

RECOMMENDED MANAGEMENT PRACTICES **FOR HIGHWAY OPERATIONS**

Roadside drainage systems can have a major impact on local drainage and water quality. The following recommended management practices for highway operations were developed for the *Water Quality Strategy for Highway Operations, Schuyler County* (January 2007) and *Water Quality Strategy for Highway Operations, Steuben County* (April 2007). Additional resources for implementing these practices are included in the *Highway Superintendent Roads & Water Quality Handbook, Edition III*. The Handbook sections applicable to the following recommendations are indicated in parentheses.

Plan your project (Handbook section: Project Planning)

Good design saves money: Properly designed and constructed road/stream crossings and roadways will lead to long-term savings by decreasing the amount of repairs and replacements that will be required “down the road.”

- Document the problem and determine the underlying causes.
- Evaluate alternatives and prepare a conceptual plan.
- Protect stream corridors, wetlands, and other areas that provide water quality benefits.
- Limit land disturbance and reduce erosion and sediment loss.
- Limit disturbance of natural drainage features and vegetation.
- Prepare a detailed plan, final budget, implementation schedule, and maintenance plan.

Obtain any necessary permits (Handbook section: Permits)

Even if no permit is required, you may still be responsible for a water quality violation. The state water quality standard for turbidity is: “No increase that will cause a substantial visible contrast to natural conditions.”

- Maintain a record of permit applications and activities (Permit Log).
- Allow sufficient time for obtaining permits.
- The County Soil and Water Conservation District provides assistance with environmental permits.

Manage road and right-of-way drainage (Handbook section: Road Drainage)

The three most important considerations in road construction and maintenance are: drainage, drainage, and drainage. Problems caused by poor drainage include rutting, cracking, potholes, erosion, washouts, heaving, flooding, and premature failure of roadway.

Land use changes anywhere in the watershed may alter drainage onto the road.

- Use high quality road materials to promote good drainage.
- Move water off road surfaces as soon as possible.
- Promote good subsurface drainage.
- Make sure that culverts are appropriately sized (the County Soil and Water Conservation District can help with calculating the amount of runoff).
- Use appropriate culvert type, alignment, and end treatments.
- Ditches are important: pay attention to the shape, side slope, fall, lining materials, capacity, and depth.
- Direct runoff into vegetated filter areas or rock-lined turnouts.
- Manage water entering the roadway (use bank benches; look beyond the right-of-way).
- Monitor and maintain all drainage ditches and structures.

Prevent erosion (Handbook sections: Project Planning; Erosion & Sediment Control; *Roadway and Roadside Drainage* manual in Road Drainage section)

Approximately 30 tons of material can be eroded from a mile of ditches before you can see the damage! To remove and replace 30 tons of material is a lot of work.

Timely re-vegetation of road ditches and banks is the single most effective deterrent to water pollution originating from roads and road ditches. Vegetation slows the flow of water, consumes water, encourages infiltration, and anchors the soil.

- Minimize areas of disturbance.
- Avoid concentrating runoff.
- Stabilize ditches and other disturbed areas as soon as possible.
- Keep runoff velocities low.
- Inspect and maintain erosion and sediment control practices.

Stabilize roadbanks (Handbook section: Bank Stabilization; consult with the County Soil and Water Conservation District)

To determine a stable slope angle, look at stable slopes nearby that have the same soil and cover.

Roots of established vegetative cover are “Mother Nature’s rebar.”

- If the bank is stable, don’t fool with it.

- Identify the cause(s) of unstable banks (bank material, slope, hydrology, vegetation, inappropriate maintenance practices, etc.).
- Select appropriate stabilization techniques, utilizing living plants whenever possible.
- Inspect and maintain new stabilization projects.

Manage chemicals on the roadway and in the garage (Handbook sections: Dust Control; Road Salt Management; Chemical Management; *Roadway and Right-of-Way Maintenance* catalogue in Maintenance section)

- Avoid over-application of dust control and deicing chemicals.
- Do not use waste products (such as crank case drain oil from engines) for dust control.
- Store road salt in a covered area.
- Wash vehicles in cold water without any additives. This can be done outside if the site is located away from streams, wetlands, storm sewers, or drainageways. If soap, detergents, or degreasing agents are used, wash water should be treated.
- Conduct vehicle maintenance inside, in an area without floor drains.
- Vehicle fueling areas should be designed to prevent stormwater runoff and spills (paved, covered, and located away from drainageways).
- Conduct a self-audit to confirm that fuel, used oil, and other materials are stored in compliance with Petroleum Bulk Storage Regulations.
- Spills should be cleaned up immediately. Dry clean up is almost always the best option. Report spills to DEC: 1-800-457-7362.

Protect streams and wetlands (Handbook sections: Streams and Wetlands; Beaver Control)

It is not unusual for human actions to disturb the balance between a stream's energy and its sediment load, resulting in increased erosion and/or increased deposition.

The easiest, most effective way to protect a stream is to maintain a strip of plants along the bank.

- Avoid directing runoff into surface waters. Consider re-profiling road ditches to direct water away from the stream crossing and into stable vegetated buffers (see technical bulletin for "Corman" Clearwater Crossings).
- Do not encroach on the stream channel or wetland.
- Minimize encroachment onto the floodplain. Consider using floodplain culverts or a high water bypass to provide a stable overflow area during extreme flow events.
- Avoid dredging, filling, channel straightening, or relocation.

- Remove garbage from streams. Remove natural debris when necessary to protect bridges or prevent flooding. Stream cleaning should be selective to retain the natural benefits of woody debris, which slows stream velocities, breaks up flow, and provides habitat.
- When dealing with a stream problem, identify the underlying causes. Treating the symptoms may only yield short-term benefits and may even cause more problems than it solves.
- Keep in mind that streams are complex systems. Consult with the County Soil and Water Conservation District before undertaking streambank protection, sediment removal, or other stream projects.
- Evaluate alternative techniques for managing beaver problems along roadsides. Trapping is not the only solution.

Inspect and maintain the road system (Handbook sections: Maintenance; *Roadway and Roadside Drainage* manual in Road Drainage section)

Proper maintenance and rehabilitation of existing culverts can be much more economical than replacement.

Any ditch work does two undesirable things if not managed and repaired. It exposes soil to erosion. And it may change the depth or shape of the ditch to an undesirable condition.

- Mark or inventory culverts so they do not get missed during inspections.
- Inspect culverts and stream crossings every year (at least every two years) and after high flow events. (Information about what to look for and a culvert inspection form are in the *Roadway and Roadside Drainage* manual.)
- Conduct ditch maintenance during dry conditions (late summer or early fall is usually best).
- When maintaining a ditch, determine if it needs cleaning (removal of small amounts of sediment and vegetation from the bottom) or reshaping (removal of large amounts of material to widen or deepen the ditch). Be sure to do the right maintenance.
- Clean or reshape only a section of ditch at a time, leaving intact vegetation in the downhill part of the ditch to capture sediment.
- When maintaining a ditch, place erosion protection or seeding every day and before any rain. (Have the erosion material ready before starting the job.) **Do not leave exposed substrates to wash downstream.**
- Unpaved road surfaces require periodic re-shaping to re-establish the crown and cross-slope and incorporate loose stones back into the road surface.
- Sweep paved roads and parking lots to remove pollutants.
- Clean storm drain systems regularly to reduce the amount of pollutants, trash, and debris in both the storm sewer system and in receiving waters.
- Roadside vegetation management should utilize techniques that maintain stabilizing root systems, preserve climax tree species (which are structurally strong), and establish low maintenance plants (selective thinning, selective mowing, seeding, pruning).