



City of Berea, KY
Stormwater Best Management Practices

Sediment Control Practices

SMP 4.3.8 Slope Drains

SD
 Symbol

SD



Description The slope drain is constructed of pipe or lined (rock or concrete) channel that extends from the top of a cut or fill slope to the bottom. This practice is used to direct and intercept storm water runoff to a controlled path to minimize slope erosion.

Application Storm drains may be used on land development sites where slopes are steep or susceptible to erosion.

Design ➤ Pipe capacity should be designed using the 10-year 24-hour storm or size chart listed below.

Drainage Area (acres) Pipe Diameter (in.)

0.5	12
1.5	18
2.5	21
3.5	24
5.0	30

- Use heavy-duty materials such as corrugated plastic pipe or corrugated metal pipe.
- Conduit should be staked down at intervals equal to or less than 10 feet.
- Extend conduit beyond the toe of the slope.
- A standard flared-inlet pipe should be used at the entrance.
- Fittings should be water tight.



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- Design (cont'd)**
- **General**—It is very important that these temporary structures be sized, installed, and maintained properly, because their failure will usually result in severe erosion of the slope. The entrance section to the drain should be well entrenched, staked down, and stable so that surface water can enter freely. The drain should extend downslope beyond the toe of the slope to a stable area or appropriately stabilized outlet.
 - **Pipe capacity**—The pipe should be able to handle peak flow from the 10-year, 24-hour storm. Use 10-inch diameter or larger pipe to convey runoff from areas up to one-third acre; 12-inch or larger pipe for up to half-acre drainage areas, and 18-inch pipe for areas up to one acre. Multiple pipes or channels are often required for large areas, spaced as needed.
 - **Conduit**—Construct the slope drain pipes from heavy-duty, flexible materials such as non-perforated, corrugated plastic pipe, or open top overside drains with tapered inlets, or corrugated metal pipe (CMP). Install reinforced, hold-down grommets or stakes to anchor the conduit at intervals not to exceed 10 feet with the outlet end securely fastened in place. CMP or corrugated plastic pipe must have one anchor assembly for every 20 feet of slope drain. The conduit must extend beyond the toe of the slope.
 - **Entrance**—Construct the entrance to the slope drain of a standard flared-inlet section of pipe with a minimum 6-inch metal toe plate. Make all fittings watertight. A standard Tsection fitting can also be used at the inlet. An open top flared inlet for overside drain can also be used.
 - **Temporary diversion**—Generally, use an earthen diversion with a dike ridge or berm to direct surface runoff into the temporary slope drain. Make the height of the ridge over the drain conduit a minimum of 1.5 feet and at least 6 inches higher than the adjoining ridge on either side. The lowest point of the diversion ridge should be a minimum of 1 foot above the top of the drain so that design flow can freely enter the pipe.
 - **Outlet protection**—Protect the outlet of the slope drain from erosion with an energy dissipator. (i.e., rock apron or other armoring).

Construction Specifications

A common failure of slope drains is caused by water saturating the soil and seeping along the pipe. Proper backfilling around and under the pipe haunches with stable soil material and hand-compacting in 6 inch lifts to achieve firm contact between the pipe and the soil at all points will reduce this type of failure.

- Place slope drains on undisturbed soil or well-compacted fill at locations and elevations shown on the plans.
- Slightly slope the section of pipe under the dike toward its outlet.
- Compact the soil under and around the entrance section in lifts not to exceed 6 inches.



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- Ensure that fill over the drain at the top of the slope has a minimum depth of 1.5 feet and a minimum top width of 4 feet. The sides should have a 3H:1V slope.
- Ensure that all slope drain connections are watertight.
- Ensure that all fill material is well compacted. Securely fasten the exposed section of the drain with grommets or stakes spaced no more than 10 feet apart.
- Extend the drain beyond the toe of the slope and adequately protect the outlet from erosion.
- Make the settled, compacted dike ridge no less than 1 foot higher than the top of the pipe inlet.
- Immediately stabilize all disturbed areas following construction.

Maintenance

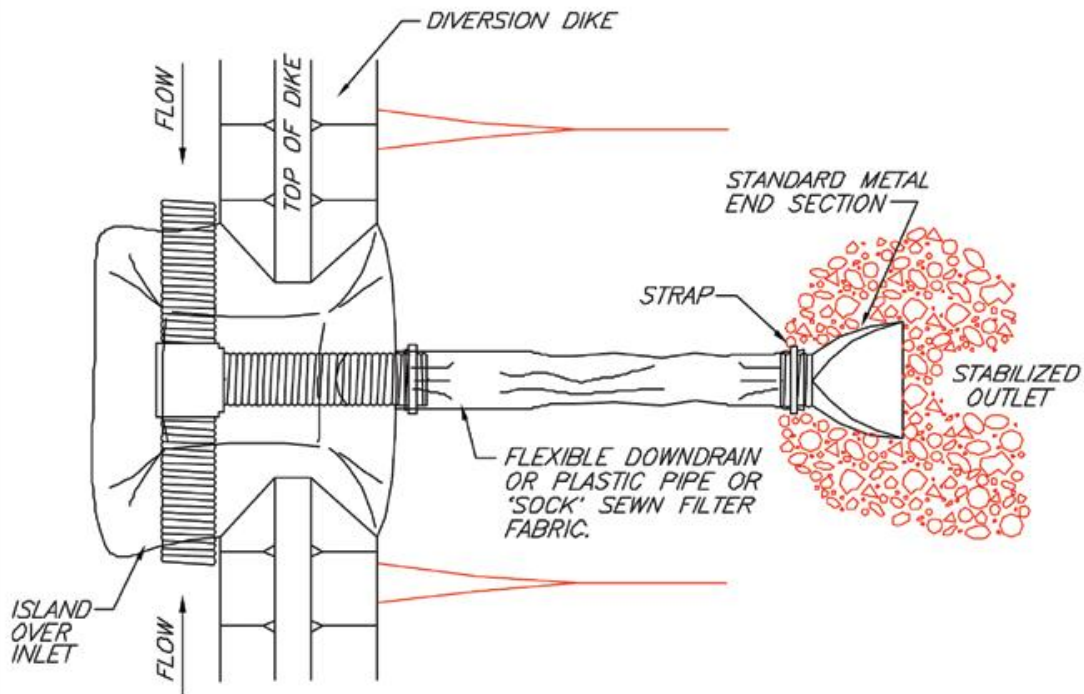
- Inspect slope drains and supporting diversions weekly and after every significant rainfall and promptly make necessary repairs.
- After stabilization remove temporary measures.
- Re-set or replace displaced stones after wet weather events.
- Remove sediment accumulation from slope drain inlet, channel, and outlet.
- When the protected area has been permanently stabilized, temporary measures can be removed, materials disposed of properly, and all disturbed areas stabilized appropriately

Inspection

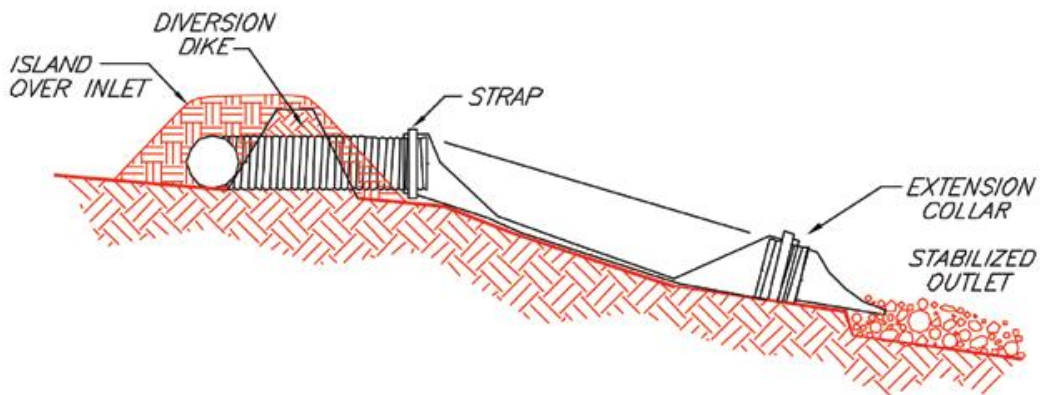
- ☐ Stones that have been displaced by wet weather events have been re-set and/or replaced.
- ☐ Pipe connections are watertight.
- ☐ Inlet/outlet has been cleaned and properly maintained.
- ☐ Remove sediment accumulation from channel.
- ☐ Construction traffic removed from slope drain.



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PLAN VIEW



SECTION

SLOPE DRAIN

SOURCE: SALIX APPLIED EARTHCARE –
EROSION DRAW 5.0

Figure SMP08-1. Slope Drain Installation
Kentucky Construction Site BMP Planning and Technical Specifications Manual