

## Building a Water Feature

### Planning

Good planning is a key to a successful water feature. So take the time to thoroughly think through what it is you want to achieve. What atmosphere do you want to create? A gentle gurgle, a crashing waterfall, or perhaps something in between. How large and how far away from the house do you want it to be? Even if you don't have small children, consider who might be visiting your water feature. Be sure to include safety in your planning.

The sound of water can mask traffic noise or other distracting noises nearby. Consider the volume of sound that you desire. Remember, if you have neighbors close by that they may not appreciate a constant rushing of water all night long.

Do you want fish? If so, plan to provide them ample depth (at least 2 feet) and large rocks for hiding from predators. Fewer fish is better to start with. A good rule of thumb is: one inch of fish for every one square foot of pond surface. Include plant life. Plants help maintain a healthy balance in your pond. They take nitrates from the water and in so doing, deprive algae the nutrients they need to survive. Additional information on aquatic plants and where to order by mail: <http://www.daydreamgardens.com/>

And one final thought, how much can you afford to spend?



### Materials and Computing Quantities

Before deciding on a liner for your stream or pond, compare strength, thickness and composition. If you are planning to have fish, the liner should be non-toxic to them. To compute the liner requirements, use a flexible tape to measure the excavated pond's width and length. Add two feet for overlap at the top. Computing the water volume accurately is essential. An improper size courseway can leave the pond lowered by several unsightly inches and topping off the pond to make up for the removed water works only until the pump is turned off, then water flows down the courseway and floods the pond and surrounding area. There is a good water volume table in the book *Waterfalls, Fountains, Pools & Streams* by Helen Nash & Eamonn Hughes. Sterling Publishing Co., Inc. New York.

Most materials used are sold by the ton. Granite boulders weigh approximately 200 pounds per cubic foot. Pea gravel and aggregates are generally figured at

100 square feet of coverage at a depth of 2 inches or 150 square feet of coverage at a depth of 1.5 inches. If you are using concrete blocks, they are sold in both solid and hollow forms in measurements of 4 x 8' or 4 x 10'. Cement and mortar are sold in 80-pound bags. They are premixed and fill two square feet at a 4' depth. Brick is figured at 4.5 bricks per square foot, laid flat. One ton of sand covers approximately 20 cubic feet. Flagstone, slate and flat granite vary in weight and thickness considerably and it is best to have your rock supplier give specific coverages for those.

Plan for accessibility of services. Electricity is required to run the re-circulating pump and also any outdoor or in-pond lighting you chose. It is best to hire a licensed electrician to ensure safe electrical service.

Use quality materials, because building a water feature is work and using ill-suited materials will cause grief in the long run. Make a list of the materials you need and price them from several sources. Decide if you will build it all at once or over more than a year. If you build it over several seasons, make your initial pond large enough to support the completed feature. The stream or waterfall added later can be sized to fit the reservoir pond, but the pond cannot be made larger without a great deal of rework and expense.

If you decide to hire a qualified contractor to do the work for you, select them as carefully as you would a homebuilder. Check references, talk to previous clients and see for yourself the quality of their completed projects. Be sure they have a business license and liability insurance.

## Waterfalls

Create a waterfall that is visually interesting. Decide whether you want the water to come from a hidden source, such as a spring or straight from the top of several stacked rocks. Consider curving the pathway the water flows to create different views from alternate vantage points.

One basic scientific principle to be aware of: water is being pumped uphill to reach the top of the waterfall and for every foot of height from the pump, pumping capacity decreases. Likewise, resistance becomes a factor within the water line. For every ten feet of pipe, you need another foot of lift height. Pump manufacturers' charts take into account these reductions in lifting capacity.

## Stream Design and Construction

If you have not installed the main pond from which the water for the stream will be recycled, you have more freedom in designing it. If you are adding a stream to an existing pond, you must determine the size that can be supported by your pond. When the pump is turned on, water fills the streambed first before re-entering the pond. A specific amount of water is removed from the main pond when the stream is in operation. If the pond is too small for the stream, when the pump is turned off water from the streambed flows downhill and the pond floods. Water levels may be reduced by several inches in the pond causing an unsightly look to your pond as well as endangering plant life.



Once you have a design, mark its outline on the ground with spray paint or chalk. Excavate in a U shape, being sure it is not too narrow or shallow to accommodate the liner and rocks that you will use. Once the excavation is complete, clean any debris, roots or rocks from the streambed and pond. It is a good idea to put an inch or two of sand throughout the entire courseway to protect the liner. Old carpet pad works well, too. Provide extra reinforcement (a small piece of liner under the heavy stones works great) of the liner where there are heavy stones. Any folds you have to make while laying the liner should be in the direction of the water flow to the pond. Consider mortaring the rocks to the liner. Loosely placed rocks invite water to flow beneath them rather than over them. Work from the lowest stream section first back up to the top or head. Build the stream walls first and then fit in any courseway rocks. Vary the size of rocks as you lay them for a more visually interesting streambed. Avoid lining up rocks along the perimeter of the pond and streambed. Extend some out into the surrounding terrain and embed them partially in the soil to appear natural.

## Pump Selection and Installation



There are submersible and centrifugal pumps to choose from. The submersible is placed directly in the pond, usually at a small distance from the bottom to prevent silt and debris from clogging the intake. Filter screens are hampered by pond debris and require cleaning occasionally. In early spring and late summer this task is required more often due to algae growth. A fine-meshed screen should be used over the pump inlet to prevent the loss of small fish and tadpoles. An advantage to using a submersible pump is that it is quiet and can also be used to drain the pond when necessary.

The centrifugal, or external pump is placed near the pond and allows better accessibility for routine maintenance and repairs. If the pump fails, there is no water contamination due to loss of oil coolant. It can be a challenge to find a creative way of hiding or masking its location without making it difficult to perform pump maintenance. Centrifugal pumps are notorious for losing their priming water. This results in a requirement to manually fill the impeller housing to restart the pump.

With the increase in the cost of electricity to run pumps, manufacturers have developed high-efficiency pumps. These pumps require less than half the power to operate, but their initial cost can be significantly more than traditional pumps.

Pump size is generally calculated by the gallons per hour (GPH) output at one foot of lift or height. To determine the size pump required for your waterfall project, estimate the vertical height from the top of your pump to the top of the waterfall. In addition to the height, for every ten feet of piping or hosing that the water must be moved, another foot in height must be added to the lift capacity required of the pump. This allows for the loss in volume from resistance within the pipe.

For a reasonable flow of water, a general rule of thumb is to figure your waterfall or stream requirement as 150 gallons per hour per inch width of channel. As an example, if your stream will be twenty inches wide, you will need a pump to produce a flow of 3000 gallons per hour. You can decrease flow through valving but cannot increase it, so it is best to estimate on the high side.

There is a multitude of books and videos on this subject. Grab yourself a few and start planning your dream water feature. Or check out a couple of good websites:

- [Pond Building: A Guide to Planning, Constructing, and Maintaining Recreational Ponds](#). Alabama Cooperative Extension
- List of [Pond Planning and Setup sites](#) at [About.com](#)