

Storm Water Protection During Culvert Construction

By design, culverts transport storm water and snow melt from roadway areas for discharge downgrade into a storm drain system or natural watercourse. Diverting water into a pipe decreases the volume of water that flows across open land, thereby reducing the potential for erosion and sediment that is transported to the outfall point. Often overlooked, however, is the potential for erosion and sediment discharge which may occur during a rain event as culvert construction proceeds. This bulletin reviews strategies and Best Management Practices (BMPs) for protecting pipes during culvert construction.

Best Strategy: Scheduling

Scheduling (SS-1) is the most important consideration when planning culvert construction. If feasible, schedule culvert construction during the non-rainy season to minimize the potential for sediment-laden discharges. This practice also facilitates construction by minimizing rain delays and additional work such as bypass flow operations in existing drainage systems.

Backup Strategy: Protection

Culvert construction generally begins at the outlet and proceeds upslope. If construction during the rainy season cannot be avoided, it may be necessary to construct a bulkhead across the end of the upgrade section of pipe to prevent sediment discharges during rain events from entering the pipe. Bulkheads can be constructed using steel plates backfilled with soil or secured by sandbags, or plywood secured by sandbags.

The bulkhead must be fitted snugly against the culvert end. Grouting with mortar may be needed to ensure storm water or sediment does not enter the pipe. Storm water can be diverted from culvert trenches using earth dikes, earth drainage swales, and earth berms (SS-9), or sandbag barriers (SC-8). Spoil material from the excavation operation can be used for this purpose. Remember that stockpiles of excavated material must be protected per WM-3, Stockpile Management. (See Vol. 6 No. 2, February 2002, for more information.)

Last Resort Strategy: Minimizing Sediment in Discharges

When culverts are needed for drainage during construction, filter fabric can be installed over the pipe end to allow storm water to enter the pipe while minimizing the potential for sediment discharge. Filter fabric can be secured to culvert ends with steel bindings using a banding machine.

When filter fabric is used with a larger pipe (> 900mm), it may be necessary to stack several layers of gravel bags inside the pipe end to support the fabric and to prevent the fabric from being washed into the pipe, while still allowing drainage.

If it is necessary to use a culvert during construction, and the culvert discharges into an unlined drainage facility, it is of critical importance to ensure that outlet protection is in place (e.g., flared-end section, rock dissipation device, etc.) per SS-10.

To prevent sediment from entering the pipe, it may also be necessary to stabilize the trench slopes at the pipe entrance with plastic covers or geotextiles (SS-7) using a method similar to SC-10, Storm Drain Inlet Protection, Type 2 - Excavated Drop Inlet Sediment Trap.

Inspection and Maintenance

As with all storm water BMPs, inspect and maintain pipe protection before and after rain events:

- Ensure that bulkheads fit snugly against pipe ends.
- Check filter fabric for deterioration and replace as needed.
- Make sure that earthen berms are adequate to divert potential flows.



During construction, unprotected pipes can transport significant amounts of sediment to a storm



This culvert should be protected with a bulkhead prior to a rain event to prevent sediment-laden



Spoil material is used to construct a dirt berm along the culvert to prevent sediment-laden storm



The filter fabric secured to this pipe end allows drainage during construction and minimizes

- Check outlet protection and dissipation devices.

