

How Much Does It Cost To Build a Proper Koi Pond

by Tom Burton, New Jersey

I've often been asked how much it costs to build a pond and I've learned that there are as many answers as there are questioners. Each pond is unique so there is no good fix on costs. However, there are some things that are necessary and common to any proper koi pond and we can certainly address those and then allude to potential additional costs based on the desires and imagination of the builder.

EXCAVATION: If a professional is hired with a backhoe, expect to pay \$400 to \$600 for a day's work. If you dig it yourself or with free labor, no sweat (well maybe some), it's free.

EPDM RUBBER LINER: The 45 mil thick liner is most commonly used because it's light enough to be handled and put in place by you and a few good friends. The cost is from about 50 cents per square foot up to a dollar. Calculate length plus two sides of the hole plus overage outside, times width plus two sides of the hole plus overage outside. Be sure and leave yourself plenty outside and don't cut any excess until you're absolutely sure it's excess. What you plan to do around the edge of the pond will determine how much overage is needed. A good size for a koi pond is around 23 feet long by 12 feet wide (not too wide - you're going to have to catch fish someday) by 3 feet (minimum) deep and let's leave ourselves 3 feet overage all around. So for this sized pond we need a liner 25' by 35' or 875 square feet, times \$.50 = \$437.50. The water volume of a pond this size is about 6500 gallons. Then when we add in the water in the filter systems, we end up with about 7000 gallons. This is about right and don't be afraid of water volume. It's just as easy to keep 7000 as it is 3000. To determine exactly how much water you've got, use a meter when you initially fill the pond. You must know this so if you ever have to treat the pond for parasites or whatever, you can administer the correct dosage.

BOTTOM DRAINS: Two of the type seen on page 32 of the Tetra Encyclopedia of Koi. These are ready to connect to four inch pipe and have an anti-vortex dome supported by a single center pedestal. The cost is from \$99 to \$140 each depending upon where you buy. This type of drain is designed to work on the principal of water gravity feeding to the filter system. What

that means is that the water in the pond and in the filter chambers are at the same level. Since water will always seek its own level, any reduction on either side will have an identical effect in the other. When we pump from the filter system back to the pond, water from the pond automatically tries to get to the filter system at the same rate. That's the gravity flow principal.

SKIMMER: This can be a swimming pool power skimmer installed just like you would in a liner swimming pool or, one of the small units that mounts on an inch and a half or two inch PVC pipe through the liner to a pump. Either type should have its own dedicated pump but the water from that pump can be routed anywhere; waterfall, stream, returns (through bulkhead fittings in the walls of the pond), filter (even one that requires pressure such as one of the bead variety), etc. etc. The swimming pool type costs about \$100 and the other about \$40.

FILTER SYSTEMS: Note - this is plural. The best way to go is two bottom drains gravity feeding two separate filter systems. This will require a pump for each. There are many, many systems now offered for sale and their level of effectiveness/efficiency runs from nil to perfect with everything in between. One very good system among many, is the Nitritech from England (and available several places in the US). It's composed of three cone bottomed chambers with purges for each, and sells for about \$1200. So for two we've got \$2400. The best place to look for filters is in the advertisements in the Mid-Atlantic Koi Club (MAKC) magazine. Places like Suburban Water Gardens in Long Island and Quality Koi in Philadelphia and Aquatic Creations are three among many other dealers carrying filters for gravity fed systems. Dealers for the several varieties of bead filters will also be found in that publication. Note: Bead filters operate under pressure and are most efficient as the last phase of a filter system (after the pump). Gravity feeding to a settlement phase then a mechanical phase (the actual filtration/extraction process) prior to the bead filter is usually best as this will help avoid clogging.

PUMPS: Again, there are many on the market, all will move water, but for a koi pond, we want one that will move about 2500 to 3000 gallons per hour, is made for use outside the pond



and can stand the weather, and doesn't use too much electricity. So we look for a low Amp and quiet variety. One that is extensively used in the koi hobby because of its low operational cost is the Sequence 1000 in either 1/8th or 1/6th HP form. The cost is \$350 to \$400.

PVC PIPE: We use four inch for the drains, and inch and a half or two inch for most of the rest (purge lines from the filter containers can use three inch drain pipe grade PVC). The two inch is recommended because the flow is greater and the pump doesn't have to work so hard. Standard lengths of rigid PVC comes 20 feet long and can be found at your local plumbing supply house or Home Depot. In Schedule 40 (the white stuff - Schedule 80 is the heavy duty gray stuff) the four inch runs about \$30 while the inch and a half is about \$8 and the two inch is about \$11 a length. You might want to use some flexible PVC in some (or even all) applications. A one hundred foot roll of inch and a half is about \$110 while two inch is \$125. Quantities less than a full roll will cost slightly more per foot. Be sure and use the glue made for flexible though.

VALVES: Knife (gate) valves (the ones with the "t" handle sticking out the top with a blade sort of like a guillotine) are used to open or close pipes (on or off) only. There should be a four inch one in each drain line just before the filter system in order to isolate the system from the pond for periodic cleaning. These valves are also used on purge lines on each section of the filter system to dump the crud from the bottom of the containers. Ball valves are used to control the flow rate and there should be one after each pump. Four inch knife valves cost about \$50. The purges will normally be three inch at \$19, while two inchers are \$13. Ball valves in inch and a half go for about \$11, while the two inchers are about \$14.

ULTRA VIOLET STERILIZER: UV's are used in the koi hobby to get rid of single celled algae that make the water look green. Many factors come into play in choosing the right unit for a given pond; amount of sunlight on the pond, volume of water, fish load, maturity of the biological processing station (it normally takes a couple of years of continuous use before a bio station is really up to speed), etc., etc. However, this device is often the only thing standing between green water and clear water. Cost ranges from \$225 for a 40 watt UV to \$800 for a 160 watt unit (four, 40 watt bulbs in sequence). The pump supplying the appropriate volume of water for the UV could be any one of the three already addressed or an entirely separate one. Flow rate through the UV is very important so in order to get within the most effective flow range for the size unit, a bypass off of a main line is a good way to go using a "Y" with a ball valve for control and a flow meter to know just what were doing. Most manufacturers suggest replacing the bulbs after six months use (the UV is typically used only in the summer) and costs about \$65 for a 40 watt.

FLOW METERS: Knowing how much water each pump is moving tells us how well the system is operating. If for some reason the flow from a pump is reduced, it helps us isolate the problem so we can correct it faster. They cost about \$40 and should be placed a couple of feet down the pipe from the ball valve on the output side of each pump.

AIR PUMPS (HIGH BLOWERS) AND AIR STONES: High oxygen levels are essential to fish life AND the good guy bacteria that live in the biological processing station and consume the toxic ammonia and nitrite that can kill fish if not controlled by these natural organisms. So we use air pumps supplying air through diffusers (air stones) to the filters and, by some koi keepers, directly to the pond to ensure the healthiest environment possible. The pump costs about \$350, each six inch diffuser runs about \$7, with a manifold from which we can run eight airlines about \$20 and 100 feet of airline tubing about \$13.

HEATERS: Koi don't like to be cold. Anything under about 45 degrees I imagine is getting pretty uncomfortable so to promote health and prosperity, it's a good idea to heat the pond. How to do this is a complete topic of discussion in itself but suffice it to say, control of water temperature is a major factor in raising and keeping healthy fish and avoiding the dreaded "Coming out of Winter" symptoms of weakness and illness from lack of food and extreme cold. For DIY folks, heating can be accomplished for about \$500. Then there is a very professional ready made, put it in place and turn on the gas unit that goes for \$2400. MAKC members can help you determine the best approach for your situation.

POTENTIAL ADDITIONAL COSTS: Rocks, bricks, paving stones, plants, trees, shrubs, landscaper's costs, waterfalls, streams, decks, patios, you name it (not to mention FISH!). The list can go on and on. This is not a cheap hobby.

HAVING A PROFESSIONAL BUILD YOUR POND: This can cost from about \$15,000 to the sky's the limit, and if you can afford it, it's probably the best way to go. Beware though of people who tell you they know how. I've been a koi keeper and very active in the club and koi hobby for 10 years and I can still count on one hand the number of people who really know (and that's without using all the fingers). Join the Mid- Atlantic Koi Club and learn what's really entailed before turning the first spade of dirt. You'll save yourselves much grief.

ALTERNATIVES: If the costs to build a koi pond and do it right puts you off or doesn't fit your budget or you just don't want to get so involved, then build a nice water garden (please see the addendum hereto). Water plants are beautiful and the

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costs associated with building such a feature are considerably less than a koi pond. But never, I mean NEVER!!, put koi in there. It will eventually lead to disaster for the fish and heartache for you. Take my word for it. Just add a few single-sexed goldfish (to avoid having hundreds - yes hundreds - of babies in due course) and you'll live happily ever after. A koi pond is a thing of beauty and a joy forever and a water garden is a thing of beauty and a joy forever but their similarity ends with the fact they have water in them.

A WATER GARDEN AND WHAT IT TAKES TO MAKE ONE

A water garden is really a lovely feature in a garden and can give endless hours of pleasure as a visual experience, a source of pride for the selection and arrangement of a vast array of water plants, and an aural source of stress relief by just the right sounds of water flowing or trickling or gently tumbling over a waterfall. For those who have planned this as a part of the total garden concept and combined it with a proper koi pond, the effect is truly dramatic. Part of the water from the koi pond filter systems is directed through the water garden providing mutual benefit by giving nourishment for the plant life from the nitrate rich water (from koi waste) while aiding in elimination of ammonia (that's why its often called a plant filter). So here are the basics:

LINER: Same 45 mil EPDM. If it's part of the same piece there won't be any need to bond the water garden piece to the Koi pond piece.

DEPTH: Two feet. If you want to excavate the hole so that there's a shelf for plant pots to sit on, that's fine. Make it 12 inches below water level (as an example, lots of water lilies only need a six inch covering of water over the pot). Angle the sides no more than 20 degrees so that you can put plants right up against the side so the vegetation can spread out and cover some of the pond perimeter making it look more natural.

SIZE: Less than the koi pond I think is best but as big as you want it, really.

BOTTOM DRAIN: You'll be glad you did but it will only be used when you want to clean out the crud that will accumulate in the bottom over time. It makes it so much easier then getting in there and mucking the thing out. I'd suggest a minimum of a three inch, and preferably a four inch bulkhead fitting in a depression in the center of the water garden with the same size pipe running to waste, controlled by a gate valve buried below the frost line. Access to the "T" handle to open and close it when you want is through a four or six inch piece

of PVC from ground level. A simple "two finger" hook on a stick is all you need to operate it.

PUMPS: Not necessary if this is part of the recirculation from the koi pond. If this is a stand alone without a koi pond, the only pump you need is to operate your waterfall and or streams (or fountains).

SKIMMER: Very nice to have in pollen season especially but useful all the time to keep the surface cleared of debris and dust. The same two kinds mentioned in the koi pond info.

FILTERS? Not necessary. For the few goldfish in the water garden, there's plenty of surface area for the good guy bacteria to live on and, the water plants will take up ammonia as well.

ULTRA VIOLET STERILIZER? Not really necessary except perhaps in early Spring before the plants are fully developed and competing and eventually winning the contest for nourishment with the algae.

HEATERS, AIR PUMPS, FLOW METERS, VALVES? Except for maybe a couple of valves, none of these are necessary in a water garden.

FISH: Goldfish of one sex is the way to go. If you have both sexes living there you're a population explosion just waiting to happen. Goldfish are the rabbits of the fish world and in three to four years you'll have them coming out your ears. But NEVER!!!! put koi in a water garden. Not only will they eat your plants when they get big enough but they'll root in the dirt and make a mess, tip the pots over, have babies, and with all those pots in there (spelled o-b-s-t-a-c-l-e-s) you can't catch them when you need to (and I've never known anyone who didn't need to at some time or another). Just don't do it. ❖

