SETTLING POND SYSTEMS
Basic Layout Strategies and Design Principles

In most lay-outs, the ponds are numbered for easy reference. **The first pond**, Pond No. 1, **will be the pond to receive gray water (cement slurry) from the reclaimer**, and is generally closest to the reclaimer. **This pond will have the dirtiest water**, and will receive and settle out the most cement. Therefore, it will also be the pond which **requires the most frequent clean-outs**.

Ponds are then numbered consecutively, with the largest number pond (i.e. generally 2, or 4) generally being the pond furthest from the reclaimer drain. **The last pond will be the pond with the cleanest water**, and is where the **submersible pump** will be located. This gives **us relatively clean water to pump back to the reclaimer** for further wash-out of waste concrete. It is also the pond which will **require the least amount of clean-outs**.

The overall objective of the pond system is to allow the cement to settle out of the water, to collect the cement, and to clean the water for reuse back at the reclaimer. The water acts like a conveyor belt: it carries the cement particles out of the Reclaimer and into the ponds, where the cement settles out of it. It then travels back to the Reclaimer to begin the cycle again.

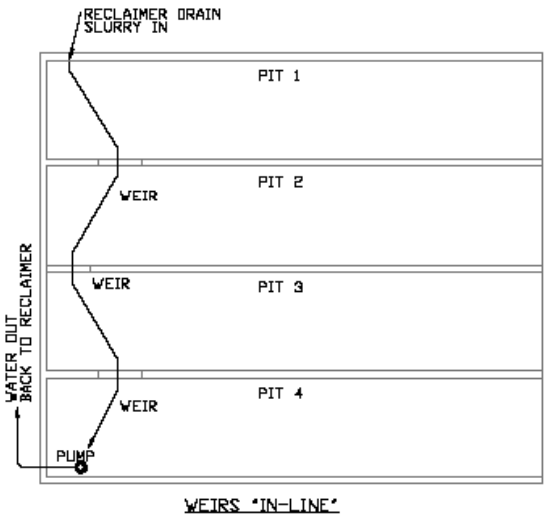
As the slurry stream flows thru the pond system, cement will begin to settle out, which takes time. Therefore**, the longer the ponds, the more settling time available**.

Ponds are separated by walls, which have weirs cut into them. Weirs allow the travel of the slurry stream to flow from one pond to the next. **The purpose of the weirs is to "skim" the top layer of the water/slurry** as it flows between ponds. As the slurry travels thru the system, the solids (cement particles) begin to fall lower in the stream, due to gravity. However, because they are very light weight, it takes a long time for them to fall - they do not fall very far very quickly.

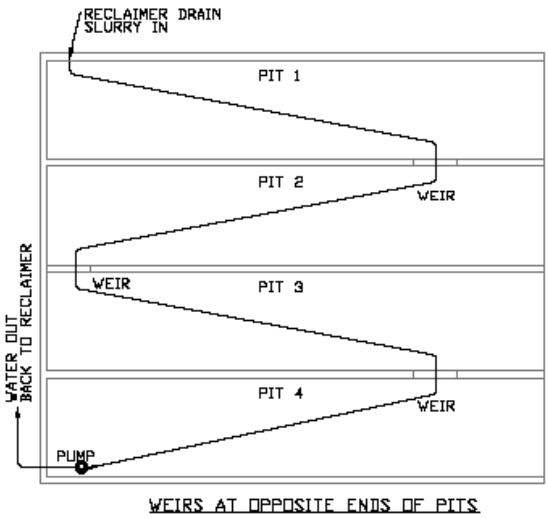
Because of this, the water/slurry stream in the pond system is always cleanest at the surface (and dirtiest at the floor) of the pond, and it is the top layer of water that we want to travel into the next pond. This keeps those cement particles that have dropped lower than the depth of the weir in the current pond, rather than traveling over to the next pond.

Therefore, weirs should be long and shallow. They should not be short and deep, nor should they be below the water surface. A good choice is 72" long, as this gives a flow depth across the weir of approximately 1", or less, a nice shallow flow depth. All particles now suspended lower than 1" in the stream, will hit the pond wall and fall out of the stream.

Additionally, weirs should be **located at opposite ends** of the preceding pond, rather than placed in a line across the width of the pond system. This makes the slurry travel down and back again before entering another weir. If the weirs are in-line with each other, the effective travel time thru the ponds is dramatically shortened.



WEIRS "IN-LINE"



WEIRS AT OPPOSITE ENDS OF PITS

The most frequent questions asked are:

How long…How wide…How deep… do my ponds need to be?
How many ponds do I need, and where do I place the weirs?

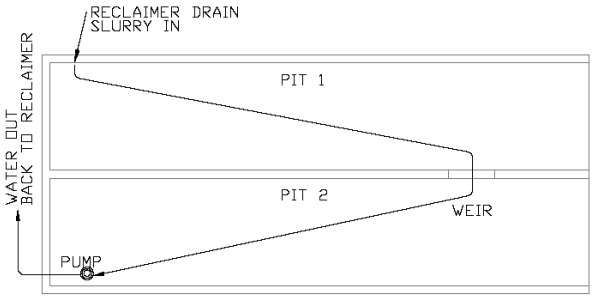
Ponds should be as long, as wide and as deep as is realistic. Their purpose is, of course, to capture cement from the waste slurry stream, and store it until it can be removed.
Use an **EVEN number of ponds (2 or 4)**, not an odd number. An even number is desirable, as **both the drain and the submersible pump should be located in the deep end** of their respective ponds.

The reclaimer **drain needs to discharge into a deep end** in order to collect the maximum amount of cement under the drain. If drained into a shallow end, the cement has nowhere to go, except to keep moving with the water, which will keep it suspended, and make it more difficult for it to settle out.

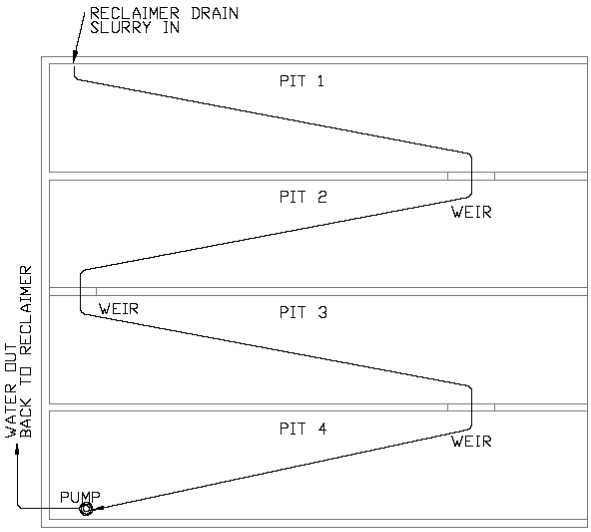
The **pump should also be located in a deep end**, as this will allow for the cleanest water available to be pumped back to the reclaimer.

The drawings show 2, 4 and 3 pond systems. If you follow the water stream thru each, you can see in the 2 and 4 pond systems that we drain into a deep end, the slurry flows down to the next weir, and ends up flowing into the last pond to the pump, which is also located in a deep end.

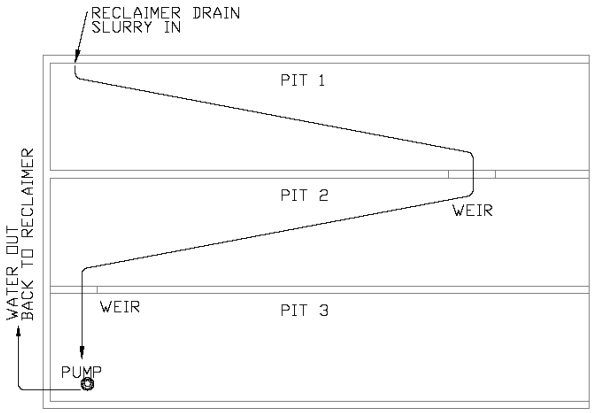
In the 3 pond system, again, we drain into the deep end of pond 1, the water then flows into pond 2; however when it leaves pond 2, the water then flows directly to the pump located in the deep end of pond 3. This makes pond 3 useless, as it does not capture any cement, nor add any settling time to the cement.



2-PIT SYSTEM



4-PIT SYSTEM



3-PIT SYSTEM

Pond system lay-outs are then 2 or 4 pond systems. Which one to use is usually dictated by the lay-out of the facility and the needs of the user.
Two main factors which affect the size and shape of the ponds are:

- **Plant lay-out, esp. traffic patterns**
  Obviously, if trucks are going up to and away from the reclaimer, we do not want that traffic to interfere with trucks attempting to get under the plant.
- **Number of mixer trucks at the location**
  More trucks means more return concrete, therefore more waste cement, therefore a need for more spent cement storage capacity in the ponds.

If a long narrow pond system is dictated (one which can be "pushed back along the back property line" for example), usually a 2-pond system is designed.

If a more "square" shaped system fits better, a 4-pond system is used.

LENGTH

The number of ponds here is not necessarily critical. **What is important is the overall length of the slurry stream from drain to pump**, in other words, how many linear feet of pond are available for the cement to settle out of the slurry.

In most ready-mix applications (using the Model B Snubnose or the Model X1 or X2 Six-Shooter) **200' of travel distance is recommended.** [NOTE: Smaller reclaimers such as the M6 or R2 can get by with shorter ponds – consult factory].

If the long, narrow 2-pond system is required, then 100' long ponds are recommended. If the more square 4-pond system is used, then 50' long ponds are recommended. In either case approx 200' of total pond is available (2 x 100', or 4 x 50').

In certain circumstances, these ponds are still too big to fit into an existing plant. If this is the case, the *minimum recommended length* is 160' of settling.

Recommended:	2-ponds @ 100'	Minimum:	2-ponds @ 80'
	4-ponds @ 50'		4-ponds @ 40'

When the ponds are made shorter, the ponds must be cleaned out more often. It may also result in dirtier water being sent back to the reclaimer, as the cement has not had enough time to settle out.

DEPTH

Ponds should be sloped from grade down to some depth below grade, to allow access for clean-out. It is recommended that pond depth be 6' at the deep end. This allows for the most storage capacity of cement, while still allowing the loader to drive in for clean-out.

Weirs are usually 1' deep by 6' long. This will give a water depth of 5' at the deep end of the ponds.

WIDTH

Pond width is **dictated by the size of the loader at the plant**, and the available room for the overall system "footprint".

They are usually 8', 10' or sometimes even 12' wide.

If you run a loader with an 8' wide bucket, you probably do not want a 12' wide pond, as it becomes more difficult to scoop up the cement (the cement tends to "swim back out" past the sides of the bucket). Usually you will want a relatively tight fit between pond walls and your bucket to minimize this. Figure on **loader bucket width + 2'** (to allow a little "wiggle" room when cleaning out), so an 8' loader would work well in 10' wide ponds.

BFK offers settling pond layout drawings at No Charge. We have hundreds of layouts already completed and are always available to complete a custom layout to fit your plant.

PLEASE CONTACT BFK TO DISCUSS YOUR SETTLING POND NEEDS.

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