

# Outlet Protection

Stormwater in drainage ways often has too much scouring power for vegetation to withstand. Outlet protection helps keep soil and vegetation in high flow areas from washing away.

## Lets get technical

Outlet Protection should be constructed at the daylight ends of stormwater drainage pipes. Discharge flows from collected runoff create higher velocities, which cause erosion of most species of grass. The width and length of protection provided is a function of discharge rate and velocity of flow from the pipe. Protection is also provided upstream of the pipe culvert, to reduce the tendency for “head-cutting” into the upper channel caused by the turbulence of water in a channel trying to enter the inlet end of the pipe.

Numerous products are available for use in outlet protection. Rock, turf-reinforcement mat, concrete, concrete block, even mat-reinforced sod can be used, depending on circumstances. Drop spillways and energy dissipation cells are sometimes used to break up the flow and reduce velocity so that grassed conveyances can be used downstream. Some block spillways contain cells which retain soil and can be vegetated with grass cover, nearly covering the block portion. Typical flow velocities from storm drainage pipes exceed 10-15 feet per second, where good grass can only withstand sustained velocities of 3-4 feet per second.

