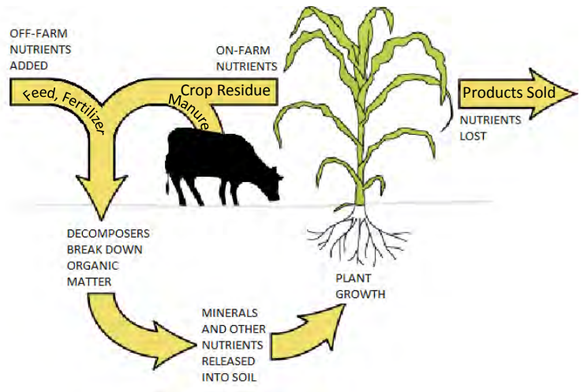
5A. Nutrient Management Plan

A Nutrient Management Plan (NMP) sets out how nutrients will be managed for crop production, while minimizing the loss of crop nutrients to water resources and/or the atmosphere. These plans are prepared in collaboration with the producer and are designed to help the producer with systematic implementation and maintenance activities associated with the plan. NMPs must be developed by a Technical Service Provider (TSP) certified in NRCS TechReg for CAP 104 Nutrient Management Plan. NMP development cost-share and **(5B.)** implementation (NRCS CP 590) incentives are eligible for plans to be used on fields for which controlled subsurface drainage, a denitrifying bioreactor and/or replacement of open tile inlets is planned.



Available State Cost-Share

- BWSR Clean Water Fund grants to Local Government Units (LGUs) require a minimum 25% non-state match for the following practices: CAP 130 Drainage Water Management Plan; Structure for Water Control (CP 587); Denitrifying Bioreactor (CP 747); CAP 104 Nutrient Management Plan: and Subsurface Drain (CP 606) - alternative tile inlet. Check with your participating LGU for cost share rates.
- An incentive payment is available for Drainage Water Management Operation (CP 554) where controlled subsurface drainage structures have been installed, at $7.58 per acre per year for the first three (3) years of implementation/ operation, up to a maximum of 300 acres per cooperator. A CAP 130 Drainage Water Management Plan is required.
- An incentive payment is also available for Nutrient Management (CP 590) implementation on fields where controlled subsurface drainage and/or denitrifying bioreactors are implemented, and/or where existing open tile inlets are replaced. A CAP 104 Nutrient Management Plan is required. The incentive payment for the first three (3) years of implementation is $5.44 per acre per year for CAP 104 acres without manure and $10.78 per acre per year for CAP 104 acres with manure, up to a maximum of 300 acres per cooperator.

Additional Resources

- Minnesota Board of Water and Soil Resources http://www.bwsr.state.mn.us/
- Questions and Answers about Drainage Water Management for the Midwest http://www.mn.nrcs.usda.gov/technical/eng/Drainage water.html
- NRCS Conservation Activity Plan—Drainage Water Management Plan (CAP 130)
- NRCS Conservation Practice Standard—Drainage Water Management (CP 554)
- NRCS Conservation Practice Standard—Structure for Water Control (CP 587)
- NRCS Interim Conservation Practice Standard—Denitrifying Bioreactor (CP 747)
- NRCS Conservation Practice Standard—Subsurface Drain (CP 606)
- NRCS Conservation Activity Plan—Nutrient Management Plan (CAP 104)
- NRCS Conservation Practice Standard— Nutrient Management (CP 590)

Found in the **NRCS Field Office Technical Guide (FOTG)** http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/

Local Contact Information

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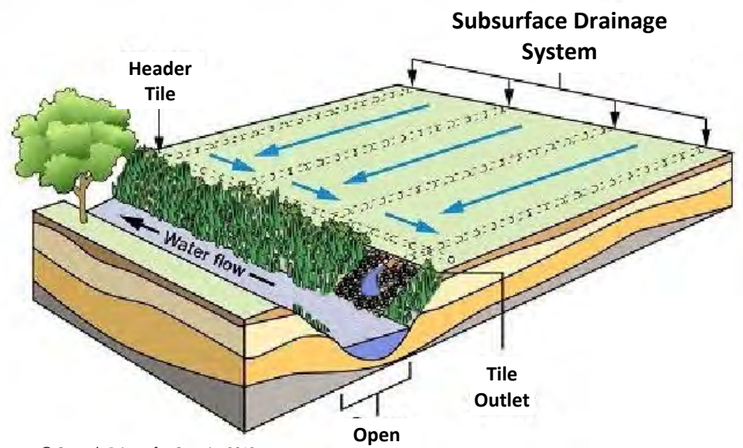
Minnesota Board of Water & Soil Resources

BWSR Conservation Drainage Program: Drainage Water Management Grants FY 2013

CLEAN WATER LAND & LEGACY AMENDMENT

Introduction

Subsurface tile drainage is a water management practice increasingly utilized in agricultural fields in Minnesota to improve field access for planting and harvesting and to increase crop production. At the field scale, tile drainage typically reduces surface runoff by increasing subsurface runoff, and increases total annual runoff volume by reducing water availability for evaporation, primarily during the spring and fall when crops are not growing. Conventional tile drainage can increase the loss of soluble crop nutrients from fields, such as nitrate nitrogen and soluble phosphorus, as well as increase the transport of herbicides, pesticides and pathogens. Increased runoff volume can, in turn, increase the risk of downstream flooding and sediment transport. The purpose of this document is provide information to financial and technical assistance providers and farm operators about conservation practices that reduce the impact of tile drainage on the environment while maintaining or enhancing productivity.



What's New?

The 2012 Legislature provided additional Clean Water Funds for FY 2013 to the Board of Water and Soil Resources (BWSR) in Chapter 264, Section 7 (d) for the Conservation Drainage Program, with the intent to be used for Drainage Water Management (DWM) in coordination with Natural Resources Conservation Service (NRCS) practice standards. The appropriation language also allows the use of Conservation Drainage Program funding for water quality improvement practices on new tile drainage systems. Previous appropriations only allowed retrofitting of existing drainage systems. The BWSR Conservation Drainage Program and NRCS Environmental Quality Incentive Program (EQIP) funds will not be used for new tile, with the exception of dense pattern tile replacing existing open tile inlets for the BWSR program.

Drainage Water Management Plans and Practices

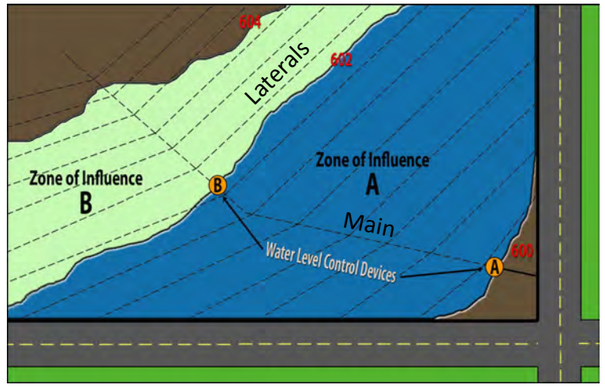
Conservation practices and strategies have been developed to reduce water quantity and quality impacts of subsurface tile drainage, as well as surface drainage. BWSR Drainage Water Management (DWM) Targeted Grants incorporate a suite of NRCS Conservation Activity Plans (CAPs) and Conservation Practices (CPs):

1. Drainage Water Management Plan
2. Drainage Water Management - Controlled Subsurface Drainage
3. Denitrifying Bioreactor
4. Subsurface Drain - Alternative Tile Inlet
5. A. Nutrient Management Plan
   B. Nutrient Management Implementation

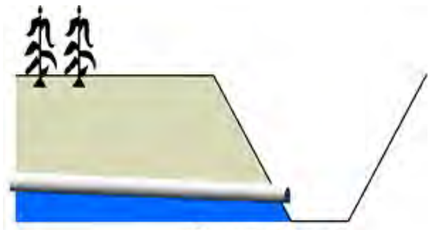
DWM PLANS AND PRACTICES

1. Drainage Water Management Plan

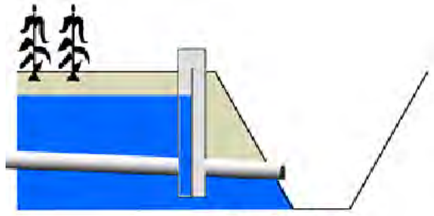
A Drainage Water Management Plan (DWMP) is a tile and control structure layout plan to help landowners protect and improve water quality, enhance crop production and retain soil productivity. A properly prepared DWMP ensures that factors of landscape, soils, slope and current drainage systems are taken into consideration and incorporated into the function of the drainage system. Conservation drainage practices that can be included in a DWMP are explained below. DWMPs must be developed by a Technical Service Provider (TSP) certified in NRCS TechReg for Conservation Activity Plan (CAP) 130 Drainage Water Management Plan.



2. Drainage Water Management - Controlled Subsurface Drainage



Conventional Drainage



Controlled Drainage

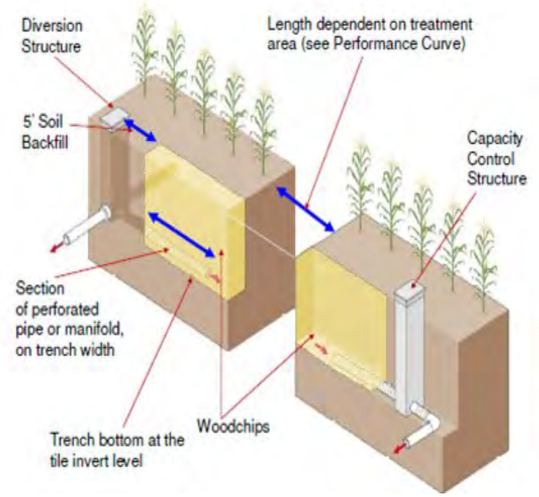
Controlled Subsurface Drainage (CSD) is similar to conventional tile drainage except that tile outflow is managed by Structure(s) for Water Control (NRCS CP 587). These structures control the elevation of the water table in a field during the year by adding or removing stoplogs in a structure, or managing control elevations at a drainage pump station. Water control structures can include float operated structures, such as the AgriDrain Water Gate, upstream from a stoplog control structure to step water level control up the system at approximately 1-foot increments. CSD is based on the premise that the same subsurface drainage depth and intensity is not needed during the year, or most effective for the best crop production. The water table can be lowered in the spring and fall to facilitate planting and harvesting, and raised during the growing season to retain water and water-soluble nutrients, such as nitrate nitrogen and soluble phosphorus, for use by crops. This reduces the overall volume of subsurface runoff and the downstream transport of nutrients as well as herbicides and pesticides. CSD can be particularly helpful for crop productivity by retaining soil profile water and nutrients for crop use during drier periods of the growing season.

Stop Log Structure

In-line Water Gate

CSD tile systems are most effective when tile laterals are laid approximately parallel with topographic contours, as shown above, to maximize the zone of influence and minimize the number of control structures. The Drainage Water Management Plan (DWMP) defines the location, size and type for each Structure for Water Control, together with the tile system layout. A critical component of a DWMP is an operation plan for the control structures.

3. Denitrifying Bioreactor



Denitrifying Bioreactors have been developed as an edge-of-field practice to help remove nitrates that leach into tile drains. A woodchip bioreactor consists of a lined trench filled with woodchips and covered with soil. A portion of the tile water flows through the woodchips before entering surface water. Micro-organisms from the soil and tile water colonize the woodchips. Some of them break down the woodchips into smaller organic particles. Other micro-organisms "eat" the carbon produced by the woodchips, and "breathe" the nitrate from the water. Just as humans breathe in oxygen and breathe out carbon dioxide, these microorganisms breathe in nitrate and breathe out nitrogen gas, which exits the bioreactor into the atmosphere. Through this process, nitrate is removed from the tile water before it can enter surface waters.

4. Subsurface Drain - Alternative Tile Inlets

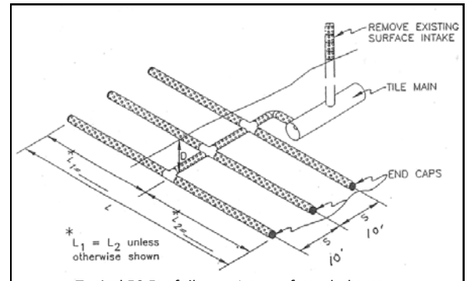
Isolated surface depressions in agricultural fields are often drained with subsurface tile having surface inlets. Open inlets that are flush with the surface of the ground can provide a direct conduit for sediment and nutrients to enter tile systems, which outlet into ditches, streams, and rivers. Alternative tile inlets increase sediment trapping efficiency through increased settling time and/or filtering. They can also reduce the velocity of flow into the tile inlet. Alternative inlets include Perforated Risers, Gravel/Rock Inlets and Dense Pattern Tile.

Replace this...

...with one of these.

Gravel/Rock Inlet

Perforated Riser



Typical 50 Ft of tile per 1 acre of ponded area.

Dense Pattern Tile