



Waterfalls & streams



As usual, some of the funniest stories come from the good old days, back when we were just getting started in the water gardening business. That includes the first job, when we changed from using mortar to foam in order to keep the big waterfall rocks and boulders in the proper position. Back in those days, we weren't using the black foam that we create and sell today. It was the old yellow stuff. If you've been around this industry long enough, you'll know what I'm talking about here.

Easy on the Foam!

Now, on this first job we didn't realize just how much this stuff was going to expand. So we used it liberally (actually extra-liberally) to make sure that the rocks and boulders would stay in place. When we returned the next day to check things out, the

yellow foam was oozing out of every joint, and coming out from under every rock. It was like a yellow tube of toothpaste was being squeezed out of all these places.

No, it didn't look natural at all, so we had to shave it, file it, and cut it back. Anything we could think of to camouflage this stuff, we did it! In the end, it took us three times as long as we'd expected. Needless to say, we lost money on this project, but we seldom make the same mistake twice, and thankfully, this one was never repeated. The moral here...leave the experimentation to us. That's what we're here for!

Ed Beaulieu

Vice President of Field Research

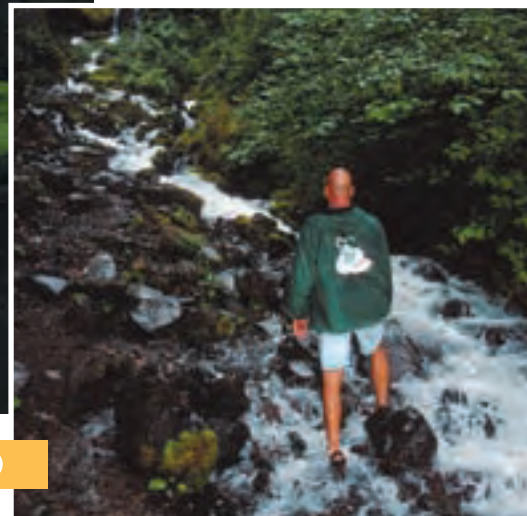
*There's no better waterfall
builder than God!*



What's the Attraction?

Waterfalls and streams capture the imagination of all who witness their beauty. Many people go on long, exhausting treks into the wilderness just to see a section of a river, a waterfall, or a stream. They're beautiful and inspiring, but why seek them out? Maybe it's the feeling of being one with nature, or the contemplative feeling of peace we find within ourselves.

The bottom line is, waterfalls and streams are an amazing part of the world we live in. They deliver and clean the water that's so vital to our existence. It's an honor and a gift to be able design and build them, and we owe it to ourselves as pond builders to master and hone these skills to perfection.



Ed trying to figure out flow rates.



How Do You Do It?

So, how do you learn how to build a stream or waterfall? You learn from those who have spent years mastering it. The team here at Aquascape has been designing and building waterfalls and streams since 1991, and that's a lot of experience. We've learned how to simplify and master the replication of nature's unique watery works of art. So grab your foam gun, and get your gloves on, because this is the chapter you've been waiting for!

Startin' With the Basics

A man-made waterfall is simply water pumped from one body of water to an area above that body of water. Then the water falls back down due to gravity. If you do it right, it'll look good, sound good, and not lose any water in between. It's that simple. Since waterfall construction can be difficult to explain, we'll employ lots of pictures.

Before you get started, there are a few questions you'll need to answer.

1. How far and how high will the water be pumped?
2. How wide will the waterfall be?
3. What type of rock is being used?
4. What is the desired style of the waterfalls?

As discussed in chapter 7, to achieve the desired effect, we first need to know how high and far the water is being moved. This information determines which pump will be required to complete the task. Be sure to do your homework on the technical side, and when in doubt, use Aquascape's technical service department to help you eliminate any mistakes.

The pond is built, and we're now ready to start working on the stream and falls. We have

the list of components, we know the rock that we're using and the style of falls, and we know where it's starting and ending. How do we connect them in an interesting yet functional manner? The easiest way is to follow Mother Nature's designs.



If you want to build a natural looking waterfall, don't go too high! Most of our waterfalls in flat yards are only 2' high like this one.

esp El Arroyo y Sus Cascadas

The Stream and Its Waterfalls

As you design, layout, and create the stream portion of the project, there are a few tips that you should keep in mind to help create the most naturalistic stream possible. Remember, water wants to run downhill as quickly as possible, and along the way it hits objects that are harder than the surrounding soil (large rocks and logs), and encounters sharp elevation changes. When this happens, the water moves off course, and the new watercourse continues downhill until it hits another object, and the cycle starts all over again. The larger the hill, the greater the odds of the water hitting objects. The goal is to copy this look as much as possible. With that in mind, let's start laying out the stream.

esp Entre el diseño, la disposición, y creando el arroyo del proyecto hay varios consejos que se debe de tener en mente para ayudarlo a crear el arroyo más naturalístico posible. Recuerda, el agua corre rápidamente hacia abajo, y en su camino pega contra objetos que son más duros que la tierra circundante (como piedras grandes y troncos), y se encuentra con cambios de elevaciones bruscos. Cuando esto pasa, el agua



se mueve fuera de su curso, y el curso nuevo del agua continúa bajando hasta que pega con otro objeto, y el círculo vuelve a empezar de nuevo. La meta es en copiar está apariencia lo más que se pueda. Teniendo esto en mente, vamos a empezar a tender el arroyo.

Stream Construction Techniques

When excavating a streambed into an existing slope or hill, simply mark the stream edge and dig down about 6

to 8" deep. This allows enough room to accommodate the rock, gravel, and water with a couple of inches to spare. Those couple of spare inches will allow for some settling and compaction of the soil to keep the stream leak-free. You can dig the stream deeper, of course. We've given the minimum amount of space needed.

The stream should twist and turn as it makes its way towards the pond. The turns will increase the sounds, and will also increase the number of

*Just like in nature,
twist and turn
your watercourse.*



viewing areas. The more places it can be seen, the more it'll be enjoyed.

esp Técnicas de Construcción para el Arroyo

Para excavar la corriente hacia una colina o un inclinado existente, simplemente marque el borde del arroyo y excave hasta 6 a 8 pulgadas de profundidad. Esto nos da el espacio necesario para acomodar las piedras, grava, y agua con unas pulgadas sobrando. Esas pulgadas demás dejarán que la tierra se coloque y compacte para evitar que el agua se escape. Ud. puede excavar el arroyo un poco más hondo si Ud. gusta. Hemos dado el espacio más mínimo que se vaya a necesitar.

El arroyo debe de retorcerse y voltearse durante su camino al estanque. Las vueltas van a aumentar los ruidos, y también el número de bonitos puntos de vista. Cuando se ofrecen más puntos de vista, uno puede disfrutar el estanque un poco más.

A beautiful meandering stream and waterfalls in an area that before was a plain grass backyard.



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In flat Chicago, we salivate when we get to work on a slope... you have a better template too work with. After a while, every slope you pass without a waterfall will look incomplete.



In nature, water carves the earth over many thousands of years to form a waterfall. We only have a couple of hours.

Every stone has a place.



As you dig, prepare for each waterfall and any large boulders, by digging those areas a little deeper. A large rock should be placed at each turn. It doesn't have to be huge, but it should be larger than the average rocks on that particular jobsite. At elevation changes, place some more larger stones, or a series of stones, to replicate the erosion process. Along the way, you should be mentally counting the number of large stones that you'll need to make sure you'll have enough. These larger rocks take the center stage, and all the other rocks will balance and support the entire composition (move over Picasso!).

esp *Mientras Ud. excava, prepárese para cada cascada y cualquier piedra grande, empezando por excavar las áreas un poco más profundas. Una piedra grande debe ser colocada en el punto de cada vuelta. No tiene que ser enorme, pero debe de ser un poco más grande que las demás piedras que uno está usando en ese proyecto particular. En cada cambio de elevación, coloque piedras más grandes, o una serie de piedras para aumentar el proceso de erosión. Durante todo esto, Ud. debe de tomar en cuenta el número de piedras grandes que se va necesitar para estar seguro de que haya suficiente. Estas piedras grandes van a ser muy importantes, y todas las demás piedras van a balancear y soportar la composición entera del arroyo.*

Getting Creative With the Stream

The stream should get narrow in areas, and then widen out and slow down in others. Make sure you use a good mix of stone and gravel to create a natural look. Fill the streambed with aquatic plants, and you've just created an awesome supplement to your filtration system.

The hardest part about streams is learning how the water reacts in certain situations. When a stream is long and without much slope, the water will tend to move too slowly, causing water to well up along the sides. This can become a problem if the edges aren't high enough.

We once built a stream over 300' long, but with very little grade change. There was over 8" of liner above the expected water level, but the water still backed up and overflowed the banks of the stream. We had to rework a 50' section of the upper stream to keep the water in place.

esp Creatividad con el Arroyo

*El arroyo debe de ser reducido en algunos lugares, y después ensancharse (o extenderse) y disminuirse en otros. Asegúrese de que se use una buena mezcla de grava y piedra para crear una apariencia natural. Llène la corriente con plantas acuáticas y se puede decir que Ud. ha creado un suplemento estu-
pendo para su sistema de filtración.*

La parte más difícil en creando los arroyos es aprendiendo como el agua reacciona en ciertas situaciones. Cuando un arroyo es largo y no contiene mucho inclino, el agua tiende a moverse muy despacio, causando que el agua suba sobre las orillas. Esto puede convertirse en un problema si las orillas no son lo suficientemente altas.



The finished job!



CONSTRUCTION GUIDELINES



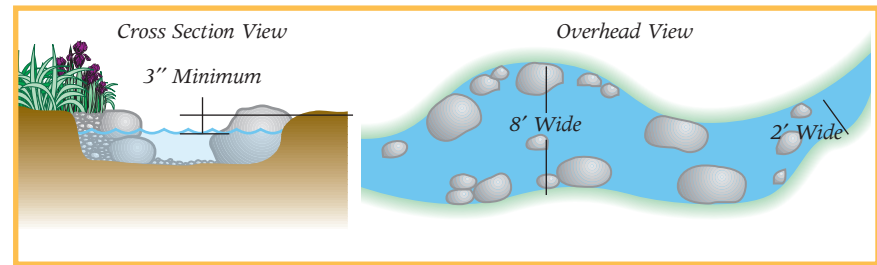
Although there are no concrete rules (they vary from project to project), we follow a simple set of guidelines based on experience and common sense.

- Always slope the streambed towards the pond.
- Have areas within the stream where the water can pool.
- If the stream narrows in one place, open it back up downstream.
- Leave several inches of soil and liner above the proposed water level in the stream.

- The water depth of the stream is determined by the height of the weir in the closest downstream waterfall.
- High water flow rates need a wider stream and/or higher edges.

esp Aunque no hay reglas fijas (estás varían con cada proyecto), nosotros seguimos reglas simples basadas en nuestras experiencias y sentidos comunes.

- *Siempre incline la corriente hacia el estanque.*
- *Tenga lugares dentro del arroyo en donde el agua se puede reunir.*



Adding moss to a job is the finishing touch. It shows the customer you're into the details and is often the only green amongst a sea of mulch and rocks.



Foam only the stones where water drops.



TIP from TEAM AQUASCAPE

There are many factors that determine how water will act in a given situation. Because of this, there is no standard formula. The results vary according to the pitch of the streambed, the width, rock positions, rock size, water flow, shape of the stream, and how the water exits the stream.

esp Hay muchos factores que determinan como el agua va actuar en cualquier situación que se presente. Es por esto que no hay ninguna norma. Los resultados varían de acuerdo al grado y ancho de la corriente, las posiciones de las piedras, tamaño de piedra, corriente del agua, el estado de la corriente del agua, y como el agua existe en el arroyo.

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- *Si el arroyo se reduce en algun lugar, abralo otra vez hacia río abajo.*
- *Deje varias pulgadas de tierra y de la capa protectora por encima del nivel del agua propuesto para el arroyo.*
- *La profundidad del agua para el arroyo es determinado por la altura de la presa en el río abajo más cercano a la cascada.*

The wild look!



It only takes a little hard digging to build a stream.



CONSTRUCTION GUIDELINES



The Waterfalls in the Stream

Each waterfall area is dug out according to the size of the rock(s) being used. When possible, we prefer to use one rock for each waterfall in the stream and rapids areas.

esp Las Cascadas en el Arroyo

El área de cada cascada es excavada de acuerdo al tamaño de las piedras que uno está usando. Cuando es posible, preferimos usar una piedra para cada cascada en el área de la corriente.

Dry stack everything before foaming.



A level will help confirm what your eye sees.



Don't over foam.



Getting Started

To get warmed up, we start with the easier waterfalls first. This will keep the crew busy while you focus on the more challenging waterfalls. Remember, we want it to look good, but we need to make money too, so use the crew members effectively.

- The easiest waterfall style is the *sheet of water effect*.
- Place two larger boulders on either side of a level waterfall weir.
- Fill between the boulders with smaller stones, and place a flat piece of flagstone on top.
- Adjust the flagstone for the best fit, then check it with a level.
- Remove the flagstone, and put a layer of foam on the liner.
- Reset the flagstone and you are done.

esp Empezando

Primeramente, nosotros empezamos con las cascadas más fáciles de construir. Esto mantendrá al equipo ocupado mientras Ud. se enfoca en las cascadas más difíciles. Recuerde, queremos que todo se vea bien, pero también tenemos que ganar dinero, así es que use el equipo efectivamente.

- *El Estilo más fácil de cascadas es el efecto de una capa de agua.*
- *Ponga dos piedras grandes, una a cada lado de la presa leve de la cascada.*



Using large boulders on either side of a waterfall frame it well.



- *Llene el espacio entre las dos piedras con piedras más pequeñas, y ponga una pieza de “flagstone” (losa) plana encima.*
- *Posicione el “flagstone” (o losa) para encontrar el mejor ajuste y después reviselo con un nivel.*
- *Quite el “flagstone” (o losa) y ponga una capa de espuma sobre la capa protectora.*
- *Después de poner la capa de espuma Ud. ya puede volver a poner el “flagstone” en su lugar.*



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The ground is shaped and lined in preparation for the stone.



Brian the rock whisperer.



It's coming together. Can you envision the water flowing yet?

Rapids or falls made up of small boulders are also fairly easy to build because they're typically small.

- Set the main boulders that will frame the rapids area.
- Dry set a series of smaller stones between the main boulders. They should fit tightly together.
- Choke the water down with strategically placed stones, so it's flowing at twice the normal rate. The typical flow rate is 1500 gph for every foot of waterfall width. Twice the rate would then be 3000 gph for each foot. Rapids are typically 1 to 1-1/2' wide, which would require 3,000 to 4,500 gph.
- This high flow rate is necessary to create the desired white water within the rapids. The best way to see the water is when it's flowing over smooth stones. If you don't have the higher flow rate, the water will still flow over the stones but it'll hug the rocks and will only make them appear wet. The smooth rounded stones demand a larger volume and greater water velocity. Otherwise, you won't have the look and sound of whitewater, and the falls could look somewhat anemic.
- Remove the smaller stones, lean the main boulders forward, and foam in behind them. Set the next course of small stones in place, and apply more foam.
- Continue placing small stones on top of each other in an overlapping fashion, covering the joints of the stones underneath.
- Work your way all the way up to a level a couple of inches higher than the waterfall weir. This will hold the gravel in the streambed in place so it doesn't get washed over the falls.

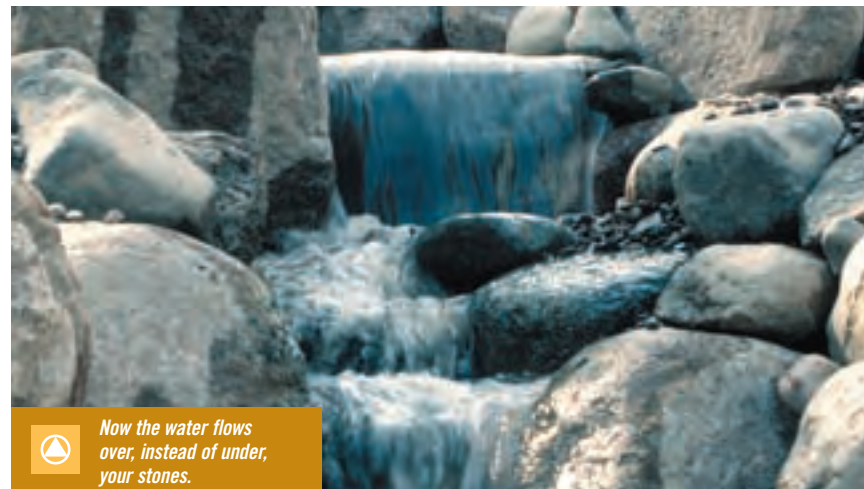
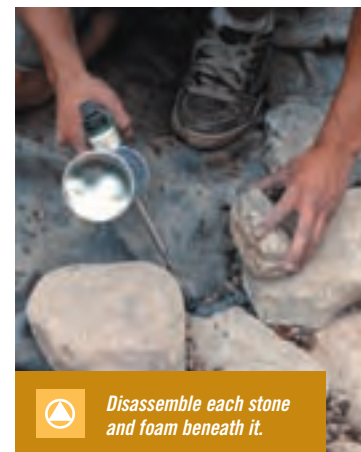
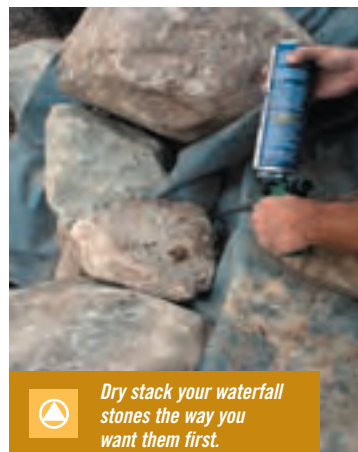
Sloping two rocks down toward a central meeting point where the waterfall then crests makes for a natural design.



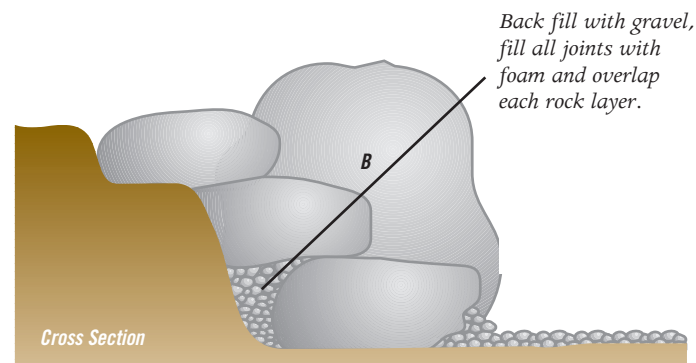
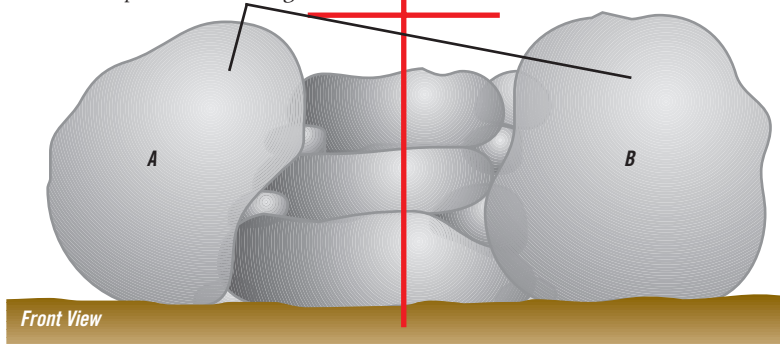
CONSTRUCTION GUIDELINES

esp Correntadas o cascadas hechos de pequeñas rocas son también fáciles de construir por que son típicamente pequeños.

- Posicione las piedras principales que van a enmarcar el área de las correntadas.
- Junte una serie de rocas pequeñas entre las rocas principales. Deben encajar apretadamente juntos.
- Empuje el agua para abajo con piedras que han sido estratégicamente puestas, para que así el agua corra dos veces más rápido que lo normal. Típicamente, la corriente corre a 1,500 galones por hora por cada pie de anchura de la(s) cascada(s). Dos veces la velocidad de la corriente entonces sería 3,000 galones por hora por cada pie. Las corrientes típicamente miden de 1 a 1.5 pies de anchura la cual requiere 3,000 a 4,500 galones por hora.
- La velocidad alta de la corriente es necesario para crear el efecto de agua blanca dentro de la corriente.
- Quite las piedras más chicas, incline las piedras principales hacia adelante, y aplique la espuma atrás de las piedras. Posicione el siguiente curso de piedras (chicas) en su lugar y aplique más espuma.
- Continúe aplicando piedras chicas y colóquelas una encima de otra, cubriendo las piedras debajo.
- Trabaje hasta llegar a un nivel en donde las piedras llegan a varias pulgadas más altas que la presa de la cascada. Esto detendrá la grava debajo de la corriente intacto para que no camine con la corriente.



Frame the rapids with two large boulders.



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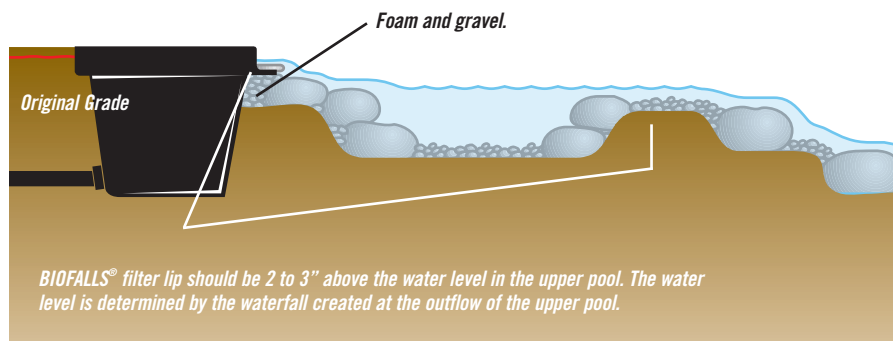
esp *Creando un Manantial (Fuente)*

Creating a Spring

Next we'll use the BIOFALLS® filter to create a spring. The hardest part of using the BIOFALLS® filter like this, is getting the level of the water set properly. The water level in the BIOFALLS® filter spring should be set so it's 1 to 2" higher than the water level of the pool that it flows into.

Whatever you do, don't set the BIOFALLS® filter below the water level of the upper pool. If it's too low, it'll have to be moved to keep it from leaking, and that's no easy task.

Treat the stonework just like the rapids discussed above. The water will well up within the BIOFALLS® filter and flow down between the boulders. The nice thing about this is that since you don't have a bermed up area that sticks out, everything is at grade level, and it truly looks like a spring.



Use the professional black foam to seal the joint.



To fill large gaps, use gravel. Make sure the gravel is well compacted.



A BIOFALLS® filter can be used to create an illusion that a pond continues.

CONSTRUCTION GUIDELINES

esp Ahora vamos a usar un BIOFALLS® para crear un manantial. Lo más difícil en usar el BIOFALLS® de esta manera es consiguiendo que el nivel de agua del manantial sea ajustado apropiadamente. El nivel de agua en el BIOFALLS® del manantial debería de ser ajustado de 1 a 2 pulgadas más alta que el nivel de agua del charco donde el agua corre.

Tenga cuidado de no posicionar el BIOFALLS® más abajo del nivel de agua del manantial. Si es posicionado muy bajo, tendrá que ser movido para evitar que no se escape el agua.

Trate el trabajo de poner piedra igual como ... El agua se va acumular dentro del BIOFALLS® y después va a correr hacia abajo en medio de las piedras principales. Lo bonito de esto es que Ud. no va a tener un área que sobresale, y todo está al nivel apropiado, haciendolo ver como un manantial natural.



A BIOFALLS® filter can be sunk into the ground to create a small bubbling water feature. Note: The snout has been cut off and rocks are foamed right to the face.



Make sure you select rocks that fit on the shelf. Once they are all in place, foam them in and don't disturb them for 30 minutes. (Hint! Set rocks aside that you think will fit before you rock in the pond).





With the liner attached, you can now use the pipe cutters or a hacksaw to cut off most of the snout.

esp La Cascada del BIOFALLS® filter

The BIOFALLS® Filter Waterfall

There are different applications in which the BIOFALLS® filter can be used to help create beautiful waterfalls.

Small Areas

The BIOFALLS® filter is extremely flexible, and a variety of different waterfall styles can be created even when there isn't a lot of space. Set the BIOFALLS® filter back about one foot from the edge, and build a small step in front of it. This will save you some time and headaches, not to mention stone.

esp Hay diferentes aplicaciones que uno puede usar para crear cascadas lindas con el BIOFALLS® filter.

Áreas Pequeñas

El BIOFALLS® es extremadamente flexible, y diferentes estilos de cascadas pueden ser creadas aún cuando no hay mucho espacio. Posicione el BIOFALLS® como a 1 pie de distancia de la orilla, y construya un escalon en frente de el. Esto le va ahorrar tiempo y dolores de cabeza, como también piedra.



An excavated shelf in front of the BIOFALLS® filter can be used as a rock ledge.



The Easiest Way

The easiest way to build a BIOFALLS® filter waterfall is to start with a couple of large rocks on either side. They should go higher than the top of the BIOFALLS® filter to help hide the corners and to funnel the water over the desired rocks. Fill in between with another large stone, or a series of smaller ones... whatever fits best. Backfill the area between the boulders and the BIOFALLS® filter with gravel or small stones, then start foaming. The water should well up within the BIOFALLS® filter then spill over the stonework, and voila! Instant waterfall.

esp La Manera Más Fácil

La manera más fácil para construir una cascada con el BIOFALLS® es empezar con varias piedras grandes y posicionarlas a cada lado del BIOFALLS®. Deberían ser posicionadas más altas que la parte de arriba del BIOFALLS® para ayudar a esconder las esquinas, y para embudar el agua sobre las piedras que uno desea. Llene la parte de medio con otra piedra grande, o una serie de piedras pequeñas... lo que quepa mejor. Rellene el área de medio de las piedras y el BIOFALLS® con grava y piedras pequeñas, después empiece a rellenar con espuma. El agua debería de colocarse dentro del BIOFALLS® y después derramarse sobre la piedra. ¡Esto creara una cascada instantanea!



Butt the rock up against the BIOFALLS® filter.



Foam the joint where they meet and disguise with gravel or small stones.

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You're ready to foam in smaller stones.



Remember, you can set gravel into place in foam that's only partially dried.



It's hidden, foamed, and ready for water.



One of a kind BIOFALLS® filter waterfall, done in 3 manhours!



CONSTRUCTION GUIDELINES



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One of a kind BIOFALLS® filter waterfall, done in 3 manhours!



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This BIOFALLS® filter waterfall took 2½ manhours to build. Imagine how long it would have taken to create a natural looking one, like this one, if you didn't use a BIOFALLS® filter.



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A More Challenging Way

The BIOFALLS® filter snout gets removed, or cut off, leaving a $\frac{3}{4}$ " piece to attach the liner. Cutting it off gives you more freedom to create interesting falls without having to use flagstone or the waterfall stone that comes with the kit. This can be a challenging way to do the BIOFALLS® filter, but we need something to keep us on our toes. (Note: *Make sure to cut lip while silicone is still wet...*) If you're using the Signature Series™ BIOFALLS® filter, the lip is reversible and can be placed inside or out, depending on your design.

esp Una forma retadora

La boca del BIOFALLS® es removida, or cortada, dejando una pieza de $\frac{3}{4}$ de una pulgada para poder sujetar la capa protectora. Cortando esta pieza le da la opción de crear una cascada muy interesante sin tener que usar flagstone (o losa), o la piedra para la cascada que viene con el resto de las piezas. Está puede ser una manera más difícil de hacer el BIOFALLS® filter, pero se puede hacerlo.

Set your larger character boulders first, then fill in the voids with smaller ones.



Use gravel to fill in large crevices.



Set stones.



Foam each stone.

Foam the lip.



You could use BIOFALLS® filter stone kit for a more customized look. See the sequence on the following page.



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Use the BIOFALLS[®] filter stone that's included in each BIOFALLS[®] filter or use a 1/2" or thinner flagstone in its place.



Each rock affects the way the water flows differently.



Fire her up!



Each drop is unique and so is the sound. The feeling of accomplishment of what you created makes all the sweat worth it.

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The Grande BIOFALLS® filter

Don't let the Grande scare you. It's nothing more than just a big biological filter—you still have the same flexibility of setting it at different heights. Not only does it make a more realistic upper pool, it also gives you a lot more freedom to be creative with the waterfalls. In fact, we use a Grande for that reason alone. The increased filtration also allows ample room for fish to grow without overloading the system.

The only challenge with the Grande is that it can take a little longer to set. It has a pretty large footprint which can make it tough to level. If this is a continuous problem, over dig the BIOFALLS® filter hole by 4" and fill it with 4" of crushed stone. Level and compact the stone and set the BIOFALLS® filter in place. This will make setting it noticeably easier.

esp El BIOFALLS® filter Grande

No deje que el Grande lo espante. No es nada más que un filtro biológico, y grande—todavía tiene la flexibilidad de poder posicionarlo a diferentes alturas. No solamente le hace realizar un manantial natural, pero también le da mucha libertad en ser creativo con construcciones de cascadas. Por eso es que usamos el Grande. La filtración superior del Grande nos da la capacidad de tener bastante lugar para que los peces crezcan, y sin sobrecargar el sistema.

El único obstáculo con el Grande es que puede tomarle un poco más de tiempo en posicionar. Tiene una huella bastante grande que puede ser difícil hacerlo plano (o llano). Si esto se presenta como un problema continuo, sobre-excave el hoyo del BIOFALLS® por 4 pulgadas y llenelo con 4 pulgadas de piedra aplastada. Aplane y compacte la piedra y reposicione el BIOFALLS® filter. Esto hará el trabajo de posicionar el BIOFALLS® más fácil.

Crushed gravel helps level out the base of the Grande BIOFALLS® filter.



Ed practices the ancient Chinese art of Tai Chi, which allows him to feel the aura of each BIOFALLS® filter.



CONSTRUCTION GUIDELINES



Ready for rocks.



It takes teamwork to set large stones.



Photos cannot do justice to how beautiful this space sounds.



CONSTRUCTION GUIDELINES

Two Standard BIOFALLS® filters can be set side by side or spread apart.



Using Two BIOFALLS® filters

Using two BIOFALLS® filters set close to each other will not only increase filtration, but also adds other creative possibilities. You can create two totally different types of waterfalls, or the two falls can be mirror images of each other. The double falls can be plumbed independently or, by using a manifold, they can be operated off of one larger pump. We prefer to plumbed them independently, so if a pump goes out, one waterfall will still be in operation keeping the pond healthy.

We like to create a high and low falls when doing a double. It adds a unique twist to a water feature by creating different views from various locations around the property. A double waterfall gives off a fuller sound and it projects into the living area, saturating it with soothing aqua-music. The actual designs are limitless... here are some ideas.

esp Usando Dos BIOFALLS®

Usando dos BIOFALLS® que están posicionados cerca uno al otro no solamente va a aumentar la filtración, si no también le agrega otras posibilidades creativas. Ud. puede crear dos tipos de cascadas totalmente diferentes, o dos cascadas que son idénticas. Las dos cascadas pueden ser instaladas independientemente o, usando un control de válvulas, que pueden ser dirigido por una bomba. Preferimos instalar cada uno independientemente por si una bomba falla la otra cascada seguirá funcionando, manteniendo el estanque sano.

Nos gusta crear cascadas con caídas altas y bajas cuando instalamos más que una. Esto le da una apariencia única a cualquier sistema acuático, creando diferentes puntos de vista desde cualquier locación en la propiedad. Teniendo doble cascadas le da un buen sonido y eso se proyecta a cualquier área de su hogar, saturándolo con música acuática y relajante.



Use a ball valve to adjust the waterflow when you offset two BIOFALLS® filters at different heights.

CONSTRUCTION GUIDELINES



Two Grande BIOFALLS® filters with two pumps.



CONSTRUCTION GUIDELINES

esp Plomería Grande

Grande Plumbing

The 3" piping that comes with the Grande doesn't have to be used. It can be substituted with a 2" line, or two 2" lines that come together from two separate pumps. There are many possible plumbing configurations. Just be sure you build the waterfall accord-

ing to the pump volume. For example, if you're using an Aquascape pump (2,700 gph), don't build a 4' wide waterfall unless you're looking for a "trickle down" effect. Instead, narrow it down so the water's only coming over a 2' wide section. Or better yet, split it so it's coming over 1½' on one side, and 6" on the other. The possibilities are truly endless. See plumbing section for more information on plumbing.

esp La plomería de 3 pulgadas que viene con el Grande no necesariamente tiene que ser usada. Puede ser sustituido con plomería de 2 pulgadas, o dos tubos de 2 pulgadas, que se reúnen y que vienen de dos bombas diferentes. Hay muchas configuraciones de plomería que son posibles. Manténgase seguro de que la cascada este de acuerdo al volumen de la pompa. Por ejemplo, si Ud. está usando una pompa de Aquascape (2,700 galones por hora) no construya una cascada de 4 pies de anchura a lo menos que esté buscando la apariencia de "goteo." En cambio, reduzcala para que el agua corra solamente sobre una sección de 2 pies de anchura. O mejor, divida el agua para que corra 1.5 pies en un lado, y .5 pies en el otro. Las posibilidades son demásiadas.

Overlapping liners will allow you to shape the ground beneath your stones at the last minute.



esp Creando la Cascada

Creating the Cascade

It's now time for the main waterfall cascade. We start at the bottom of the fall, by carving a series of small steps into the steep hillside. Use a separate piece of liner with this larger cascade, because the subsoil will need to be adjusted to assure a proper fit. This is time consuming, but well worth the effort.



TIP from TEAM AQUASCAPE

When you disconnect the pump in a system that includes a Grande BIOFALLS® filter, you can prevent the backflow of all that dirty water by installing a ball valve outside the back of the skimmer box. After you turn off the pump, but before it gets disconnected, simply close the ball valve and you'll stay dry.

esp Cuando Ud. desconecte la pompa en el sistema que incluye un Grande BIOFALLS®, puede prevenir que el agua sucia que va corriendo regrese hacia atrás. Esto se puede solucionar instalando una válvula de bola afuera de la parte trancera del skimmer box (caja del skimmer). Después de que Ud. apague la pompa, y antes de que la desconecte, simplemente sierra la válvula de bola y se quedara seco.

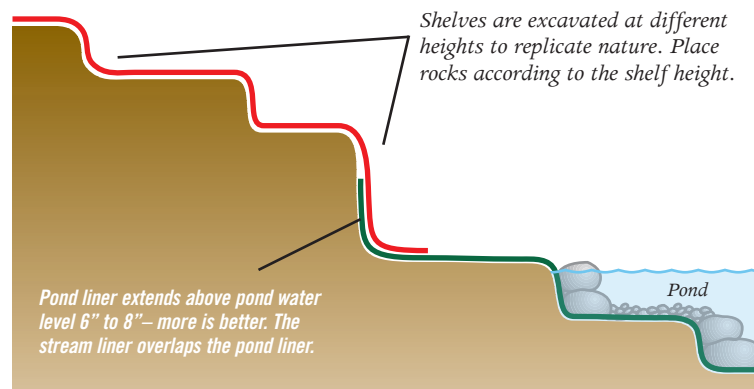
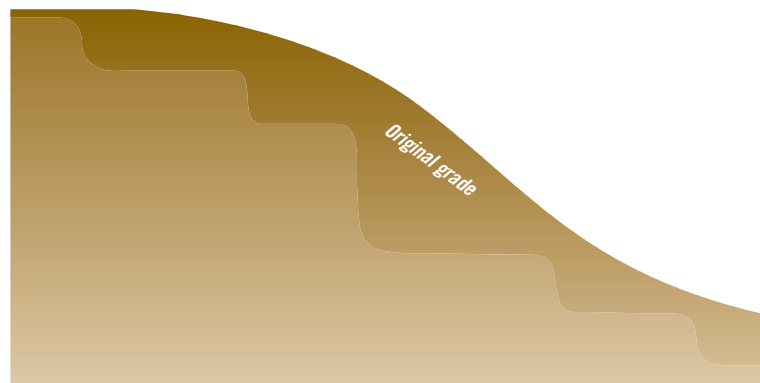




- Put the main character boulders in place, and then pull the liner forward and custom carve the next shelf into the hill, a couple of inches below the top of the rocks that were just set. This will assure that the water gets funneled through the areas as you've planned, and the main rocks stay dry. This takes a little practice, and this type of waterfall is one of the most challenging. Just remember to think like the water, and take the splashing and tumbling into consideration.

esp Ahora es tiempo para crear la cascada principal del estanque. Empezamos con la parte de abajo de la cascada y excavamos una serie de escalones pequeños hacia la parte empinada de la colina. Use un pedazo de la capa protectora con la cascada más grande por que la tierra de abajo tendra que ser ajustada para asegurar que todo este bien acomodado. Esto toma un poco de tiempo pero vale la pena.

- Posicione las piedras principales en su lugar, y después jale la capa protectora hacia adelante y excave el siguiente escalon en el interior de la colina, varias pulgadas debajo de las piedras que aun acaba de posicionar. Esto le asegurará que el agua sea dirigido por las áreas planeadas, dejando que las piedras principales se mantengan secas. Esto toma un poco de práctica, y este tipo de cascada es uno de los más difíciles en crear. Solo recuerde en pensar como el agua, y tome en cuenta las revolcadas y chapoteos del agua.



CONSTRUCTION GUIDELINES

- Continue moving up the waterfall, setting all the main stones. Once they've been set, step back and look at the creation. If you're not happy with it at this point, make changes now because it will start becoming more and more difficult to change from this point forward.
- If you're satisfied, start filling in the areas between the large character boulders with small and medium sized stones.

esp Continúe subiendo la cascada y siga posicionando las piedras necesarias, o principales. Una vez que han sido posicionadas, tome un poco de tiempo en admirar su creación. Si Ud. no está contento con lo que ha hecho hasta este punto, haga los cambios necesarios en este momento por que desde este punto en adelante, va ser más difícil de hacerlos.

• Si Ud. no está satisfecho, empiece a rellenar las áreas en medio de las piedras principales con piedras pequeñas o medianas.



Don't even try to do detail foaming without a professional gun.



After a couple minutes of cure time, the foam can be sprinkled with gravel. It's dry enough to prevent gravel from sinking and sticky enough to hold the gravel in place.

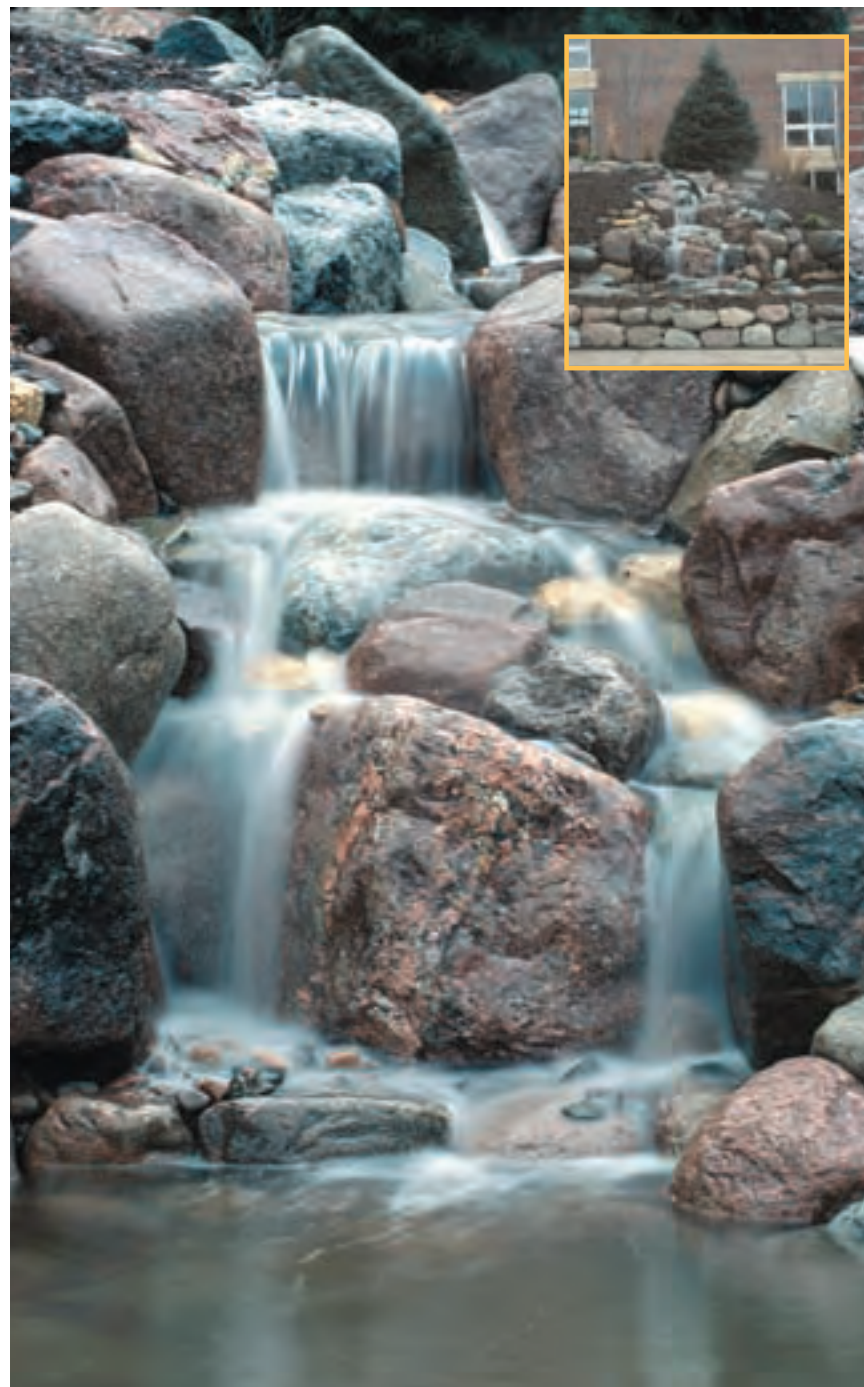
- Set a couple of courses, then dismantle and start foaming the rocks.
- The main thing to remember is to overlap the joint between the rocks.
- As you approach the top of the cascade, carve the rocks into place as previously described. Remove the rocks and place the upstream liner over the top of the liner below it. This will insure a leak-free lap joint.
- Replace the rocks, making sure that they extend above the waterfall weir by a couple of inches minimally. Foam all the rocks in place, and cover the streambed with gravel and river rocks.

esp Posicione varias series de piedras, y después desmontelas y empiece a tender la espuma.

- Recuerde que tiene que tapar el espacio que queda en medio de las piedras que uno va posicionando.
- Llegando a la parte de arriba de la cascada, posicione las piedras por medio de excavación, como ya habíamos dicho. Desaloje las piedras y posicione la capa protectora del arroyo sobre la capa protectora del estanque de abajo. Esto asegurará que el agua no se escape.
- Reposicione las piedras, y asegúrese que se extienden sobre la preza de la cascada por lo menos algunas pulgadas. Alóje todas las piedras en su lugar con espuma, y cubra el arroyo con grava y más piedras.



A waterfall should look good with or without water.





Notice the extra ledge, farther out from the BIOFALLS® filter. Watch how it gets transformed.



esp Técnicas para Aplicar la Espuma

Foaming Techniques

- Good foaming techniques will separate good pond builders from the rest of the pack. It's important to understand the proper use of foam and, more importantly, how to hide and disguise the foam so it's invisible.
- We'll start the falls with a standard technique using a double falls coming out of the BIOFALLS® filter.
- The common theme in doing the falls is setting the main rocks on either side of the falls first.

- *esp* Teniendo buenas técnicas para aplicar la espuma va apartar los buenos constructores de los demás. Es importante entender como usar la espuma apropiadamente, y aún más importante, como esconder la espuma para que no se vea.
- Vamos a empezar con la técnica común de usar el BIOFALLS® para lograr doble cascadas.
- El tema común en constuyendo las cascadas es primeramente posicionando las piedras principales a cada lado de donde caera el agua.

CONSTRUCTION GUIDELINES

- Use different creative methods when placing stone, and remember... some rocks are meant to have water going over them.
- Dispense the foam from deep behind the larger stones. Lean the stones forward enough to insert the applicator tip behind the rock. Depress the trigger and move the tip in a side-to-side motion, then a bottom- to-top motion behind the stone.
- Lay the stone back into its original position and move on to the next rock.
- If some of the foam oozes out from behind the rock, it needs to be removed or hidden from view. This is common, and once you get the feel for it, you'll be able to judge the proper amount of foam and will have less oozing.

esp Use diferentes métodos creativos cuando está posicionando la piedra y recuerde que el agua debería pasar sobre varias piedras.

- *Distribuya la espuma desde la parte trasera de las piedras grandes. Incline las piedras suficientemente hacia delante para introducir la punta de la herramienta de aplicar detrás de la roca.*



Find cool shaped rocks like this one and use them to direct water.



- *Posicione la piedra en su lugar original y avance a la próxima piedra.*
- *Si alguna espuma se desprende por detrás de las piedras, tiene que ser removido o escondido de vista. Esto es muy común, y una vez que se acostumbre a aplicarlo, Ud. va a poder medir mejor la cantidad de espuma apropiada para cada piedra.*



Another snout has been cut off to start the waterfalls instantly.

CONSTRUCTION GUIDELINES



Backfill behind the boulders for stability and a base for smaller stones.



Finish with smaller stones.

- If you're using flagstone, simply tilt it forward, insert the applicator under the stone, and dispense the foam. These flat stones don't need much because they have a large, flat surface area for the foam to bond with the liner. Typically, they have very few voids to fill with the foam.
- Rapids and cascades require the greatest amount of foam. The irregularities and rounded shapes of the rocks create great voids between the rocks and liner, so the bond is crucial. We start by filling the larger voids with a mixture of small stones and gravel. Continue filling behind and between the rocks until the gaps are almost full. Next, lay a heavy bead of foam over the rock and gravel fill. Let it set for a couple of minutes, then pour another layer of gravel over the foam. Let it set for another 15 minutes and you're done.

esp Si Ud. está usando Flagstone (Losa), simplemente incline la piedra hacia adelante, e insierte el aplicador debajo de la piedra, y aplique la espuma. Estas piedras planas no necesitan mucha espuma porque tienen un área de superficie bastante grande y plano para que la espuma se adhiera a la capa protectora. Típicamente, tienen pocos vacíos que llenar con la espuma.

- *Las corrientes y cascadas requieren la cantidad más grande de espuma. Las irregularidades y formas redondas de las piedras producen grandes vacíos entre las piedras y la capa protectora, así es que la unión es crucial. Empezamos por rellenar los vacíos más grandes con una mezcla de grava y piedras pequeñas. Continúe rellenando detrás y en medio de las piedras hasta que los vacíos estén casi llenos. Luego, tienda una capa abundante de espuma sobre la piedra y la*



grava. Déjelo situado por unos minutos, y después tienda otra capa de grava sobre la espuma. Déjelo situado otros 15 minutos más y ya terminó.



Strategically foam all voids and joints.



Cover the foam with more stone and gravel.



- Foaming between rocks within the actual cascade is a little different. Once the waterfall is dry stacked, remove some of the key stones. Insert the applicator and deep foam the interior of the waterfall. This will lock the stones in place, while creating a watertight seal that forces the water over the rocks.
 - Let the foam set for a couple of minutes, allowing it to cure and expand into the voids. Strategically place small pieces of rock and gravel into the wet joints, then dust the entire joint with rock dust or sand. Let the foam totally cure, and remove any excess sand and gravel.
- esp* *Aplicando la espuma entre las piedras dentro de la cascada actual es un poco diferente. Una vez que la cascada es montada, remueva una de las piedras principales. Inserte el aplicador y aplique profundamente la espuma al interior de la cascada. Esto va a asegurar que las piedras estén intactas, y a la vez creará un sello bien ajustado y apretado para forzar que el agua corra sobre las piedras.*
- *Déje que la espuma se sitúe por varios minutos para que se desarrolle y se seque, llenando los vacíos. Posicione grava y piezas de piedras pequeñas en las uniones que están mojadas, y después aplique polvo de piedra, o arena, a las uniones. Déje que la espuma se seque totalmente, y remueva el exceso de grava y arena.*

CONSTRUCTION GUIDELINES



Cover the BIOFALLS® filter with flagstone, slate, or gravel.



Another one of a kind. Notice the small photo and how that unique rock directs water.

esp Stream Construction

Stream Construction

Streams set the mood in a water feature. When you close your eyes and envision a stream in your mind, what image appears? Is it a loud crashing watercourse showing you the power of water, or is it a slow meandering stream making you feel peaceful and tranquil? You may have the most beautiful visions, but without an understanding of stream construction, it can become a flash flood of problems.

We love to design and build streams, which we feel are an integral part of a water feature's form and function.

Before you start designing your client's dreamscape, you should know what your capabilities are. All it takes to build an impressive stream is a little extra liner, rock, gravel, and pipe. Well, it's not quite that easy. There are a few other things you must know before you get started.

esp Los arroyos dan buen tono a las características del agua. ¿Cuándo usted cierra los ojos e imagina una corriente en su mente que imagen aparece? Un arroyo de agua fuerte chocando muestra el poder del agua, o si es un arroyo despacio hace que usted se sienta pacífico y sereno. Usted puede tener las visiones más hermosas, pero sin una comprensión de la construcción de el arroyo, puede llegar a ser una inundación de problemas. Me encanta diseñar y construir los arroyos, porque me hacen sentir como una parte integrante de la característica del agua y su función. Antes que usted comience el sueño de su cliente, usted debe saber lo que sus capacidades son. Todo lo que toma para construir un arroyo impresionante es un liner, piedra, grava, y tubería. Bueno, quizás no es tan fácil, porque hay otras cosas que usted debe saber antes que usted comience.



Use larger boulders to naturally twist your stream by diverting the water.

1. How high and far does the water have to go?

Sure, it's great to have a stream tumbling out of the mountains, but remember, you have to pump the water up there first. The greater combined height and distance equates to a greater amount of head pressure put on your pump. You may have to compensate for this by using a larger pump and increasing your pipe diameter to allow for a higher flow volume. This will change your costs somewhat, and we would definitely recommend going with a high efficiency pump to help offset some of the electrical costs. Another option is to use multiple pumps and piping to supply a greater water volume. We prefer this second option whenever possible because it gives you more flexibility. You can shut one pump down without stopping the entire stream. Please contact Aquascape's Technical Department if you need help in sizing the proper pump and piping for your project. Refer to pump section for more info on selecting the proper pump for your job.

esp 1. ¿Qué tan alta y que tan baja el agua tiene que viajar?

Claro que está muy bien que el arroyo descienda fuertemente de las montañas, pero recuerde que usted tiene que bombiar el agua hasta arriba primero. Entre más grande sea la combinación



A serpentine planting bed is about to be baptized.

de altura y distancia, más grande es la presión que tiene que ser producida en su pompa. Para compensar tanta presión, debe tener una pompa con un diámetro más grande para que mueva más agua. Esto va ocasionar que su cuesto sea menos y recomiendo que difinitivamente use una pompa con más eficiencia para que el costo de electricidad también sea reducido. Otra opción es usar pompas

múltiples y más tubería para que mueva más agua. Yo prefiero esta segunda opción cuando sea posible porque ofrece más flexibilidad. Usted puede apagar una pompa sin tener que parar toda el arroyo. Por favor, contacte a nuestro departamento técnico en Aquascape si necesita saber de que tamaño requiere su pompa o su tubería.



Dig to match the existing twists.



2. Increase Your Reservoir.

One of the most frequent design flaws is having a large upper pond or stream going into a small lower pond. It should be the exact opposite; the lower pond should always be larger.

The reasoning behind it is simple. You need a large volume of water where your pump is to supply the water in your stream. This becomes crucial during times of pump maintenance or power outages. (See example on next page.)

With the liner in place, rock it!



esp 2. Aumente Su Depósito.

Uno de los problemas más frecuentes que existen son cuando los estanques grandes o los arroyos descienden a un estanque chico. Debe de ser exactamente lo puesto; el estanque chico siempre debe

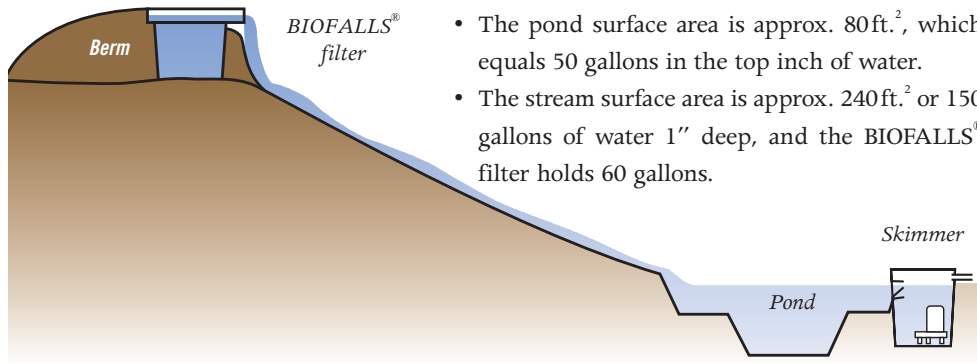
de ser lo más largo. La razón es muy simple. Usted necesita un volumen de agua muy enorme donde su pompa va a supeir agua en su corriente. Esto es muy importante durante el mantenimiento de su pompa o cuando tiene un corto.



CONSTRUCTION GUIDELINES

For Example: A 10' x 10' pond with an 80' stream 3' wide coming down a 3' slope.

esp Por ejemplo: Un estanque de 10 pies por 10 pies y con una corriente de 80 pie por 3 pies de anchura con 3 pies de cuesta.



- The pond surface area is approx. 80ft.², which equals 50 gallons in the top inch of water.
- The stream surface area is approx. 240ft.² or 150 gallons of water 1" deep, and the BIOFALLS® filter holds 60 gallons.

esp El área del estanque es aproximadamente 80 pies cuadrados, que equivalen a 50 galones en la capa de la superficie del agua.

• La superficie de el arroyo es aproximadamente 240 pies cuadrados o 150 galones de agua con una pulgada de profundidad y las BIOFALLS® retiene 60 galones.

The stream looks great and everything is running fine until we have a power outage.

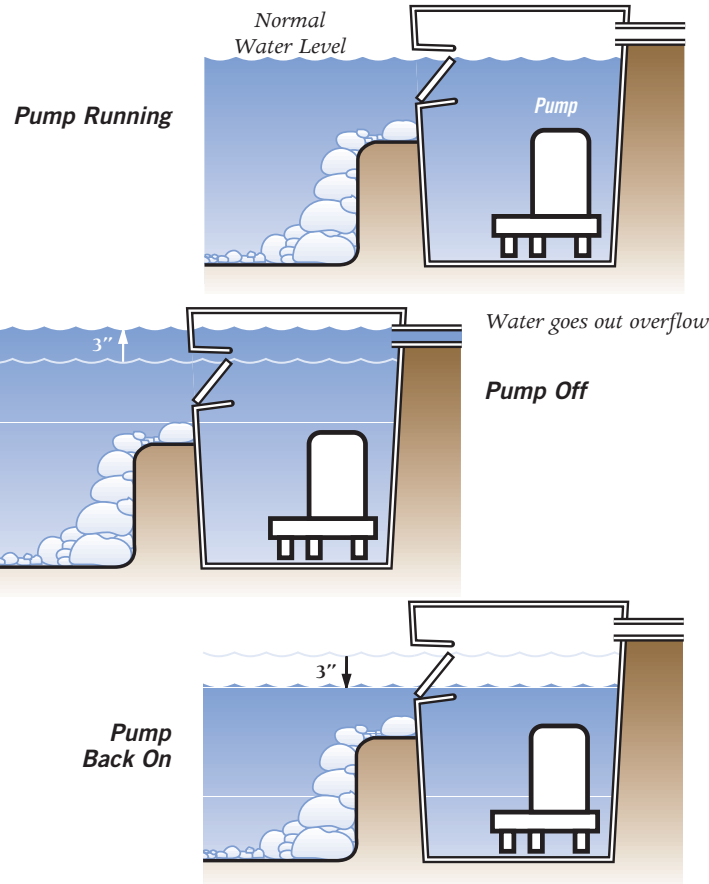
esp El arroyo se mira muy lindo y todo está corriendo muy bien hasta que tenemos un corto.

What happens?

- The checkvalve on the pump will keep the 60 gallons in the BIOFALLS® filter, but the other 150 gallons in the stream will continue to flow by gravity to the lower pond.
- The extra 150 gallons will raise and overflow the lower pond by at least 3". When the power is restored, the pump will send 150 gallons or 3" of its water back up to the stream. The stream will be flowing, but the pond is now missing 3" of water. The water will have to be replaced in order for the pond to function at its proper level.

esp ¿Qué pasa?

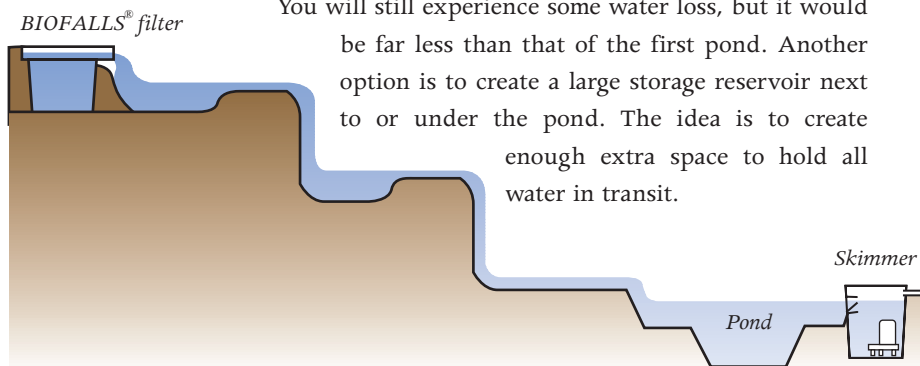
- La válvula de chequear en la pompa va a mantener 60 galones dentro del BIOFALLS®, pero los otros 150 galones en el arroyo va a continuar y la gravedad la llevará al estanque de abajo.
- Los 150 galones extra de agua levantarán y causarán que el agua descienda al estanque de abajo cuando menos por 3 pulgadas. Cuando el corto sea compuesto, la pompa va a mover los 150 galones o 3 pulgadas de agua rumbo al arroyo. El arroyo va a moverse pero el estanque no va a tener 3 pulgadas de agua. El agua va a tener que ser replacido para mantener la función del estanque en su nivel normal.



CONSTRUCTION GUIDELINES

The Solution:

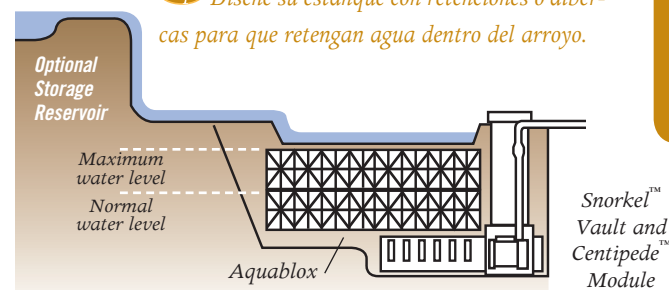
- By having a larger lower pond, the flooding could easily be avoided. The recommended pond size would be a 15' x 20' lower pond with an approx. surface area of 240 ft.², which is equal to the stream's surface area. You will still experience some water loss, but it would be far less than that of the first pond. Another option is to create a large storage reservoir next to or under the pond. The idea is to create enough extra space to hold all water in transit.



esp Por tener el estanque de abajo más grande que el de arriba, el escape de agua puede evitarse fácilmente. Yo recomiendo que el tamaño del estanque sea 15 pies por 20 pies en el estanque de abajo con aproximadamente una superficie de 240 pies cuadrados que es igual a la superficie del arroyo. Usted va a experimentar una pérdida de agua, pero va a ser mucho menos que la del primer estanque.

Design your pond with holding areas or pools to help retain some water within the streambed.

esp Diseñe su estanque con retenciones o albercas para que retengan agua dentro del arroyo.



In nature, water erodes away the soil to expose stone. Use your shovel to achieve the same affect. The "eroded" away soil is now ready for the liner and stone.

CONSTRUCTION GUIDELINES

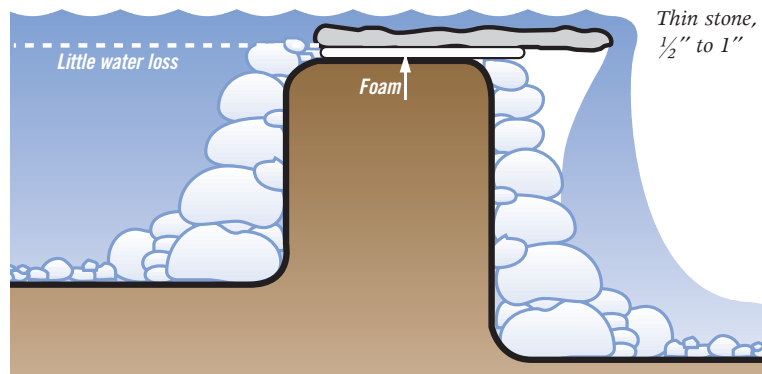
3. An often-overlooked part of stream construction is the thickness of your waterfall stones.

Water will eventually seep through the foam joints if the pumps are off for prolonged periods of time. The water will slowly seep around the thick stone, resulting in water loss equal to the thickness of that stone.

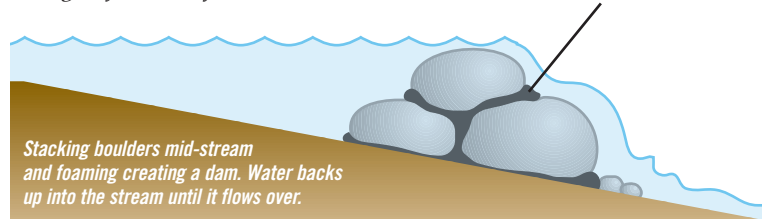
esp 3. Algo que frecuentemente no se toma a cabo durante la construcción del arroyo es lo grueso de las piedras que se encuentra en las cascadas.

El agua eventualmente penetrará la espuma si la bomba no trabaja por periodos prolongados. El agua lentamente penetrará entre las piedras resultando que el agua se pierda. El volumen de agua perdida será igual al tamaño de la piedra.

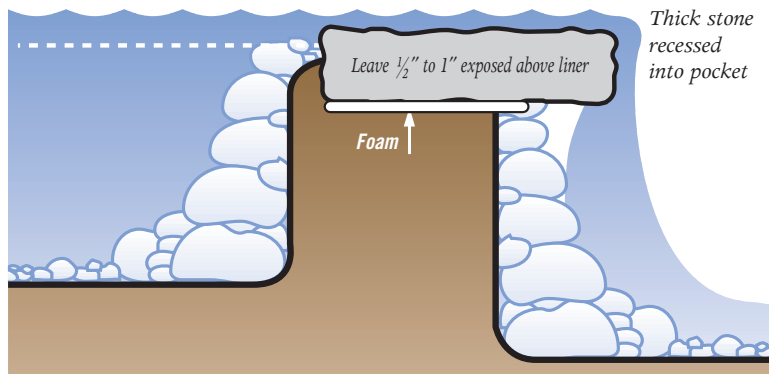
By using a thin stone the situation can be easily remedied.



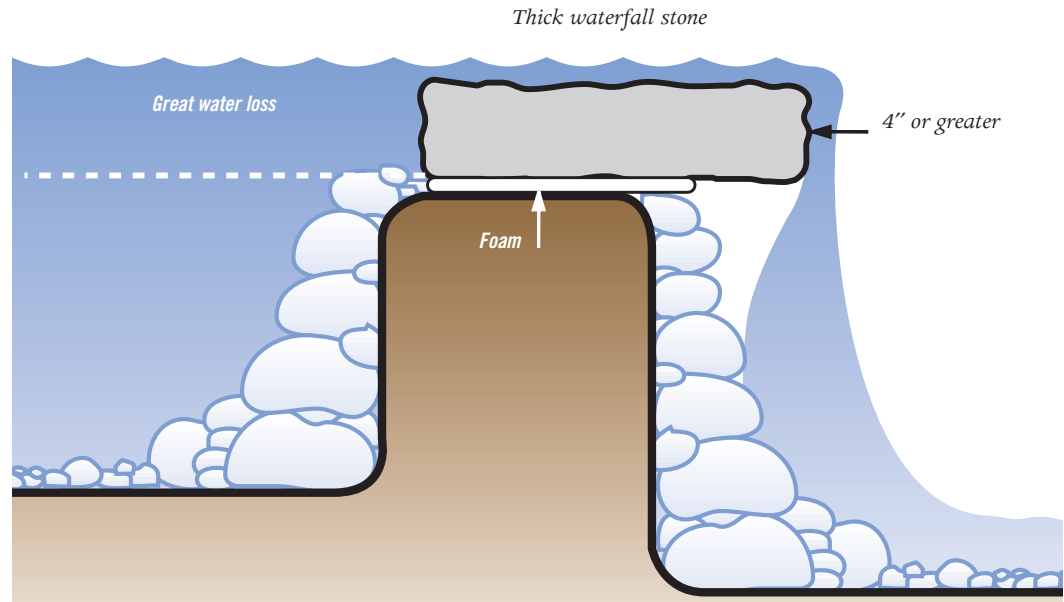
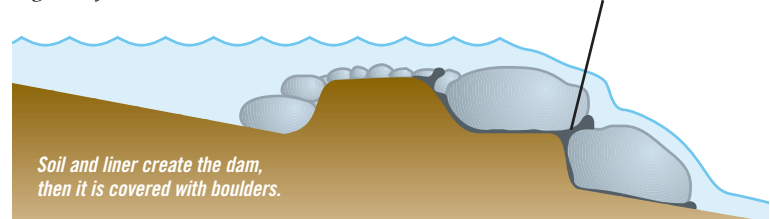
Wrong way: boulder falls



If your only option is thick waterfall stones use the following method:



Right way

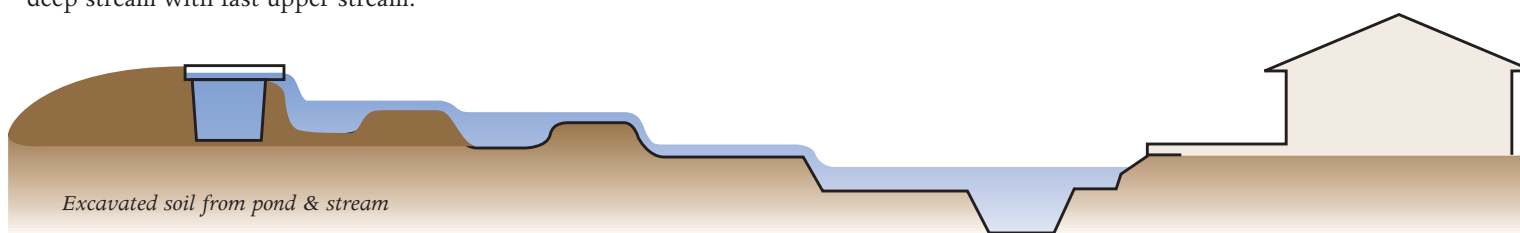


4. The next part of stream design is basic but is still important to your success. There are three basic scenarios that you will encounter.

- A. Flat backyard
- B. Slope going away from home
- C. Slope going towards the home

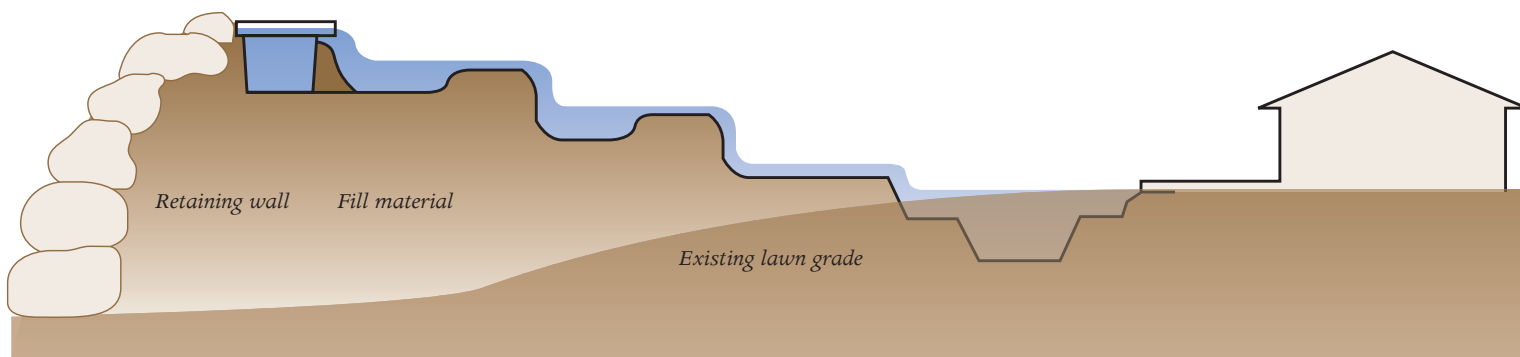
A. Flat Backyard:

This is easy to work with. You may need to bring in fill material if you want a fast moving stream. Otherwise, do a combination of deep stream with fast upper stream.



B. Slope Going Away From Home:

This is more challenging and more expensive. You will definitely have to bring fill material to the site if you want a stream visible from the main viewing area. You must be very careful about fill compaction and retaining wall integrity. If done properly, it is an amazing transformation, and well worth the challenge.



esp 4. El siguiente diseño del arroyo es básico, pero a la vez es muy importante. Existen tres básicos ejemplos.

- A. El traspatio plano
- B. La cuesta dejando el hogar
- C. La cuesta yendo hacia el hogar

esp A. El Traspatio Plano:

Esto es fácil de trabajar. Usted debe traer material terrenal si usted quiere que el arroyo mueva rápido. Si no es así, combine un arroyo profundo con un arroyo que mueva rápido.

esp B. La Cuesta Dejando el Hogar:

Esto es más difícil y más costoso. Usted definitivamente debe de traer material terrenal si quiere un arroyo visible desde el área principal. Usted debe de poner mucha atención de que el material sea fuerte. Si está hecho bien, es una transformación enorme y vale la pena.

CONSTRUCTION GUIDELINES

C. Slope Going Towards the Home:

This is the easiest and most natural looking. Simply shape and carve the hillside for the desired affect. The trick with this is to try and keep all soil on site. You may have to haul some away, but it will not be a problem as long as you make provisions ahead of time.

esp C. La Cuesta Yendo Hacia el Hogar:

Esto es lo más fácil con la visión más natural. Simplemente, forme y trinche la loma a su gusto. El truco es tratando de tener toda la tierra lista para el proyecto. Es posible que

tenga que mover algo de la tierra, pero no es problema si usted toma en cuenta esto a tiempo.



5. The Deep Stream

If your client is set against the concept of a large lower pond, simply incorporate the stream into the pond. Let's go back to our example pond and stream (see diagram at top of pg. 240) which is a 10' x 10' pond with an 80' x 3' stream with a 3' slope. The diagram below illustrates a combination of methods while still keeping a streamlike effect.

55' x 3' upper stream = 165ft.²

20' x 4' deep stream > combined = 160ft.²

10' x 10' lower pond

esp 5. El arroyo Profunda:

Si su cliente no quiere tener un estanque grande baja, simplemente incorpórela en el arroyo de el estanque. Vamos a nuestro ejemplo de el estanque del tamaño 10 pies por 10 pies con el arroyo 80 pies y cuesta de 3 pies.

55 pies por 3 pies arroyo alto = 165 pies cuadrados

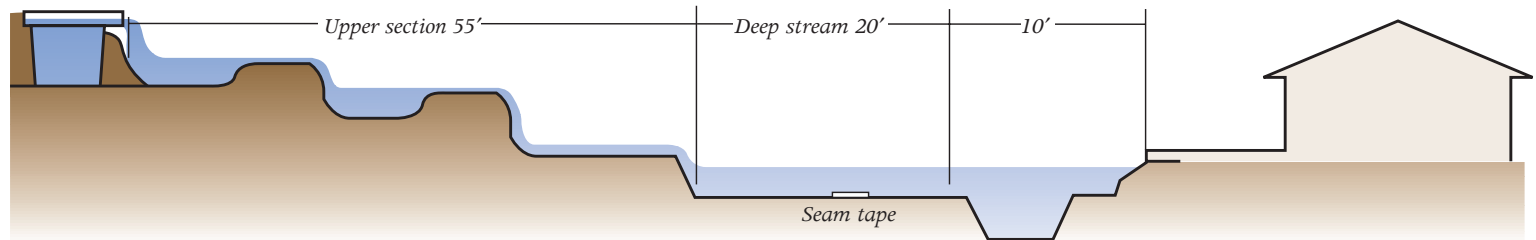
20 pies por 4 pies

arroyo profundo

10 pies por 10 pies

fuentes baja

> combinado 160 pies cuadrados



No matter what, never make a small lower pond with a large stream. Even though the client may have a great vision in their mind's eye, you will be doing them a great disservice by not adhering to these few simple rules on stream construction.

esp No importa cual sea la razón, nunca haga un estanque pequeña con un arroyo grande. Aún cuando el cliente tenga una gran visión. Usted le va a hacer un daño a su cliente si Usted no sigue ésta regla.

One More Thing Before You Get Started

You may be anxious to get out and start building a dreamscape with lots of flowing water and a serene pond filled with lilies and extraordinary koi. Before you get your marking paint and shovels out, there's one more greatly misunderstood concept of pond and stream construction to talk about here.

It seems that many people are so enthralled with the sound of water, that all they want is a huge waterfall and stream that fills their property with the incredible sounds of falling water. The only problem is, if the pond gets neglected, and/or forgotten about, it doesn't work very well.

Let your creativity take over and see what happens. Regardless of the outcome, you'll definitely learn something and, in the process, you'll learn a little each time. The bottom line on stream and waterfall construction is, if you enjoy what you do, it will show in your craftsmanship. There's no greater feeling than the satisfaction of a job executed to perfection, and loving every minute of doing it.

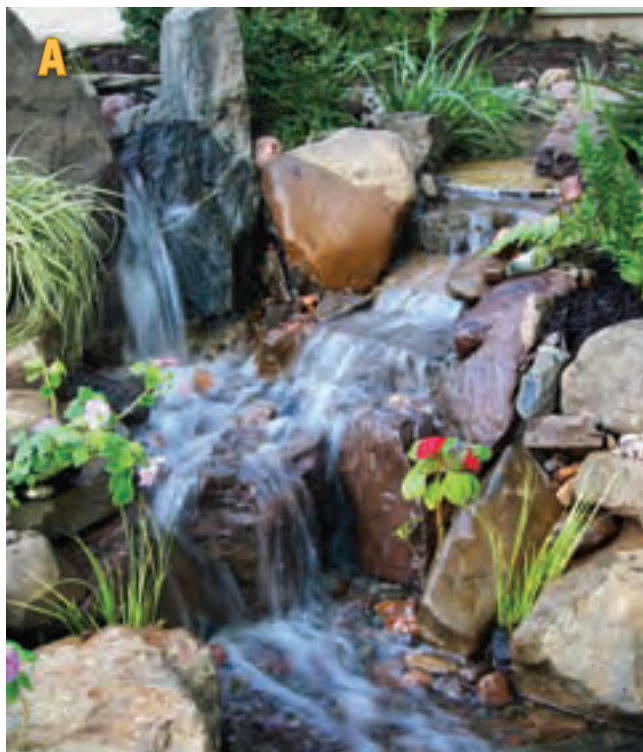
esp Una Cosa más que Hacer antes de Empezar

Sabemos que Ud. está ansioso de empezar a construir su sueño acuático con un estanque bello, lleno de azucenas y bastante Koi. Antes de que saque su pintura para marcar y sus palas, hay un concepto muy mal entendido sobre la construcción del estanque y su corriente que mencionar.

Parece que mucha gente está encantada con el ruido del agua del estanque, que todos quieren una cascada y una corriente que llene su propiedad con ruidos increíbles. El único problema es que si uno descuida su estanque, no va a funcionar correctamente.

Déje manejar su creatividad y ver que pasa. Sin importar como salga el producto final, Ud. definitivamente aprenderá algo y, en el proceso, aprenderá cada vez un poco más. Si Ud. se divierte construyendo las corrientes y las cascadas se notará en el trabajo que Ud. hace. No hay sentimiento más grande que la satisfacción de un trabajo bien hecho y a la vez disfrutando cada minuto.





The PondSweep Addition

Our newest biological filter came from the PondSweep product line – the Endless Cascades™. Its key distinguishing characteristic is it has no pre-cut waterfall opening. Cut your own opening? Sure, it's actually pretty easy once you try it.

Probably the biggest two benefits of cutting your own opening is the ability to perfectly match the opening to the stone you've picked out for your waterfall AND the ability to create more than one opening/waterfalls out of a single box. (see figure A)



Now it's easier than ever to use smaller stones or make narrow waterfalls flowing directly out of the Endless Cascades™. The stone pictured here is about 8" wide and the opening was cut to match it. (see figures B and C)

Don't worry too much about cutting the opening too big and then not having a big enough waterfall pump. Just close the opening by foaming in a taller edge stone or "framing rock" to narrow down the opening so it flows better. (see figure D)

Liner attachment

Don't make the mistake of attaching the liner exactly at the size of the opening you expect to use. What

if the opening is too small and the pump wants to force water over the back edge of the biological filter? As long as you attached the two vertical liner attachment strips well outside the intended opening area, you can easily enlarge the opening by just cutting it wider, and you'll still be inside the liner attachment area. (see figure E).



TIP from TEAM
AQUASCAPE

Both Endless Cascades™ require that the installer cut a 3" opening for a 2" bulkhead fitting. This way the flex PVC can be fed to either side of the vault for easier positioning.

Waterfall Design Ideas

Cut Stones (Figure 1)

Incorporating a BIOFALLS® filter into an existing cut stone wall is actually pretty simple. Set and plumb the BIOFALLS® filter as any other installation. Connect the liner and build the dry stacked wall on top of the liner. Work that liner in between the stones several feet wider than the waterfall area (see figure 2).

Using a sharp razor, trim excess liner and fabric after the wall is completed. Use small amounts of foam to direct water flow to specific areas. Otherwise, let the water seep between the joints to create the desired effect.

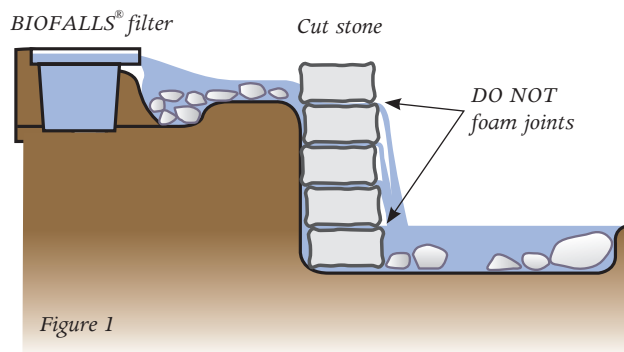


Figure 1

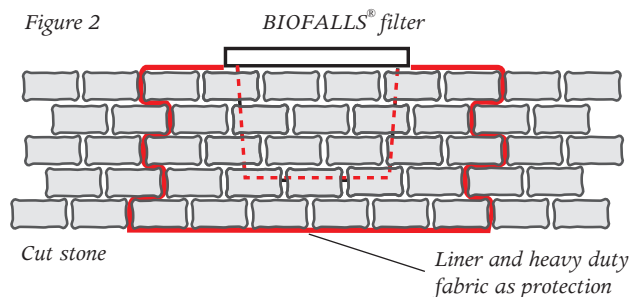
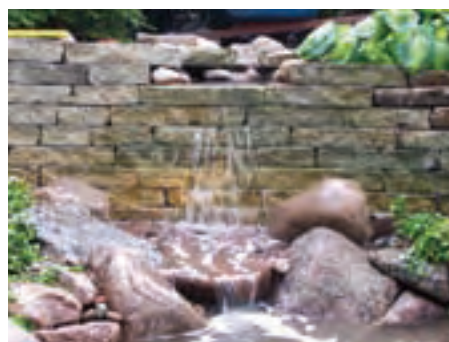


Figure 2



The Log Falls

Walk along the banks of any woodland stream and you're bound to stumble across a "log jam." Logs and broken branches will float downstream until they become lodged between other logs or boulders. The water will back up behind this dam until it over flows creating a small waterfall. Wood will not last nearly as long as rock but depending upon the species, logs will last from 10 to 200 or more years in the right conditions. Why not use stumps or logs to create interesting waterfall

effects? Our clients love the unique sights and sounds we can create with driftwood and logs.

Character Stones

If you're lucky enough to find a large stone that has water worn grooves and crevices cut into it, it can be placed into a waterfall for an amazing effect that cannot even be described because it just looks right. Man cannot reproduce in hours or days something that took nature decades to create.