there's a need for a good bit of educated guesswork and a fair measure of improvisation.

On top of that, you also have to be prepared to deal with members of any number of community organizations and historical societies (not to mention concerned citizens, donors and benefactors) – all of whom have something to say about the need for absolute authenticity. Many times, for example, they will insist on reusing original materials or, where that's not possible, fabricating appropriately genuine replacements. They'll also require that you work in such a way that you stay

within the watershape's original footprint without damaging or otherwise compromising historic surroundings or precious nearby structures.

All of this means that the process can take many times the span of a normal project – in my experience, sometimes more than a decade. Through it all, you must always be patient and accommodating, ready at the drop of a hat to respond creatively to tricky issues and, perhaps above all, willing to compromise along the way.

Doing Our Best

As complex and frustrating as these projects can be, we at Rowley International (Palos Verdes Estates, Calif.) enjoy them immensely because they give us the opportunity to step directly into the flow and history of these facilities in a way few professionals ever manage to do. We learn about the cultural and emotional importance of these places, hear the idiosyncratic stories and translate all of that into strategies that revive these facilities and enable them to continue adding to the cultural richness of our communities – and society as a whole.

We've had the honor through the years of working on a range of watershaping projects that can, to varying degrees, be labeled "historic." Our goal is always to restore the beauty of the site while bringing systems and structures up to con-

temporary standards. In some cases, that means light, mainly aesthetic renovations; in others, it results in complete reconstruction of new structures with "original" appearances. For the most part, however, these projects will land somewhere between those extremes.

We've also found that determining exactly what makes a place "historic" is open to interpretation. In the projects discussed in detail here, for example, two are manifestly historic in nature: the Annenberg Community Beach House in Santa Monica, Calif., which was designed and built by Julia Morgan; and, a short distance away near downtown Los Angeles, Frank Lloyd Wright's Ennis House.

The third, which has to do with the Palos Verdes Beach & Athletic Club, may lack the provenance and renown of the other two, but the community has adopted the facility as a local cultural landmark and sees it as the historic embodiment of the rich traditions and oceanside lifestyles that define the area.

From our perspective, of course, deciding what is or isn't historic is beside the point. Instead, we enter into these projects knowing that they are very important to a great many people and that, in a society that tends to tear down its past without blinking, we're privileged to do our level best to make certain these properties will be there for future generations to enjoy.

The Annenberg Community Beach House

This project is arguably among the most historic of all possible swimming pool/property restoration projects: As noted in passing above, the site was designed by Julia Morgan, the architect of Hearst Castle and a singular presence in the annals of California architecture.

During the 1920s, Hearst commissioned Morgan to design and oversee construction of a second home about 200 miles to the south of his famous castle – this one on the beach in Santa Monica and intended for use by Hearst's long-time mistress, Marion Davies, who was also one of the leading movie stars of the era.

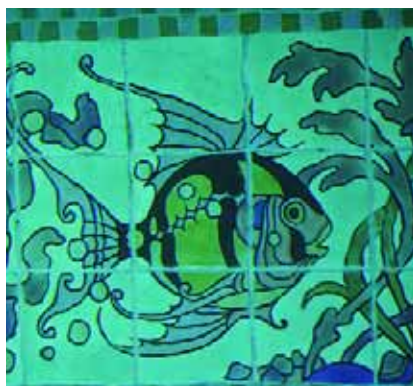
As was the case with Hearst Castle, the Davies residence, as it was originally known, became a gathering place for celebrities and the social elites of the day. After her death, the estate changed hands several times. The main house was torn down in 1956, leaving behind a smaller guest house, the swimming pool and some other structures.

Using a \$28 million grant from the Annenberg Foundation, the City of Santa Monica started in the early 1990s to reinvent the property as both a historic site and a recreation facility. We became involved in 1997, at first compiling a feasibility study on the restoration of the pool as well as on updating the equipment so the pool could safely be opened to the public.

I covered the early stages of the project in the June 2006 issue of *WaterShapes* ("Restoring Waters Past," page 60). At that time, the planning for the pool's renovation had been completed and work on site was just beginning.

Artful Recovery

To recap the story briefly, the place was in terrible shape when we arrived. The surviving structures and pool had long ago been abandoned, and it was



The tile border and details within the pool are wonderful – a true testimonial to the artisan-ship that went into preparing a home for one of Hollywood's biggest stars and witness to the fact that William Randolph Hearst and his architect, Julia Morgan, didn't hesitate when it came to lavish details.





The marble-inlaid decking, the marble gutter-and-coping system and the marble ladders inside the pool are all straight restorations of details Julia Morgan designed and installed.



all the city could do to keep squatters at bay. For safety's sake, the pool had been covered with a temporary, low-profile wooden roof, and the entire property stood out as something of a missing link on what is otherwise one of the busiest, most upscale beachfronts in the United States.

The issues related to refurbishing the overall site go well beyond the scope of this article, but there are several points about the pool's renovation that bear some discussion.

First the credits: The senior project manager overseeing all aspects of construction and restoration was Rick Stupin of Charles Panko Builders Ltd. (Pasadena, Calif.). Frederick Fisher & Partners (Los Angeles) acted as project architects, while Mia Lehrer & Associates (also of Los Angeles) served as the landscape architect. Vaneelya Simmons was the project manager for the City of Santa Monica.

Construction work on the pool was performed by Condor, Inc. (El Monte, Calif.) and expertly managed by company owner Fred Weiss. The patience, determination and flexibility he and his crews showed throughout the project was both remarkable and suitably relentless.

Now to the pool, which is 103 feet long and 22 feet, one inch wide – an odd set of dimensions to say the least, and it's anyone's guess why Morgan designed it that way. Although the watershape is not as elaborate as either of the pools at Hearst Castle, it had many similar features, including an all-tile finish with beautiful mosaics along with gutters, coping and handrails in beautiful marble.

The pool deck is also outstanding. The surface was covered in concrete inset with panels of marble tile laid out in a diamond pattern. The concrete portions of the deck were broken up and removed, but every piece of the marble tile was removed and catalogued to indicate its exact placement and orientation to facilitate eventual restoration of the original appearance.

The removal of the deck dramatically facilitated work on the pool, allowing us to excavate the outside of the shell and

install new plumbing runs before the soil was re-compacted to support the refurbished deck.

As part of this process, Weiss and his crews discovered that, during original construction, the builders had backfilled the shell with all manner of debris — chunks of concrete, pieces of steel and more. In addition, while installing new light and plumbing fixtures (we kept these new penetrations to a minimum for obvious reasons), Weiss's masons learned the hard way about the strength and density of aged, 24-inch-thick, poured-in-place concrete structures that had been reinforced with the square rebar that was in common use in the 1920s.

Before the decks were re-installed, each of the marble insets had been water-honed: While this didn't affect the appearance, it had the benefit of creating a slip-resistant surface.

That small-seeming detail was only one of the several places where the local Health Department needed to mediate between its standards and the original pool design. Indeed, inspectors were involved from the start and were tremendously cooperative when it came to bending in cases where the historic pool's configuration gave them pause. The shallow-end depth, for example, was an inch shy of four feet, making it fully five inches too deep. To accommodate this issue, they had us add an extra set of ladders and rails in the shallow end.

Step By Step

Another issue to be negotiated had to do with the color of the pool finish and Health Departments' usual insistence on white and nothing but white.

As we found it, the pool had beautiful ceramic tile mosaics throughout as well as a light-green field tile on the bottom. Recognizing the historic nature of the watershape and the fact that the tile was its defining feature, officials didn't hesitate to grant a variance. Happily, the mosaics had survived years of neglect in very good shape, needing little more than cleaning and re-grouting. As a result of spalling, however, we had to replace all of the field tiles, using the same type of



Given the historic nature of the project, the city was unusually willing to grant variances that let us preserve the pool's original features and appearance. So the tile borders stayed, as did the pale-green field tile, and we were also able to develop depth markers that seem at least consistent with the level of craft that went into the pool's original construction. Officials even allowed us a variance on the depth of the pool, requiring us only to add a couple of ladders (with, unfortunately, plastic steps) in the shallow end.



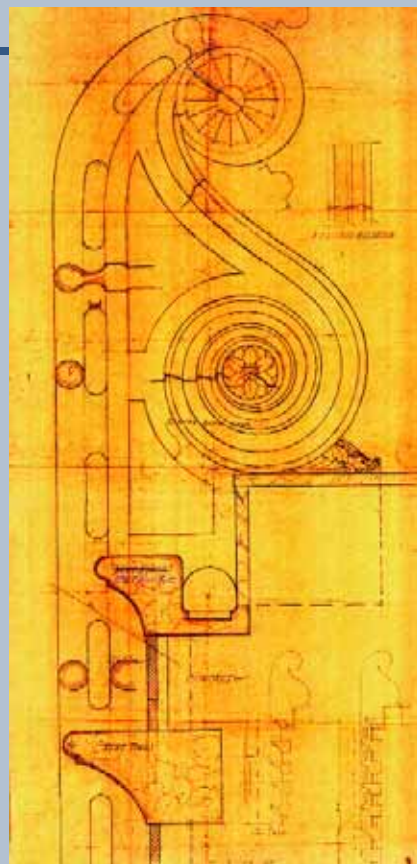
The One that Got Away

For all the triumphs associated with restoration of the Annenberg Community Beach House's pool, there was one major disappointment: When architect Julia Morgan originally built it, she borrowed a number of details she'd used on the pools at Hearst Castle – including the beautiful marble handrails.

Unfortunately, the originals on the Santa Monica pool had been damaged beyond repair during the property's years of non-use. We were able to obtain Morgan's original drawings and were determined to fabricate authentic replacements, but after months of discussion with local building officials it was determined that the rails just wouldn't be strong enough for public use because of the need we'd have to insert mounting bars reaching about 39 inches into the material. An expert representing the supplier told the city that it was unlikely the pieces could be successfully drilled to that depth, so the city abandoned the concept.

Our hope is that, someday, technology will make using our replicas a possibility and help a future generation of watershapers do even more to restore the pool to its original beauty.

– W.N.R.



ceramic tile in an exact color match.

Around the edges of the pool, the gutter was a solid green marble that matched the decorative marble coping. Many of the gutter pieces and some of the coping had been badly damaged and needed to be replaced.

Happily once again, the project team was able to find the Vermont quarry that had originally supplied Morgan with her marble, and we were able to generate exact replicas of the original pieces. Not only was it the same quarry, but also the *same vein* from which the original material had been removed: You can tell the difference between new and old, but the distinctions are quite subtle even now and won't be much of an issue at all once the new stone has weathered a bit.

Maintaining the theme of authenticity, we used brass drain grates in the gutters that are remarkably similar to what was found in the original pool. And in one of my all-time favorite compromises with health officials, where we had to place

depth markers, we used water-cut marble inlays instead of the usual garish tiles.

As the issue of the depth markers highlights, the Annenberg Community Beach House watershape was basically a nice residential pool that was being repurposed and redesigned for public use, meaning that beyond the often-subtle aesthetic restoration we were pursuing, we also had to update the watershape with a circulation system fully up to commercial standards.

The pool holds 105,000 gallons, operates with a 4.4-hour turnover rate and has been licensed to handle 113 bathers. To make it all work, the system includes a 10-horsepower pump (Paco Pumps, Brookshire, Texas) and a 27-square-foot, high-rate Stark sand filter (Paragon Aquatics, LaGrangeville, N.Y.). The water is chemically treated with sodium hypochlorite, with pH control courtesy of dual carbon-dioxide/muriatic-acid injectors.

The project earned a LEED silver des-

ignation, an extraordinary feat for a restoration of this nature. The energy-conscious system includes a solar heating array provided by Solar Unlimited (Cedar City, Utah) and installed under the guidance of company president Bob Dominguez. The pool also earned additional points for the efficiency of its pumps and gas heaters.

The facility's grand opening took place on April 25, 2009 – a dozen years after we first became involved – and the public was welcomed to a new community center that not only includes the refurbished guest house and pool, but also several recreation spaces including beach-volleyball courts, picnic areas, a splash pad and ample parking.

Now that the pool is finished, we're all excited to think that visitors will be swimming in a watershape designed by one of the most prominent architects in our nation's history and will all get to enjoy a taste of the refined lifestyle that made Hearst and his properties so famous.

The Ennis House

In some cases, restoration work on historic properties requires a light touch.

That was just the case for us in 2008, when we were asked to participate in the renovation of Frank Lloyd Wright's Ennis House in the Los Feliz neighborhood of Los Angeles. The structure, completed in 1924, features an elaborate, Mayan-inspired, molded-concrete façade; some 15 years later, Wright came back to expand the outdoor areas and add a simple, elegant pool.

The house has long been a southern California landmark but was badly damaged by an earthquake in 1994 before being further harmed by torrential rains in the winter of 2004-2005. After this second blow, the house was condemned and for a time was considered as one of the most threatened of all historic sites in the United States.

The effort to save the Ennis House (also known as the Ennis-Brown House in recognition of a later owner) has been impressive: A dedicated foundation raised more than \$15 million to cover restoration work, about \$4 million of which was set aside to cover rehabilitation of the patio, deck and pool.

In the grand scheme of things, our role was about as low-key as it gets: We were engaged as consultants to oversee the acid-washing of the pool and the careful cleaning and restoration of the pool's coping and tile details. There was also a bit of housekeeping involved in upgrading some plumbing and equipment, but as such projects go, this one was about as non-invasive as it gets.

To be sure, our contribution to the overall project was significant despite its apparent ease, but you never know when you get into processes of this kind exactly how things will go. As a watershape restoration, this was quite straightforward; even so, there's a remarkable measure of pride we take in saying we helped preserve a Frank Lloyd Wright house for future generations.



Our role in restoring the pool at Frank Lloyd Wright's Ennis House was small, but there are many stresses associated with working around and within architectural treasures as you walk the line between sticking to original intent while making certain all systems are fully functional and effective.

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WATER SHAPES

ONLINE

This project began for me as a simple matter of participating in my local community. The Palos Verdes Beach & Athletic Club had been established in 1930 and for decades had provided me and other longtime residents of the Palos Verdes peninsula with a beautiful venue for exercising and socializing – and for swimming right next to the ocean.

By the late 1980s, however, the property had been through many hands and had been closed for about ten years. The club's beautiful Spanish Colonial-style building was in complete disrepair, its only occupants some pigeons and perhaps a coyote or two. But the situation began to look up in 1988, when the city decided to redevelop the site. I became involved soon after and was asked to re-design and update the swimming pool and the spaces around it.

The original pool was a rectangle 105 feet long and 45 feet wide. Its poured-in-place concrete shell was intact but had moved out of level, which wasn't too surprising given its placement in the sandstone material that forms the cliffs atop which the club is located.

We did a geotechnical survey and discovered that the original shell had indeed experienced differential settlement. Given access issues and the size and strength of the existing structure, we knew demolition would be both difficult and costly and started looking for other solutions.

In With The New

The answer we came up with was simply to leave the original shell in place and install two new pools inside it – one a 75-foot lap pool, the other a small, general-purpose wading pool.

There had been about six inches of differential settlement through the years, enough movement to let us know we had to reinforce the foundation. We accomplished this by punching holes in the floor of the original shell and sinking piles down to bedrock – six in the wading pool and 45 within the lap pool. These piles are tied to a structural slab at intervals of eight feet or less.

We also removed the bond beam from the original shell, installing 15-pound

Palos Verdes Beach & Athletic Club



These two pools were installed several years back inside the shell of the club's original, 1930s-vintage pool. Now it was time to add a large spa to an elevated deck overlooking the pools and the ocean beyond.



The nautilus-shaped spa greets club members as they pass down to the pool level. The seat created by the twist in the 'shell' has already become a popular spot for watching the waves and taking in spectacular sunsets.



felt as a bond breaker before forming and preparing the two new pools inside the existing structure. The new pools were completely supported on the system of piles, leaving the existing shell to continue settling independent of the new structures inside it.

We wanted to maintain a four-and-a-half-foot depth in the lap pool, which we knew would be a practical impossibility given the original pool's configuration. To make things easier, we went with a perimeter-overflow system that raised the waterline while leaving the decks at their original elevation and the pool at the desired depth. (These depth issues didn't apply with the shallower wading pool, so it has a standard coping/skimmer detail.)

All of this work was completed by 1992, at which point the club reopened and the watershape was named the Rossler Pool in honor of former mayor Fred Rossler, who had been instrumental in initial establishment of the club.


From the start, the club's managers had wanted a spa to go along with the new pools, but the original redevelopment budget couldn't handle the extra expense. Planning ahead, we installed the plumbing runs we anticipated would be required by such a spa – a bit of forethought that would relieve future contractors of the need to tear up the decks. We came back in shortly thereafter and installed a circular spa adjacent to the lap pool, picking up those plumbing runs.

Two years ago, the club decided to add a second, more spectacular spa overlooking the entire pool area. Wanting to do something special, our firm designed a raised spa with a unique nautilus shape, filling the available space with an 18-by-10-foot vessel set atop its own pile system. The spa's unusual shape and bench configurations establish a unique central lounging area overlooking the Pacific Ocean. Behind the vessel is a tile mosaic featuring peacocks.

Although it's a brand-new addition to the club, it certainly harmonizes with the facility's long history of celebrating its oceanfront setting and makes us proud that we've taken part in preparing the facility for its future.

Under Control

By Paolo Benedetti



Striving to avoid anything that might compromise the visual integrity of his projects, Paolo Benedetti is always on the lookout for ways to conceal drain heads, skimmer lids and other undesired intrusions. Here, he takes aim at spaside controls, describing a quick, effective means of removing them from view by hiding them in a niche topped by a lid made from the same material as the coping or decking that surrounds the spa.



Solutions

One of my pet peeves is the thoughtless use of products such as skimmer and deck drains purely as they are supplied – that is, just as they come out of the box.

To be sure, we have no choice but to use these and other devices, fittings and fixtures in our project. What I can't stand is placing them directly and uncritically into a project, basically because they have the potential to detract from the visual contexts I work so hard to create.

By now, we've all seen wonderful treatments for stone skimmer lids and deck drains (courtesy of David Tisherman and several others who've written about them in *WaterShapes* through the years), so there's no longer any excuse for installing ugly, plastic components where they just don't belong. Besides being hideous to look at, they create distractions that, whether directly or subliminally, undermine a project's visual integrity.

Extending on that thought, I have similar objections to placing control panels alongside spas. Adding to the distraction of the plastic keypad is a glowing LED or LCD display – not to mention the fact that ultraviolet radiation inevitably takes a toll on the keypads and displays. Then there's the practical point that, left exposed, these visual nuisances are an open invitation to kids who can't resist pushing buttons and the possibility that settings can be altered by pedestrian traffic or the errant elbow.

under cover

While some might see my attention to such details as being picky or even excessive, it probably comes as no surprise that I've come up with a way to conceal our spaside remotes. It takes

a bit of planning, but it's actually quite easy to do.

It all starts during construction, when we install two conduits to the desired horizontal location of the spaside remote. One conduit, usually polyethylene or drip-irrigation tubing a half-inch in diameter, is simply a drain line that runs to a pocket of drain rock underneath the spa or nearby decking. (The amount of water to be drained is minuscule). The second conduit carries the control wiring for the controller. (I typically use a one-inch-diameter conduit to make wire-pulling easier: The added cost of the larger material is insignificant relative to the time savings.)

When it comes time to install a coping system of either stone or concrete, my masons carefully cut out a niche of sufficient depth to allow the top surface of the spaside remote to sit just below the level of the finish material, allowing for the thickness of the lid we'll fabricate to cover the keypad. (In many cases, the piece cut out of the coping material is used to make the lid.)

Once the masons are done, we cut the drain tubing flush to the "floor" for unimpeded flow away from the niche. Then we cut the wiring conduit down so that it stands about a quarter-inch proud of the floor and install the remote in the niche.

Just to be certain there's no contact between the lid and the keypad, we grind away a portion of the underside of the lid. Then we grind a "finger cup" on the underside of the lid along with a matching detail on the coping.

Once in place, the keypad is both accessible and practically invisible. As I see it, for the limited amount of actual use a keypad will see during its lifespan, there is no reason at all to leave it, exposed and visually intrusive, on the deck for all to see.

A desire to avoid the visual intrusion of spa-side controls has led us to develop a simple system for concealing them under small panels made of the same material as the surrounding coping or decking material.



In construction, we create a small box in which we've placed two lines – one for the controller's cables and the other a drain. When the coping is installed, my masons cut out a piece of the stone over the box. This piece will eventually become a lid we make fully functional by carving out a finger cup.



royal treatment

During the design phases of some of my projects, I go so far as to inquire about where my clients wish to place the king's and queen's thrones within their spas.

Once we stop chuckling about the question, we usually get into an earnest discussion of what they'll see from these seats, the depth of these thrones in response to their physical dimensions and the placements of jets in these locations.

I also determine their right- or left-handedness and ask who is going to work the controls. Then we place the spa-side remote to the right of the throne of the right-handed person who is to control the remote or to the left of a left-handed person.

This, I've found, is attention to detail that definitely sets us apart from the crowd.

—P.B.



Builders

By William Bennett & Walter Williams

Conceived of as part of the home's original design and construction, this stunning rectangular pool provided the watershaping team of William Bennett and Walter Williams with the opportunity to work closely with an architect at the top of his game. The resulting composition in concrete, glass, wood and water – set on a steep slope in a densely wooded area – made all participants rise to the occasion with practical, cost-sensitive solutions.

Pride

There's no doubt about it: Projects in which watershapers participate from the start in the overall design of a custom residence offer rare opportunities for creative integration that don't come along very often. That was just the positive situation we encountered here – and the results are among the finest we've ever achieved.

The project was organized by Lewis Bloom of Bloom Builders (Bethesda, Md.). We at Alpine Pool & Design (Annandale, Va.) have had the privilege of collaborating with him often through the past 20 years and have enjoyed a wonderful working relationship every step of the way. In this case, we were asked to get involved with a spec house he wanted to build on a steeply sloping, heavily wooded lot overlooking the Potomac River as it passes through Bethesda.

Heading the design team was a prominent local architect, Robert M. Gurney, who has earned a reputation for beautiful Contemporary approaches to both residential and commercial projects. More to the point, he's also known for

his ability to maximize connections between built spaces and the areas that surround them.

Everything seemed to mesh, and we jumped in without hesitation.

Long and Narrow

The preliminary design wasn't in a style typically associated with the area, but Gurney won everyone over by making his tall, angular structure seem right at home in its rustic environs. The key in this case was his extensive use of Ipé in conjunction with the glass and concrete: Its warm wood tones struck a natural balance between the stark geometry and the home's wooded surroundings.

What he also wanted was a visual bridge from structure to surroundings in the form of a large, reflective water surface – and that's where we came in. We went to work immediately, collaborating with the structural engineers to achieve complete visual integration of home, water and the environment beyond.

The home itself now stands three stories above grade, which places the out-

side edge of the pool a full 25 feet above ground level. From inside the house with its floor-to-ceiling glass wall, it always seems as though you're among the trees. In fact, many people have described the space as an astonishingly luxurious treehouse.

In aesthetic terms, the home's design is extremely straightforward, so the decision to complement it with a simple, rectangular pool was a natural. At first, we tried to up the ante by nudging Bloom to go with a vanishing-edge design that would have broken the barrier between home and woods and tied the entire prospect into views of the river.

That didn't work out, however, with Bloom convinced that working so far above grade with such an elaborate detail would've added another layer of complexity that just seemed too costly. (The idea stuck, however, because in another project we're just starting with him in similar circumstances, a vanishing edge is very much in the picture.)

The ten-by-55-foot pool for this project is four feet deep on both ends, slop-





ing gently to a center depth of five feet. The pool is separated from the home's glass wall by a six-and-a-half-foot-wide strip of wooden decking – fairly tight, but enough distance that you don't feel as though you're going to fall into the water when you step outside.

To be sure, it's a narrow space – yet another decision driven by economics: The farther out we reached from the back of the house, the taller and more massive (and costly) the support structure beneath it would have to be. There's also the fact that two spacious deck areas are available at both ends of the pool, with a primary space defined at one end by a long fire feature. Taken all together, this pool/deck area is 88 feet long, spanning the entire width of the house, and about 20 feet wide.

Setting the Table

The obvious challenge with this project was elevating the pool and deck structure 25 feet above grade. We've completed a number of above-grade structures through the years, using a variety of approaches that have most often included columns of some sort. In this case, the builder wanted something different – structurally sound, of course, but also more cost effective than other strategies.

Simply put, the design team decided to install a concrete "table" that would serve as the bottom of the pool structure and support the shell. To complete it, the builder installed six reinforced, concrete-masonry-unit (CMU) walls perpendicular to the back of the house and spanning a bit more than the width of the pool/deck area.

This approach was feasible because the entire house was set on standard concrete footings that reached down to competent, load-bearing soil. The footings we were to add for the pool and deck were similarly just a few feet deep, but we made them a robust five feet wide to forestall any lateral movement. In addition, the builder cross-linked the perpendicular walls, further enhancing lateral stability.

To create the tabletop, Bloom turned to a local manufacturer of prefabricated concrete slabs of the sort used in parking garages. These slabs are three feet wide and a foot thick and were specified to span the supporting wall system. When construction was under way, these panels were delivered, craned into place and then mounted on top of the walls to give us the platform we needed to build the pool.

Our first step involved the fashioning of a reinforced CMU box within which we'd eventually place the pool shell. To ensure that the gunite shell we'd be adding could expand, contract and move independent of the box, we covered the walls with polyurethane foam and the floor with two layers of six-mil plastic sheeting.

The basic structure we were working on was so sound that our concern was never ground movement; rather, we were concerned about creating a situation in which the box and shell would move differentially and might actually grind one another to pieces. The approach we developed to isolate these structures from one another was like creating a gigantic foam ice chest.

Once the box was ready, we set the pool-floor contours with



The structure supporting the pool is basically a table stretched across six walls running perpendicular to the house and its foundation. One of the open bays this system created became our equipment room, while up on top we prepared a box that would eventually contain a pool that was to be built within it.

poured concrete, similar in effect to what might be done with crushed rock beneath a common inground pool. From that point forward, pool construction became somewhat standard – *almost*.

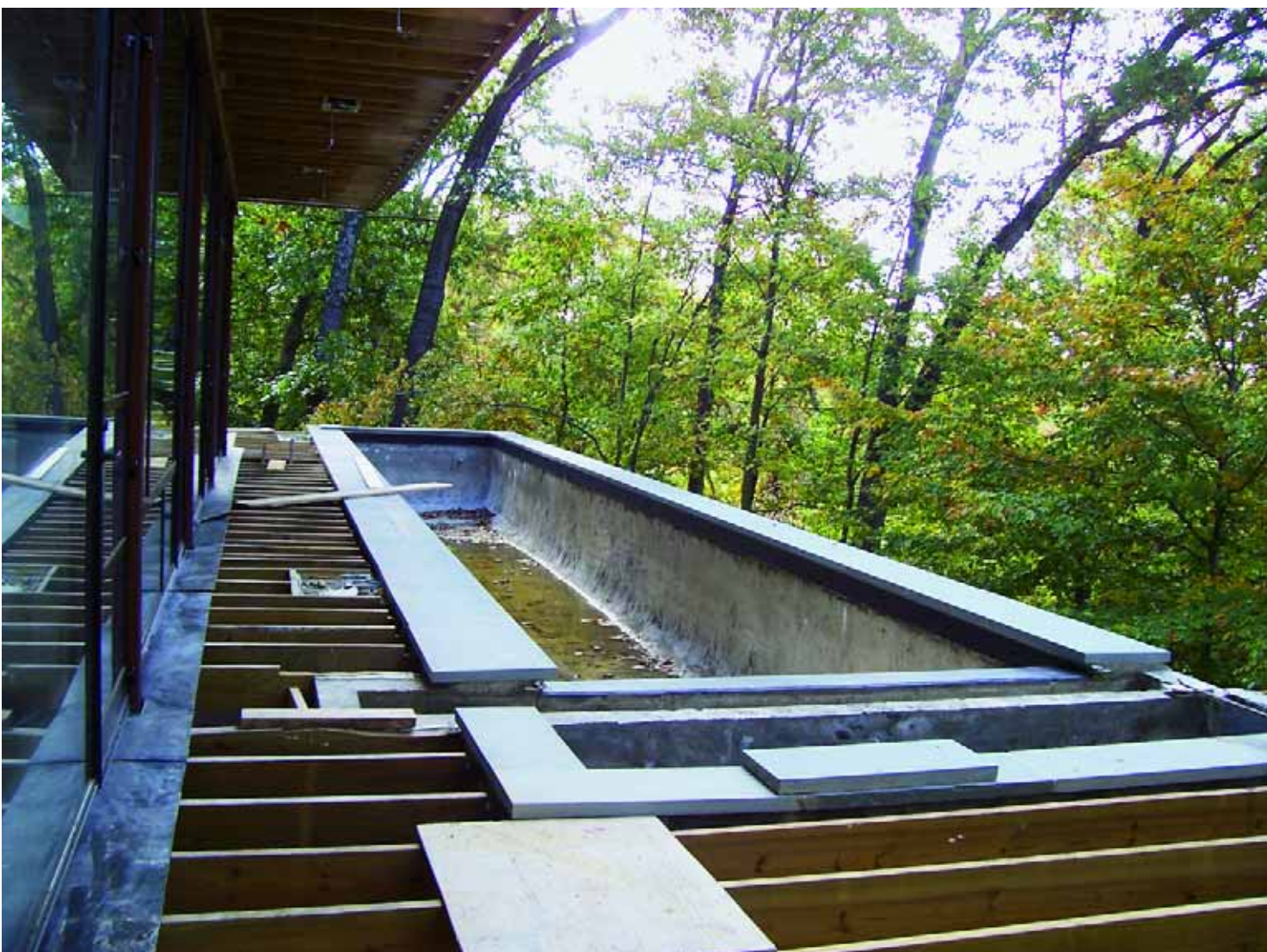
An Inside job

The trickiest part of the project once the box was done had to do with establishing the plumbing runs, mostly because we didn't have much room. First off, everything had to be accessed through the inside wall of the pool. In addition, in some places we had to cut holes or channels in the foam and polyurethane to accommodate runs from the pool to the equipment pad, which we placed in a space directly below the center of the swimming pool.

We had to be very careful in all of this because we didn't want the plumbing to take up space inside the seven-inch-thick gunite walls. Once we'd figured everything out, we laid and tied the steel – #4 rebar on eight-inch centers – and shot the pool just as we would a normal inground pool. As designed, the bond beam rises above and wraps over the top of the CMU box, which effectively disappeared from view as the shoot progressed.







Once the box was ready, we lined it with foam panels and plastic to ensure that the pool could expand, contract and move independent of the supporting structure. Once the plumbing was set (no small trick given the space restrictions), we shot the pool and basically hid any signs of the box beneath it.

Inside the pool, we set up 18-inch-wide steps/benches that run along the side of the pool nearest the home – a detail we borrowed from Frank Lloyd Wright. On this same wall, we placed four 100-watt lights that face away from the primary viewpoints inside the house. These fixtures are small and create subtle spotlight effects without causing glare.

By the time we completed this basic construction work and the shell was done, the builder had mostly completed the house. This complicated things for us to an extent, because we had to use extreme caution in moving our materials through the house to avoid doing any damage.

One of our first tasks with the shell in place involved installing the deck. The choice of Ipé was perfect because, as mentioned before, it ties into some of the exterior details of the home while creating a visual link to the woods beyond. This material also had some practical advantages in being strong, yet lightweight.

This meant that it didn't need further structural support and was also easy to transport and set in place.

We started around the pool and worked outward toward both ends of the deck space. The only difficulty came in the fact that we were so high above grade in so narrow a space that it was a bit nerve-wracking for our crews.

The pool has an automatic cover from Aquamatic Cover Systems (Gilroy, Calif.) that features an encapsulated-track system positioned on top of the beam and just below the Bluestone coping. (An open-track system would've required a three-inch coping cantilever: With a pool this narrow, we didn't want to lose so much space!) The cover's vault is located beneath Bluestone panels set between the fire pit and the pool. With the exception of a very narrow slot beneath the coping, the system is basically invisible.

The coping itself is a blue Pennsylvania flagstone that came in

36-inch-long segments that were 18 inches wide – a breadth dictated by the combined width of the pool wall, the slip/expansion joint material and the masonry box. The stone is two inches thick and was cut to precise dimensions by the stone supplier, who also applied a flamed finish to create a smooth, matte appearance.

The pool interior is a simple, gray-tinted plaster. We tried to talk the builder into a pebble finish, but he likes gray plaster and has told us he doesn't mind its inevitably mottled look. We have to agree that it looks great and that its dark tones support truly amazing reflections.

Warm Welcome

The final touch we added to the project came by way of the fire feature we installed at the end of the pool adjacent to the cover's vault. It's two feet wide and 12

feet long and was included to add visual drama as well as interesting reflections.

At first we didn't give too much thought to the fact that it would also generate heat. That changed one night after the project was complete and we were having dinner with Bloom on the deck next to the fire: It was a cool fall evening – probably not more than 50 degrees – but we were all perfectly comfortable outdoors.

After all of the work on site was complete, Bloom and his wife moved into the house and fell in love with it. As it turned out, however, their stay was short, because the house sold almost as soon as they put it on the market to a buyer who made a generous offer after just one visit.

Little wonder there, because the home is something special – and its elegant watershape a point of pride we'll carry with us forever.

The surface of the pool now reflects the spectacular beauty of the setting, the sleek architecture of the home and the dancing flames of the long fire feature we inserted at the end of the pool nearest the largest available expanse of deck. It's a visual delight, day and night – and a source of great pride.



Up and Under

As mentioned in the accompanying text, the equipment pad for this pool sits several feet below its center – a decision made by the architect's structural engineers.

It makes sense, because the system of walls they devised to support the structural-concrete "tabletop" upon which we were to build the pool created an enclosed box that was perfectly suited to the task. We completed the room by pouring a slab between the support walls' footers, ultimately creating a tight but workable 12-by-12-foot space. The room is accessed via an exterior door found on a path meandering down from the house.

Our firm's service division will service the pool, so we brought in our technicians during the installation process to make certain everything would be as functional and accessible as possible. The biggest technical challenge we faced had to do with the fact that the equipment is set approximately 15 feet below the bottom of the pool: We did all we could (within reason) to accommodate the hydrostatic loads as well as the need to winterize the pool.

The lines for the skimmers and the return lines enter through the

wall on the house side of the equipment room. Much of the plumbing was strapped beneath the Ipé deck by our crews, who worked at the top of extension ladders. We located shut-off valves on all lines so that water flowing in and out of the equipment could be isolated – necessary because of the force of gravity involved in such a drop.

Up above, the lines for the skimmer loop just above the water line. This makes it possible, when the time comes to winterize the pool, for technicians to blow the lines clear and cap the skimmers. The arrangement also allows us to isolate the flow from the pool: With an assist from several check valves, we've made the system as safe and serviceable as possible.

The equipment set itself is quite straightforward, including diatomaceous-earth filters and a Whisperflo high-head pump from Pentair Water Pool & Spa (Sanford, N.C.) along with a high-efficiency gas heater from Raypak (Oxnard, Calif.). For easy maintenance, the system also includes a Polaris automatic pool cleaner and pump made by Zodiac Pool Systems (Vista, Calif.).

– W.B. & W.W.



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For live links to the companies listed in the Spotlight Index, go to **www.watershapes.com/spotlight**

The Power of Transformation

For more than a decade, the Genesis 3 Design Schools have influenced the professional lives of hundreds of watershapers. It's an unfolding story of elevation and transformation best told by those who've experienced 'life after Genesis.'

Listen to What Others Are Saying About Their Student Experience with the Genesis 3 Schools!

'David Tisherman's drawing class was great! Very detailed presentation, very helpful – I learned a lot.'

– Antonio Aparicio, Aquascape Pool, Arcadia, Okla.

'Alternating between watching David and doing the work individually really helps.'

– Greg Howard, Carecraft, San Juan Capistrano, Calif.

'Loved every minute! Thanks, David.'

– Stan Penner, Classic Reflections Pools, Gunter, Texas

'How he explains how to draw in perspective is great. I would have liked a longer class!'

– Robin Westwood, Huntington Pools & Spas, Thousand Oaks, Calif.

Experience the power of transformation yourself!

Basic Perspective Drawing: An Eight-Hour Workshop

**October 7, 2009
La Jolla, California**

Before the next Elements of Construction school convenes, David Tisherman will lead an eight-hour, entry-level class in 'Basic Perspective Drawing.' This workshop will cover the essentials of one- and two-point perspective and introduce skills needed to communicate visually with clients, contractors and fellow designers. (Note: This class is a prerequisite for Larry Drasin's 'Design Communication – Measured Perspective,' a 20-hour course that will be offered in Las Vegas in November 2009.)

Fees: \$799 (\$699 if also attending The Elements of Construction); includes one hotel night and meals.

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Come join us in La Jolla!

Elements of Construction

**October 8-10, 2009
La Jolla, California**

In keeping with our mission of advancing education on a global level, we are pleased to offer our newly expanded, three-day Elements of Construction course as the latest component in our design-certification program.

The school's curriculum covers plan review, excavation, layout, soil and drainage, steel placement, plumbing, utilities, gunite, tile and coping, decks and drainage, plaster and start-up and includes the Genesis 3 Edge Program as well as a key roundtable discussion. All sessions are taught by top-flight tradespeople, designers and engineers from the watershaping industry and beyond.

Fees: \$3,900 includes four nights' accommodations, meals and course materials. (If a spouse or guest joins you, an additional fee of \$1,150 will be charged to cover accommodations and meals).

Coming this fall:



**November 13-18, 2009
Las Vegas, Nevada
www.poolspat patio.com**

In the Spotlight

For live links to the companies featured here, go to
www.watershapes.com/spotlight

Compact Track Loader



BOBCAT (West Fargo, ND) has introduced the Model T110 compact track loader. Designed for easy operation on hard-to-reach job sites, the unit is just 47 inches wide to pass through narrow openings; runs on rubber tracks to prevent damage to surfaces and maintain traction in muddy conditions; and has a horsepower-to-weight ratio that provides pushing and digging forces needed to complete work quickly.

Aerating Fountain



OTTERBINE BAREBO (Emmaus, PA) has introduced Equinox – the tenth pattern in the company's extensive line of aerating fountains. Designed to offer the dramatic look of an architectural fountain while retaining the

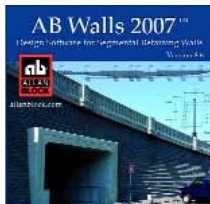
easy installation, plumbing-free convenience and low cost of a floating fountain, the system's nozzle array generates intricate, multi-tiered displays that rise to 20 feet and span up to 72 feet.

Pool Paints



KELLEY TECHNICAL COATINGS (Louisville, KY) offers the Zeron and Poxolon lines of epoxy pool paint. Designed for multi-year durability in applications on both newly sandblasted and rough, discolored surfaces, the products cure to a ceramic-like finish that inhibits algae growth and common staining. They are available in five shades of blue and also come in white, black, red and yellow.

Segmental-Wall Software



ALLAN BLOCK (Minneapolis, MN) offers version 8.6 of AB Walls, a software package that simplifies the design of segmental retaining wall. Developed to make it easier to give wall designs high levels of accuracy and structural stability, the system determines how internal seismic forces are distributed and guides the designer in generating elevations, plans and multiple cross-sectional views of their projects.

Two-Part Salt System



PRISTINA (Overland Park, KS) has introduced a two-step system for the start-up and maintenance of saltwater pools. The start-up product is a Nova Scotia salt along with protective ingredients that help prevent initial scaling, staining and corrosion. The maintenance product establishes and maintains salinity levels and extends cell life while avoiding problems commonly associated with salt impurities.

Pool-Construction Catalog

SWIM-CRETE POOL PRODUCTS (Shawnee, KS) had published a catalog on its line of construction-related products. Starting off with detailed descriptions of construction procedures for both all-concrete and vinyl-liner pools, the 76-page booklet (with accompanying CD) covers many types of forms for walls, coping, overflows and more as well as tools, braces and a variety of accessories.



Waterfeature Brochures

CRYSTAL FOUNTAINS (Toronto, Ontario, Canada) has published literature on its Water Crystal line of waterfeatures for pools, spas and small fountains. The eight-page, full-color brochure covers single- and triple-stream jets; foam, laminar and crown jets; arching waterfall and Fyrefly jets for pool and spa applications as well as fan and cascade jets, spray rings and plume and jewel jets for small fountains.



Door-Latch System



TOT STOPPER (Costa Mesa, CA) has introduced latches that stop gates or doors from opening. Designed for use in upscale settings where conventional latches might mar fine materials and expensive carpentry or fabrications, the unobtrusive devices install with only two screws and act as spring hinges that allow doors to close with ease but that are set at levels too high for toddlers and small children to reach.

Salt Chlorine Generator



FLUID LOGICS (Upland, CA) offers the FL Series of salt chlorinators. Designed for use in commercial and larger residential applications, the three models provide continuous operation even with low salt levels and reach breakpoint chlorine levels inside their cell housings, eliminating concerns about chloramines and "chlorine odors." The models produce chlorine at levels from 250 to 1,000 grams per hour.

Water Leveler



PARAMOUNT POOL & SPA SYSTEMS (Chandler, AZ) now offers Paralevel, a water-leveling device designed for easy installation, service and maintenance. The unit operates with a sensor that enables it to ignore sloshing water and respond only to the watershape's true level. The sensor also protects and lengthens the device's service life by keeping it from cycling on and off rapidly and unnecessarily.

Underwater Lights

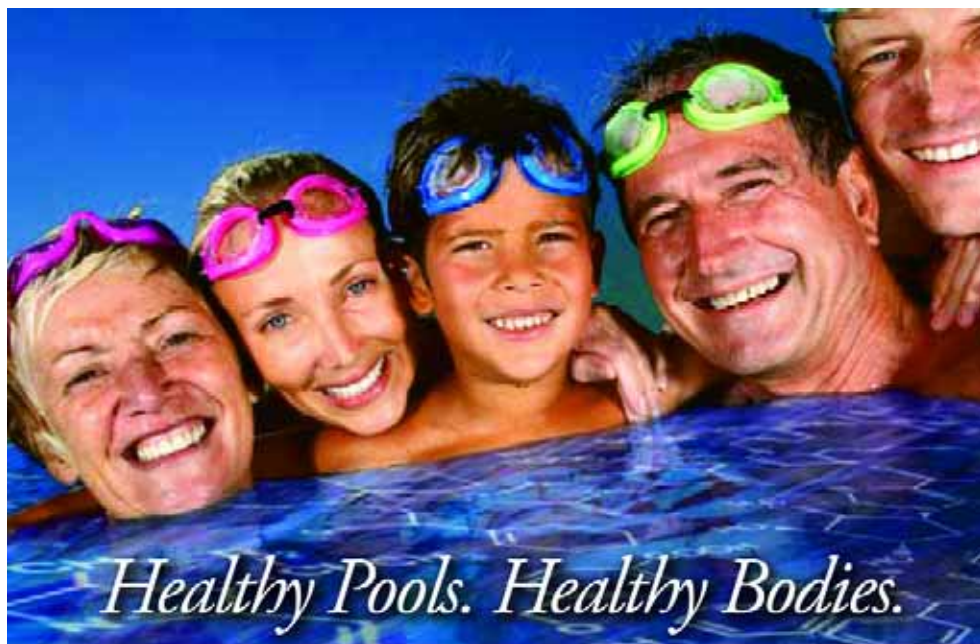


ORBIT/EVERGREEN (Los Angeles, CA) has introduced a series of premium, marine-grade, 316 stainless steel underwater lights for residential and commercial applications. Designed for use in ponds, streams, waterfalls and other aquatic installations, the low-voltage SS510 line features three different lens-cover designs (flush, hooded and louvered) and colored lenses in red, yellow, purple or green.

Pool Surround



REPLICATIONS UNLIMITED (Hazelwood, MO) offers Urestone Textures, a line of artificial rock panels designed for use as pool surrounds and for wall applications. Available in multiple styles and colors, the lightweight panels cost less and are easier to install than real stone materials, and the 4-by-8-foot sections can be cut with any type of saw to fit any indoor or outdoor environment.



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In the Spotlight

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Noise-Damping Tiles



PINTA ACOUSTIC (Minneapolis, MN) has introduced Phonstop ceiling and wall tiles. Made from 100-percent recycled glass sintered to form rigid, lightweight, porous, sound-absorbing surfaces, the two-inch-thick panels come in two sizes (24 inches

square and 24 by 48 inches), are temperature- and weather-resistant for outdoor applications and have noise-reduction coefficients of up to 0.90.

Commercial Sand Filters



PENTAIR WATER COMMERCIAL POOL & AQUATICS (Sanford, NC) offers the Triton C Series of sand filters. Designed for easy maintenance and high efficiency in large-capacity commercial applications, the units have unique internal designs that level the sand bed and produce even water flow for efficient filtration, superior filtration capacity, long cycles between cleanings and lower operating costs.

Pool-Safety System



TERRAPIN COMMUNICATIONS (Ottawa, Ontario, Canada) offers the Safety Turtle Wireless Door Alarm Model DA-101, which mounts next to any door that provides access to a client's backyard. The alarm sounds at a base station that supports use of any number of wristbands and gate/door sensors of the same color. (Neighbors use systems with different colors to avoid cross-alarming.)

LED Pool Lights



PENTAIR WATER POOL & SPA (Sanford, NC) has introduced IntelliBrite White LED lights for residential and commercial applications. Intended as a brighter alternative to incandescent pool lighting, the units feature wide-beam lens geometry and reflector design along with arrays of 32 LEDs that provide illumination equivalent to a 500-watt

incandescent light while drawing only 70 watts.

Concrete Sealer



DECK-O-SEAL (Hampshire, IL) offers Deck-O-Grip, a non-yellowing, acrylic-based, high-solids, transparent, easy-to-apply liquid cure and seal. Designed to provide a clear, flexible, durable protective film that is abrasion- and stain-resistant, the material also withstands common pool chemicals while retaining and enhancing the appearance of colored concrete and exposed aggregate surfaces.

Step Strips



QUAKER PLASTIC CORP. (Mountville, PA) has introduced Trim Strip. Designed to simplify installation of steps in vinyl-liner pools, the strips conceal screws used around the perimeter of pool steps and are made of a flexible material that can easily be pressed into the holding track around the step (and just as easily removed). This helps installers avoid having to remove one strip section to insert others.

Compact Heat Pumps



AQUACAL/AUTOPILOT (St. Petersburg, FL) has introduced TropiCal, a line of heat pumps designed for use with small pools. The efficient, economy-minded devices are available in three models with outputs at 35,000, 55,000 or 75,000 Btus; have small footprints; operate efficiently with microprocessor controls and titanium heat exchangers; and already use environmentally friendly R410A refrigerant.

Outdoor Fireplaces



STONE AGE MANUFACTURING (Collinsville, OK) offers kits for the easy, reliable installation of masonry fireplaces and fire pits, outdoor kitchens, kitchen islands, outdoor pizza ovens, brick ovens, fireplace accessories and arbor kits for residential applications. Designed for durability in the face of the elements and vigorous outdoor living, the devices will not rust, rot or crumble.

The WaterShapes Interviews

Ideas...insights...inspiration



Dave Garton:

Changing Your Approach in Difficult Times

Dave Garton, owner of Lawnchair Watershapes in Denver, is both an expert pond and stream builder and an in-demand business coach. Here he discusses how watershapers should adjust their approach to potential clients during the current economic situation— plus how watershapers themselves can deal with the emotional toll of this tough business environment.



Dr. Tom Lachocki:

Fostering Research into the Benefits of Swimming

Dr. Tom Lachocki, CEO of the National Swimming Pool Foundation, talks about his organization's support for research on the health benefits of swimming—as well as efforts to eliminate drownings, diving accidents and suction-entrapment incidents. How well does Dr. Lachocki think the watershaping industry is doing at spreading the word on both fronts?



Skip Phillips:

How Pool Builders Can Avoid Being Sued

Skip Phillips—owner of Questar Pools in Escondido, Calif., and one of the founders of The Genesis 3 Design Group—has served as an expert witness in more than 300 lawsuits involving pool construction. With that vast experience under his belt, Phillips reveals how pool builders can lower the risk of winding up in court.

**Go to www.watershapes.com
and click on Interview.**

WATER SHAPES

ONLINE

Emotional Intelligence

By Mike Farley

Whether we think of them this way or not, watershape and landscape designs have the ability to create emotional responses among our clients.

In that sense, we're actually in the business of provoking those feelings. When we do things right, the conjurings are positive and are at their best when we successfully forge links to our clients' treasured experiences. If we miss the mark by not properly considering our work's emotional impact, however, the results are discordant and somehow unsettling.

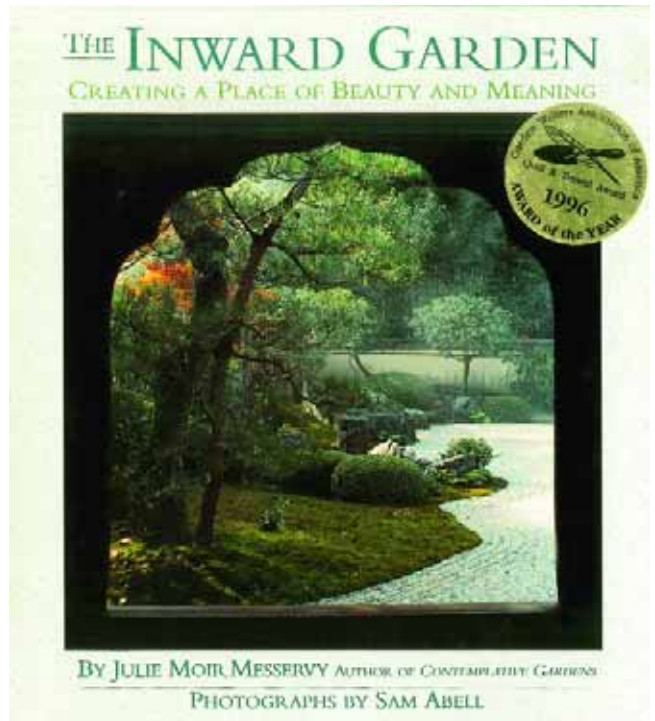
I think I've always known all of this on an intuitive level, but I'd never truly *organized* my thinking along those lines – not until, that is, I picked up a copy of *The Inward Garden* by Julie Moir Messervy (Little, Brown & Co., 1995). In more than 250 beautifully illustrated pages, Messervy focuses her attention on how we, as designers, can (and deliberately *should*) do our best to maximize positive emotional impact.

She uses her own projects to illustrate what she means by this, and the first impression I drew is that she's truly a gifted designer with an amazing range in terms of style and scale. It's obvious that she's studied a variety of design traditions and has focused extensively on the nuances of Japanese gardening, which she cites as the primary inspiration for her emotion-generating approach.

It's no surprise that her process begins with homeowners, with whom she spends quality time figuring out which design elements are most likely to conjure feelings in them. As she points out, this is a complex exercise because you have to begin by understanding that any particular one of the elements with which you yourself are familiar will evoke different feelings in different people. The key, she explains, is to ferret out which pieces of the puzzle have the greatest positive influence with each person. (Now I see why she operates across such a diverse range of styles!)

Centermost, she says, is the need to learn as much as possible about clients' most inspiring childhood experiences as a foundation for moving on to explore their adult experiences. As she accurately points out, most people have warm, early memories of time spent in nature, and the exterior designer's job is to capitalize on those points and the sense of excitement, wonder, comfort, safety, risk or tranquility they bring to the surface. Next, you select details in the design that embody those positive associations.

To speed the exploratory process for others, she offers an



organizational tool in the form of seven categories of natural settings (sea, cave, harbor, promontory, island, mountain and sky) and then defines design elements that align with each.

These are not literal classifications, of course. In discussing harbors, for example, she describes spaces that provide a view in one direction with a sense of shelter and safety in the opposite direction – something as simple, say, as a bench backed by a planted wall and overlooking some sort of view, be it intimate or vast. A cave, by contrast, is a place that feels completely enclosed, secure and private in all directions.

Messervy is also a masterful watershaper, using water for reflections, sounds and sensations of motion while also exploiting its ability to create and lend interest to destinations.

I found her approach to be fascinating, insightful and, ultimately, *extremely* useful. The text is aimed primarily at homeowners rather than designers, but the methodology she defines is clearly beneficial to both sides and, I think, is particularly valuable on ours. If nothing else, the book can be used as a professional's guide to the design process – and especially to client discussions.

If you're looking for a resource that will inspire you to look at the design process with fresh eyes (and, I dare say, a more open heart), this is a great place to start. **WS**

Note: Messervy has just published a new book called Home Outside (Tatum Press, 2009). I've picked up a copy and will cover her current ideas in an upcoming issue.

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



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