



What are Flow Controls?

Flow controls are structures used to manage the flow of water within and leaving agricultural drainage projects. Flow control types can vary, but the most common type is a berm with an appropriately sized standard culvert that reduces or throttles the flow from the drainage works. Flow controls can also be gated structures, weirs, and engineered structures depending on the project. Flow controls require a sufficient storage area immediately upstream to temporarily store peak runoff volumes.

Flow controls are designed to manage flow rates up to a weather event size of 1 in 5-10 years. Depending on the landscape and the extent of drainage in the area, runoff events beyond a 1 in 10 year event are likely to overtop the constructed flow controls resulting in some flooding. As runoff events get larger; 1 in 50, 1 in 100, 1 in 500 years, the presence of drainage works will have a diminishing impact on total runoff volumes. In these large event sizes, flooding is expected to occur in a similar manner to an undrained basin.



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When are flow controls required?

Most drainage projects will require flow controls as a condition of the approval. The number and size of flow controls will be determined by the size of the project, the area of drained acres and the local topography. Most network projects over a quarter section in size will require flow controls.

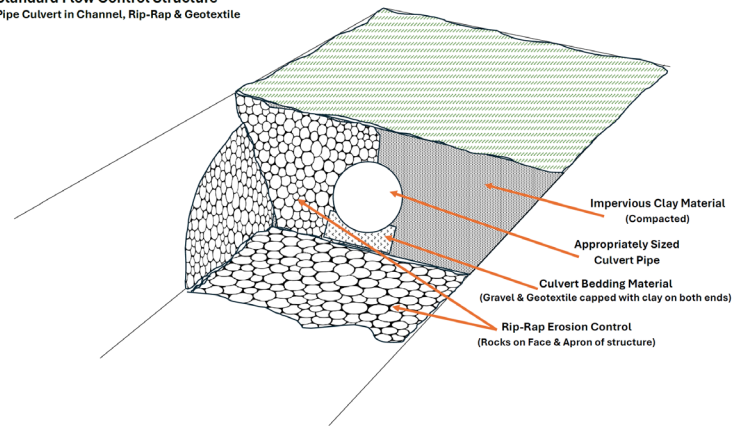
Why would I want to slow down the flow of water?

Although the goal of drainage is to remove excess water from the landscape, responsible drainage includes flow controls to manage downstream flooding and erosion impacts. By reducing or “throttling” the peak flow rates and providing temporary storage, water leaves the land in a controlled manner reducing impacts.

All drainage works must receive an approval to be operated and many approvals will require that flow controls be in place.

How are flow controls designed?

In 2025, WSA implemented an updated procedure for designing flow controls. This updated process includes enhanced technical methods for calculating the appropriate culvert size, temporary retention basin, and berms to effectively manage peak runoff volumes.



Flow Control Design and Construction

Although there are several styles of flow controls, these are the most common types of flow control structures used in agricultural drainage projects.

Standard culvert flow controls are the most common type of flow control. Their straight-forward construction, simple design and low cost make them the ideal water management structure. The structure is usually constructed at the outlet of a drained wetland. A standard culvert flow control consists of an armored compacted earthen berm with a culvert through it. The culvert through the berm is appropriately sized for the contributing area. Standard flow controls do not require engineering and will often be built by landowners using standard designs provided by WSA.



Gated culvert flow controls are constructed very similarly to standard culvert flow controls with the addition of a gate attached to the upstream side of the culvert. The intent is to temporarily store water until the peak has passed the Point of Adequate Outlet (PAO) and then release the runoff to alleviate peak flows downstream. Gates can also be used within projects to stage the release of water to manage flows throughout a drainage project. Most gated flow controls will not require engineering and will often be built by landowners using standard designs provided by WSA.



Tile drainage can be used as a flow control where the pipe is of a small diameter with areas to temporarily store runoff. Tile can be installed in a full field pattern tile or in a targeted system. Full field systems typically cover the field from corner to corner or are specifically under an irrigation pivot. Targeted tile systems will target problem areas of the field, where saturated or saline soils are reducing crop productivity. Soil type, amount and size of tile, and precipitation all have an impact on tile flow rates. Tile drains will only remove the free pore space water from the soil. If the soil is not saturated, the tile will not discharge water.



Who is responsible for maintenance and operation of the flow controls?

The drainage approval holder (in most cases the landowner) is responsible for the maintenance and operation of the flow controls, as outlined in the conditions of their drainage approval.

Client Services

Have a water project? Wondering what the next step is?

Reach out to our Client Service Agents by email at client.service@wsask.ca or call 1.866.727.5420.