



This fairly steep, 50 acre watershed part of the field required three narrow-based berms to protect against rill erosion. The berms, which are parallel to each other and are permanently vegetated, have reduced soil erosion by 75%.



Erosion Control Structures

Erosion control structures are used to manage surface runoff and soil loss. Water and sediment control basins, diversion terraces, and grassed waterways are the most common upland erosion control measures that can be implemented, depending on the size of the watershed and type of erosion (i.e., sheet, rill or gully erosion).

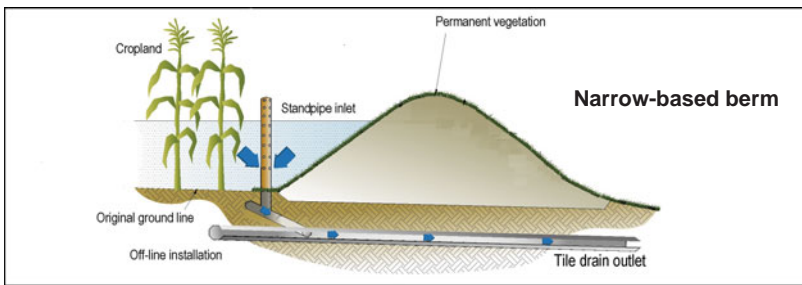


Proper design is essential to ensure effective erosion control.

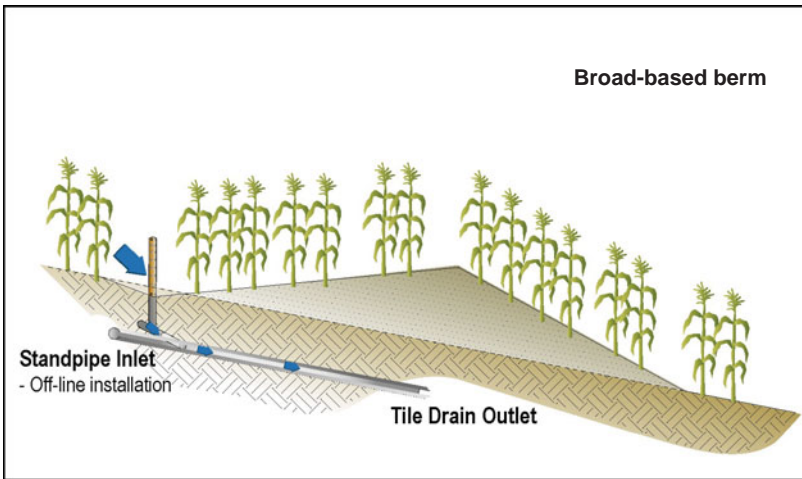
Planning, Design, and Construction

The planning, design and construction of erosion control structures should be carried out by qualified professionals. Working with someone experienced in soil erosion control, such as conservation authority staff or a certified erosion control contractor, will ensure that site specific conditions are taken into consideration to design an effective erosion control structure for your field. For information and to find a qualified professional, see the “Additional Information” section below.

An erosion control structure should be combined with upland management practices that limit soil erosion, such as crop rotation, conservation tillage practices, perennial crops and cover crops. Lack of these practices will limit the performance and longevity of an erosion control structure.



A narrow-based berm is permanently vegetated but crops can be grown on either side.



A broad-based berm is designed so the crop can be grown over the berm.

Water and Sediment Control Basins

A water and sediment control basin (WASCoB) is an earthen berm that spans a natural drainage way. It is designed to intercept and temporarily pond concentrated runoff. The ponded water is slowly released (in under 24 hours) through infiltration or a standpipe inlet that discharges into a tile drainage system. The capacity of the tile drainage system must be large enough to drain all of the ponded areas.

Where rill erosion is being experienced in watersheds of up to 25 acres (10 ha), a single WASCoB could be considered. If the watershed is larger than 25 acres, a series of WASCoBs may be required. The number and size of each structure is based on drainage area, slope, soil type, and farm management.

The berm can be a broad-based or a narrow-based in cross-section.

- Broad-based berms are designed with a 10:1 (horizontal : vertical) side slope, which enables the berm to be cropped.
- Narrow-based berms are designed with a 2:1 side slope and are permanently vegetated.

The subsoil used to build the berm should:

- Have a minimum 10% clay,
- Be free of stones and other debris,
- Be compacted adequately.

If possible, always install the tile drainage system prior to moving earth.

WASCoB Maintenance

Regular maintenance is essential to ensure the long-term integrity of the WASCoB.

- Inspect the berm, inlet and tile drainage system on occasion for burrowing animals, cracking, settlement and other concerns.
- Consider mowing occasionally to control woody vegetation.
- Protect the ponding area from excessive sedimentation by using crop rotations, conservation tillage practices and cover crops. Remove excess sediment build up within the ponding area to keep the system working at its best.
- Check the emergency spillway, especially after extreme runoff events, and immediately make necessary repairs.



Conservation tillage, crop rotations and the use of cover crops can help prevent excessive sedimentation in the ponding area of the berm. To ensure proper functioning of the berm, remove excess sediment from the ponding area and clean crop residue from standpipe inlet.

Diversion Terraces

A diversion terrace is a structural method used to control sheet erosion. These low, berm-like structures are permanently grass covered and work by breaking up a slope. A diversion terrace intercepts surface runoff and diverts the water underground into a tile drain, or overland to a protected outlet via a grassed channel on the upslope side of the terrace.

Grassed Waterways

When the contributing drainage area is larger than 35 acres (14 ha), a grassed waterway is recommended. A grassed waterway is a broad, shallow, permanently vegetated channel that conveys runoff during rainstorms and snowmelt to a stable outlet. The waterway should follow the natural drainage way to protect against rill and gully erosion.

A grassed waterway is not a swale or drainage way left in grass; rather, the channel is designed to fit the characteristics of the watershed and is intended to carry surface runoff from a 10 year frequency storm. Generally, side slopes of 10:1 are recommended, which allows for farm machinery to easily pass. Protect drainage tile by offsetting from the centre of the grassed waterway.

Maintaining Diversion Terraces and Grassed Waterways

Regular maintenance is required to ensure the ongoing, long-term functioning of diversion terraces and grassed waterways.

- Inspect the structures at least annually as well as after large storm events and make any needed repairs.
- Establish and keep a dense, vigorous cover of grass through regular mowing, fertilizing and over-seeding.



A grassed waterway is a broad, shallow, permanently vegetated channel that conveys surface runoff to a stable outlet.

The Do's and Don'ts of Grassed Waterways

Do -

- Raise farm implements when crossing the waterway
- Harvest forage crops from the grassed waterway
- Bring crop rows into the grassed waterway at an angle, if possible.

Do Not -

- Don't spray the grassed waterway with herbicide
- Don't use the waterway as a travel lane or as a turn strip during field operations
- Don't establish head rows along the waterway

Additional Information

To find your local conservation authority, please visit:

<http://www.conservation-ontario.on.ca/about-us/conservation-authorities/ca-contact-list>

To find a certified erosion control contractor, please visit:

<http://www.omafra.gov.on.ca/english/engineer/facts/soilerosioncontractors.htm>

For more information on erosion control structures, please visit:

<http://www.omafra.gov.on.ca/english/landuse/erosion.htm>