WATER QUALITY: BEST MANAGEMENT PRACTICES

ENHANCING CONDITIONS FOR CROP PRODUCTION

Meeting the need for improved crop production while also managing water quality and environmental requirements is an important balancing act that can be effectively accomplished through the use of agricultural Best Management Practices (BMPs).

As stewards of our surroundings, expertise is needed in navigating the complexities of agricultural production, environmental regulations, and knowledge of the best land and water management practices that are the most effective based on specific conditions.

ISG engineers continually work in partnership with agencies, drainage authorities, regulators and landowners to develop the most effective water quality plans that enhance conditions for production and also comply with requirements.

ISG's agricultural drainage projects serve as progressive models for the industry. These projects represent a fundamental shift in the way rural drainage systems interact with the landscape since they help to improve water quality while also securing operational and financial benefits for landowners and producers.

Primary pollutants found in agricultural settings include sediment and nutrients, primarily phosphorus and nitrogen. Although some nutrient discharge may occur in agricultural production, there are various agricultural BMPs that can be implemented to mitigate adverse effects.

BMPs include a variety of methods that can be applied to the existing landscape without dramatically changing land use. They are designed to improve water quality by:

- Improve soil health
- Prevent runoff and erosion
- Control flow rate
- Provide water storage
- Reduce sediment and nutrient loading

Our experience in Agricultural Drainage and BMPs includes work in the following Minnesota counties:

Blue Earth – Chippewa – Cottonwood – Faribault – Freeborn – Jackson – Le Sueur – Martin – Mower – Nicollet – Nobles – Redwood – Renville – Watonwan

Grassed Waterways
These vegetative drainage swales through agricultural land allow concentrated flows to drain from the surface while minimizing erosion.

Riparian Channel Vegetation
A mix of grasses, forbs, sedges, and sometimes trees that serve as an intermediate zone between upland and aquatic environments, helping to stabilize banks.

Native Filter Strips and Contour Buffer Strips
Areas of vegetation between fields and surface waters to minimize organics, nutrients, and sediment in runoff from entering nearby surface waters. They reduce runoff velocity and erosion near surface waters by establishing sheet flow throughout the strip, increasing bank stability.

Wetland Restoration
The reestablishment of natural hydrology and native vegetation to a former or degraded wetland that was drained, farmed or otherwise modified.

Water and Sediment Control Basins (WASCOBs)
Earth embankments placed perpendicular to the surface water flow direction on a moderate to steep hillside to improve the ability to farm steep sloped areas by reducing gully erosion.

Surge Basin
An excavated or ponded area with an engineered outlet designed to provide water detention. Sediment and nutrient laden particles then drop out of suspension and allow for nutrient uptake and removal in vegetative areas.

Woodchip Bioreactor
Woodchips are placed in an underground trench and tile water is diverted through the bioreactor to remove nitrates from subsurface drainage water.

Water Control Structure
Barriers are used to convey water, control flow direction and rate, and maintain a desired water elevation using weirs, drop inlets, culverts, or baffles. Water quality benefits include sedimentation, reducing peak flow rates and volume, and providing wildlife habitat.

Two Stage Ditch
This design mimics the natural process of a stream and flood plain with a low-flow channel inside a high-flow channel. It minimizes sediment and nutrients from traveling downstream, and reduces channel and bank erosion.

Alternative Tile Inlets
A replacement to open surface intakes, this inlet allows water to temporarily pond around the structure. This increases the water detention time, reduces peak flow rates, and allows for sedimentation and prevents soil erosion.

Controlled Subsurface Drainage
A water control structure is used to control the water table elevation. Benefits include increased crop yields and reduced total flow and nitrogen delivery.

Saturated Buffer
A vegetative subsurface outlet provides a route for tile drainage water to seep beneath buffer areas of perennial vegetation. This process reduces peak flow rates, nitrates in tile water and increases plant uptake of nutrients.