Effluent stone-traps (6-25)

A stone-trap is a sealed bunker used for removing heavy solids such as silt, sand, stones and gravel from effluent. Heavy sediments will settle in the stone-trap as liquid flows from an elevated outlet pipe.

Stone-traps are also commonly referred to as sand-traps, grit-traps, or wedges.

Farm dairy effluent contains grit and stone material which can be carried into dairy yards on the feet of cows from farm races and paddocks. If this material is not removed from effluent it can cause excessive wear and tear on pumping equipment and/or mechanical separators. Good, effective stone-trap design and management is imperative to ensuring pump longevity.

![Diagram of effluent system with stone trap](image)

*Figure 1: Common placement of a stone trap in an effluent system.*

**Management**

Stone-traps should be inspected daily to ensure there are no blockages or overflowing occurring. Stone-traps are part of the effluent system that must be compliant 365 days a year.

Stone-traps should be cleaned frequently enough to prevent the overflow of grit and stones to the sump or pond. Using the tractor front end loader is often the easiest method for emptying the grit from the stone-trap. Ensure the design and surrounding area enables easy tractor access and manoeuvring space.

Solids should be stockpiled and dewatered in a sealed bunker which drains back into the effluent system. Dewatered solids can be applied to land using a muck spreader, or spreading onto cultivated ground.

If a stormwater diversion system is used, this must occur upstream of the stone-trap to prevent any effluent from the stone-trap entering any freshwater. If a stormwater diversion system has been installed downstream of the stone trap, it should not be used, as it will be a non-complying discharge to a waterway.
Principles of good design

There are a number of aspects which define a well-designed stone-trap structure. These are as follows:

- The inlet and outlet pipes are located in the deepest part of structure
- The stone-trap is not too deep – it does not need to be any deeper than 1 metre
- The inlet and outlet pipes are on opposing angles. This is to reduce the velocity and energy of incoming effluent. This will ensure that heavier grit and stone material drop out of suspension into the stone-trap

![Figure 2: A pictorial illustration of a stone-trap with dimensions. The inlet is about half the size of the outlet.](image1)

- The trap is built from impermeable (sealed) material such as concrete, so there is no leaching or loss of effluent other than out of the outlet pipe
- The outlet is characterised by a structure such as a weir. The outlet is twice the size of the inlet pipe. This helps to reduce outgoing effluent velocity, thus leaving stones and grit in the trap
- Inlet pipe is only slightly higher than the outlet weir
- Is easy to clean out, and suits the method of cleaning – i.e. width of the trap is wider than the width of the tractor bucket
- If cleaned by a tractor front end loader, the structure should have a gradual slope into the trap for safely reversing out of the trap (no greater than 1:4 with grooved and rough concrete)
- Have a reinforced end wall which is designed to have a front end loader bucket scrape up against it
- Rear and side walls high enough to prevent overflow from the tractor bucket while emptying
- Have an impermeable area adjacent to the trap, for stockpiling and dewatering solids. This should allow liquids to drain back to the stone-trap

![Figure 3: An example of good inlet and outlet locations. Flow is slow with maximum distance between inlet and outlet; grit will drop into the stone-trap.](image2)
Safety measures

Stone-traps can be potentially dangerous as they contain liquid and semi-solids that may not support human weight. Therefore, getting stuck or even drowning in the stone-trap is possible. These stone-traps should be well fenced or covered to prevent children or animals falling in and any other accidental entry. Any concrete areas around the stone-trap should be finished with a rough slip-free surface.

Stone-traps should be included as part of the whole farm hazard identification system.

Figure 4:
A well-designed stone-trap with safety fencing, a dewatering storage pad adjacent to the trap, sloping back into the trap. A raised lip along the front edge of the dewatering pad the rear wall will prevent leachate escaping the system.

Figure 5:
An example of a good safety provision to prevent people and animals from falling into the trap.