# Stormwater Outlet Sediment Traps

**SEDIMENT CONTROL TECHNIQUES**


**Photo 1 – Excavated sediment trap just prior to scheduled clean-out (note energy dissipater at end of pipe)**


**Photo 2 – A supplementary straw bale barrier**

## Key Principles

1. The key objective is to collect sediment in a location where it can be easily and permanently removed from the flow path. If however, sediment is allowed to settle within the stormwater pipe (Photos 9 & 10), then there is the high risk that a significant proportion of this sediment will be resuspended and washed through the outlet sediment trap during the pipe de-silting exercise.
2. The key design features are usually the surface area ($A_s$) of the settling pond, and the distance of separation of the settling pond from the stormwater outlet. This separation helps to minimise the effects of outlet 'jetting', and reduces sediment re-suspension.
3. Sediment collection is primarily achieved through gravity-induced 'sedimentation'; however, the process can be improved by incorporating a filtration system such as a *Filter Tube Dam* (Figures 3 & 4) or *Rock Filter Dam* (Figure 5).
4. The key operation issues include the appropriate management of all safety issues associated with the settling pond; and the regular de-silting of the sediment trap to minimise the risk of sediment re-suspension by subsequent storms.

## Design Information

*Discussion is not provided within this fact sheet on the design of permanent sediment traps.*

The design of stormwater outlet sediment traps primarily depends on the available land space and landfall that exists immediately downstream of the outlet. In situations where land space is limited, then best use should always be made of the available land area to maximise sediment trapping potential.

If the stormwater pipe discharges into an outlet channel with very little fall (Figure 1), then the sediment trap will normally consist of an *Excavated Sediment Trap* (refer to the separate fact sheet on *Excavated Sediment Traps*).

In circumstances where the stormwater pipe discharges at least 300mm above the receiving discharge channel, a *Coarse Sediment Trap* (Figure 3), and/or *Filter Tube Dam* (Figure 4) can be incorporated into the sediment trap to improve the sediment capture process.

In circumstances where the stormwater pipe discharges at least 500mm above the receiving discharge channel, then in addition to the above options, a *Rock Check Dam* or *Rock Filter Dam* can be incorporated into the excavated sediment trap (Figure 5). To further improve the treatment process, *Filter Tubes* can be incorporated into the *Rock Filter Dam*.

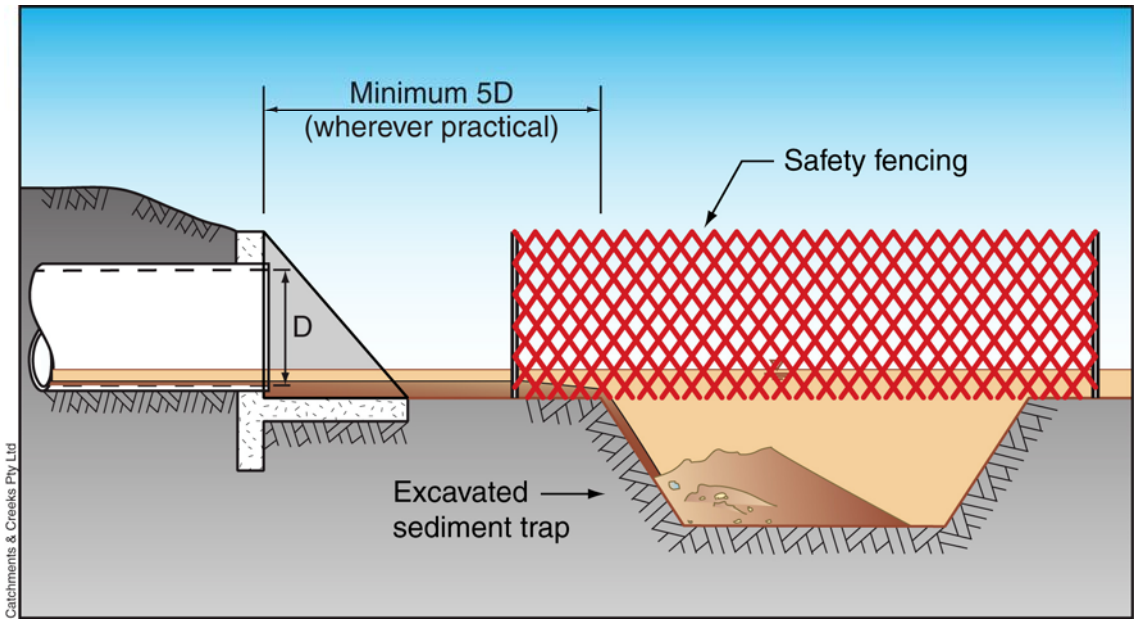



**Figure 1 – Recessed sediment trap suitable for pipe outlet with a pipe invert close to the elevation of the outlet channel**

In circumstances where the stormwater pipe discharges at least 300mm above the receiving discharge channel, a *Coarse Sediment Trap* can be installed within the discharge channel as shown in Figures 2 & 3. If the chamber is partially confined by earth banks (as in Figure 2), then the final sediment fence can be replaced with a more elaborate filtration system (Figure 3). Examples of these alternative outlet structures are provided within the separate fact sheet for *Coarse Sediment Traps*.

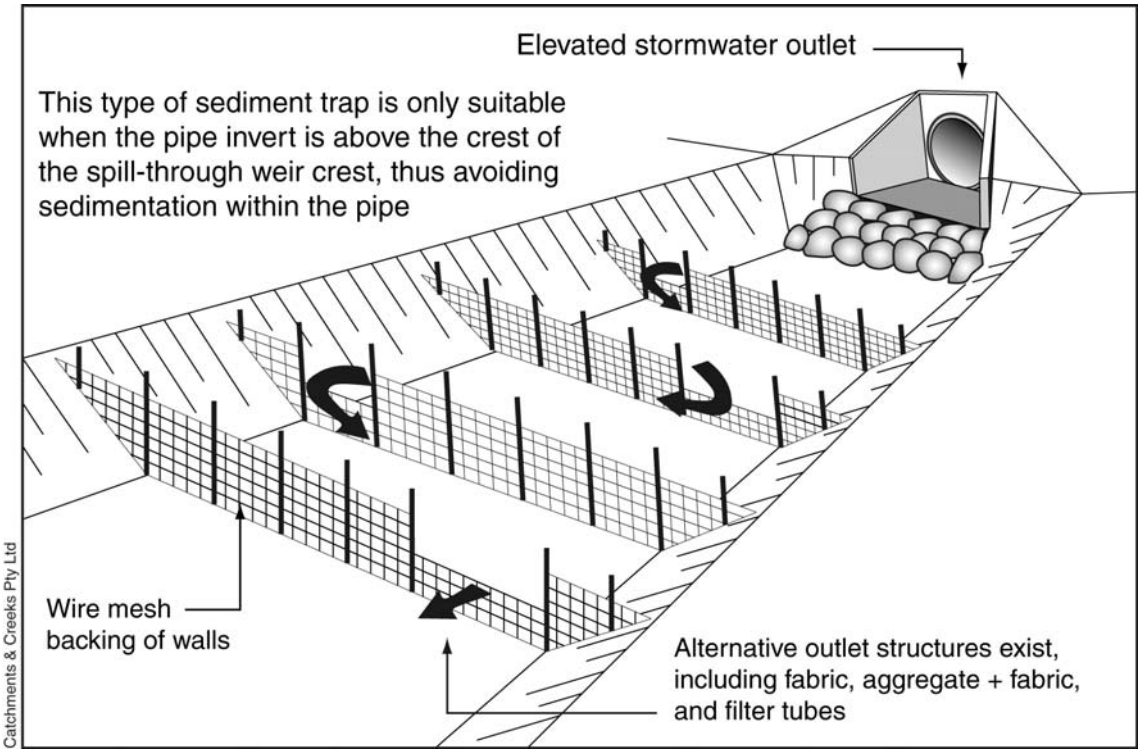



**Figure 2 – Partially enclosed coarse sediment trap located at a stormwater outlet**

Photos 3 to 10 show examples of temporary sediment trap located on stormwater outlets.

Photos 11 to 18 show examples of permanent sediment traps located on stormwater outlets.

Figure 3 shows an example of a *Coarse Sediment Trap* placed downstream of an elevated stormwater outlet.

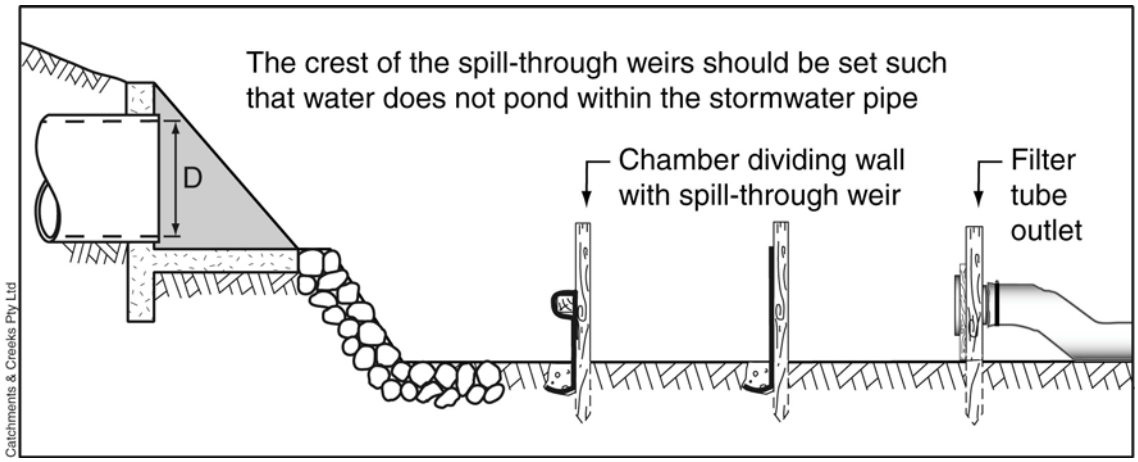



**Figure 3 – Coarse sediment trap placed downstream of an elevated stormwater outlet**

Figure 4 shows an example of a *Filter Tube Dam* placed downstream of an elevated stormwater outlet.

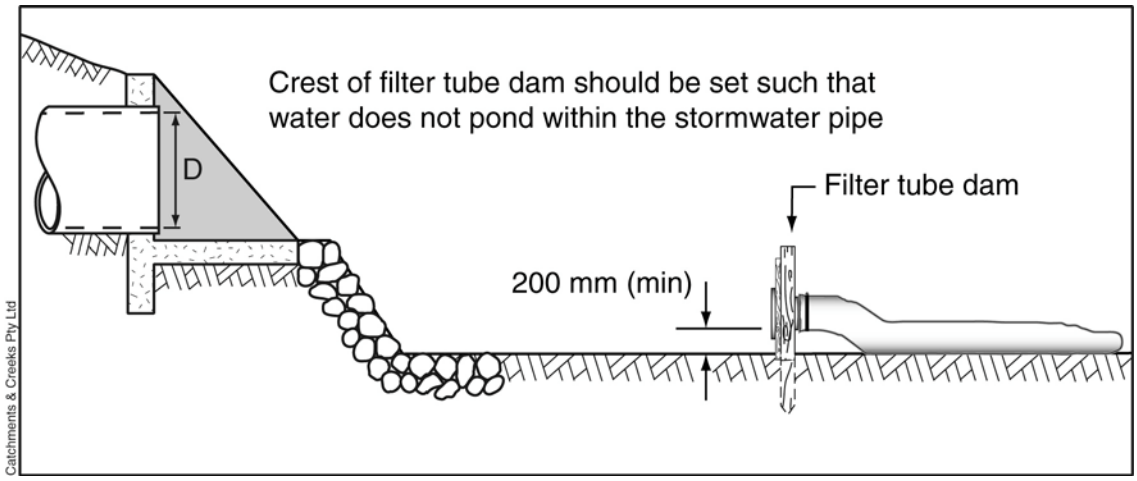



**Figure 4 – Filter tube dam placed downstream of an elevated stormwater outlet**

Figure 5 shows an example of a *Rock Filter Dam* placed downstream of an elevated stormwater outlet.

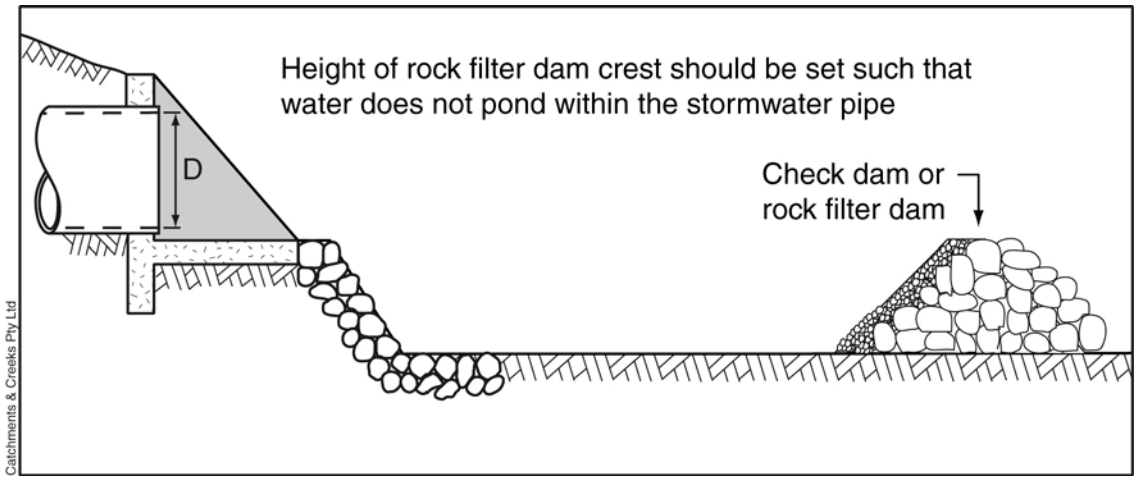



**Figure 5 – Rock filter dam placed downstream of an elevated stormwater outlet**


**Photo 3 – Note temporary gabion wall**


**Photo 4 – Coarse sediment trap**


**Photo 5 – Pipe outlet sediment trap**


**Photo 6 – Temporary mini wetland**


**Photo 7 – Filter tube dam placed down-slope of stormwater outlet**

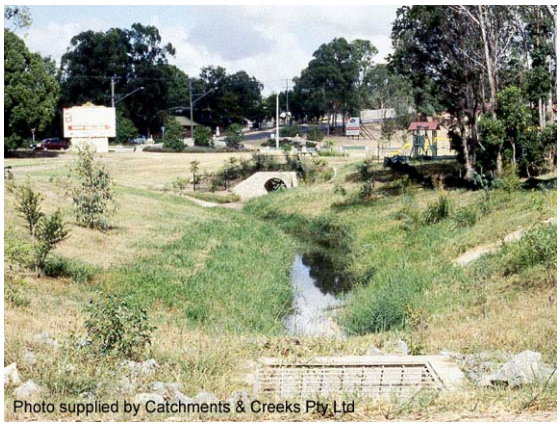



**Photo 8 – Temporary conversion of an outlet swale into a sediment basin**


**Photo 9 – Sediment should <u>not</u> be allowed to collect within the pipe**


**Photo 10 – Straw bales are rarely effective and often fail during storms**


**Photo 11 – Outlet sediment trap during construction phase**

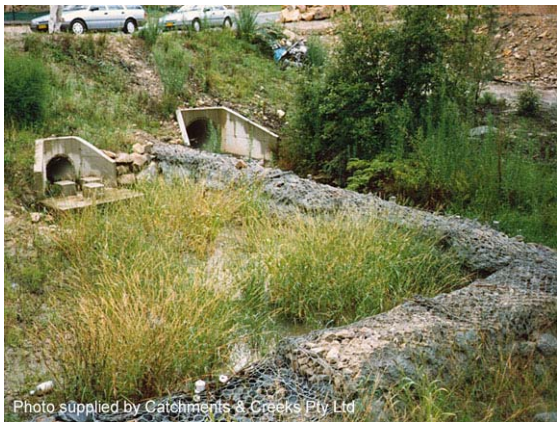



**Photo 12 – Same trap (Photo 11) during operational phase**


**Photo 13 – Coarse sediment trap collecting sediment from road discharge**


**Photo 14 – Same sediment trap (Photo 13) after several years**


**Photo 15 – Mini wetland outlet system**


**Photo 16 – Open gross pollutant trap**


**Photo 17 – Enclosed gross pollutant trap**

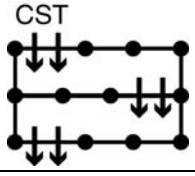
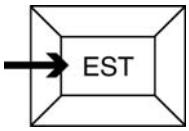
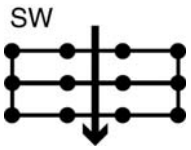

**Photo 18 – Major wetland outlet system**

Table 1 outlines the attributes of various **temporary** sediment control techniques that may be suitable for placement at the outlet of stormwater pipes. Extreme care must be taken when selecting the preferred technique as not all of the techniques are suitable in all circumstances.

When locating a sediment trap at the outlet of a stormwater pipe, the sediment trap should ideally be located downstream of the influence of outlet 'jetting' (i.e. 10–13 x pipe diameters downstream of the outlet). As a minimum, the sediment trap should be located at least 5 pipe diameters downstream of the outlet (Figure 1).

All sediment traps must be located totally within the relevant property boundaries unless otherwise approved in writing by the appropriate regulatory authority and land owner.

**Table 1 – Sediment control techniques at the outlet of stormwater pipes**

| Technique | Code | Symbol | Typical use |
|---|---|---|---|
| Coarse Sediment Trap | CST |  | • Type 3 sediment trap.<br>• Best used on sandy soils.<br>• Only suitable if the outlet is elevated at least 300mm above the outlet channel. |
| Excavated Sediment Trap | EST |  | • Supplementary sediment trap.<br>• Best used when it is necessary to avoid backwater ponding and thus sedimentation within the stormwater pipe.<br>• Safety issues may require the excavated pit to be surrounded by appropriate safety fencing. |
| Filter Tube Dam | FTD |  | • Type 2 or 3 sediment trap.<br>• Only suitable if the outlet is elevated at least 300 to 500mm above the outlet channel.<br>• It may not be practical to incorporate enough *Filter Tubes* to cater for the expected design flow rate. In such cases the sediment trap may only be considered a Type 3 system.<br>• A supplementary (coarse) sediment trap may be required upstream of the filter tubes to prevent sediment blockage of the filter tubes. |
| Modular Sediment Trap | MST |  | • Type 3 sediment trap.<br>• Modern replacement for *Straw Bale Barriers*.<br>• Capability of accepting concentrated flows depends on construction technique. |
| Sediment Weir | SW |  | • Type 2 sediment trap.<br>• Best used when high flow rates are expected.<br>• *Filter Tubes* can be incorporated into the *Sediment Weir* to improve the treatment of low flows.<br>• Gabion walls (Photo 3) can be used as an alternative to a *Sediment Weir*. |
| Straw Bale Barrier | SBB |  | • Type 3 sediment trap.<br>• Only suitable when poor site access prevents the use of other, more suitable, sediment traps. |