

Field Guide for Construction and Maintenance Activities



NOVEMBER 2006

HDR

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Dairyland Power Cooperative (Dairyland) is a generation and transmission cooperative based in LaCrosse, Wisconsin that provides wholesale electrical energy to 25 member cooperatives and 20 municipalities who deliver the energy needs to over 500,000 people.¹ Dairyland's service area comprises 62 counties in Illinois, Iowa, Minnesota, and Wisconsin (Figure 1).

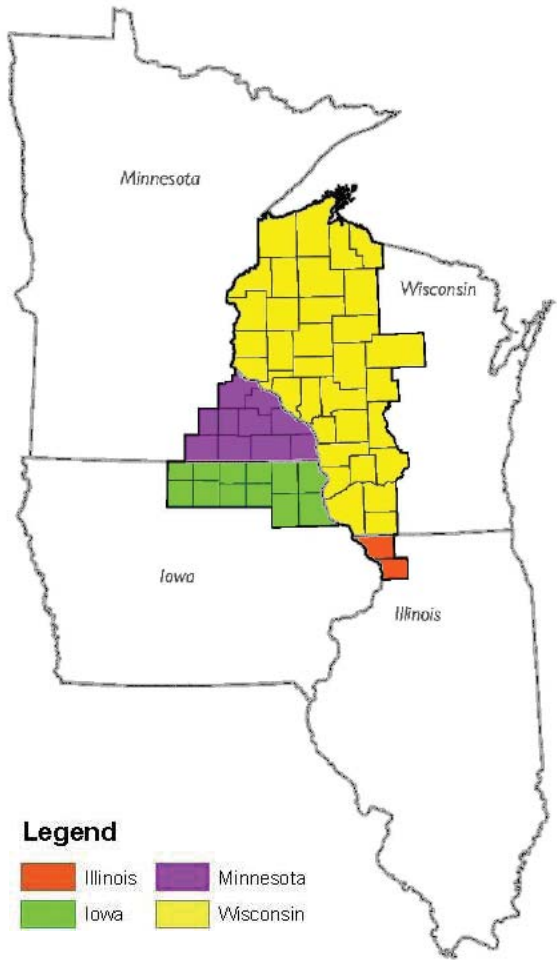
Dairyland is committed to the preservation and protection of precious natural resources. This field guide was created in acknowledgement of that commitment. The field guide summarizes erosion and sediment control BMPs for use by field crews. These practices, when properly implemented, will minimize or prevent erosion and sediment pollution from adversely impacting sensitive resources, such as, streams, ponds, lakes, wetlands, and natural vegetative. This guide must be periodically updated to reflect changes in BMPs.

Erosion and sediment control measures apply to all earth moving activities – small or large



¹McWilliams, John M, MBA, PE. *Dairyland Power Cooperatives' Methane Digester Project*, AgSTAR National Conference. Madison, Wisconsin, 2006.

Figure 1
Dairyland Power Cooperative Service
Area



Tips for Construction in Residential Areas

Construction near residential areas requires special precautions to minimize disturbance to residences and maximize safety considerations. Impacts to residences near construction will be minimized by implementing the following applicable mitigation measures:

- Strip and store, or replace topsoil with imported topsoil after construction.
- Install orange safety fence between the construction area and residences.
- Avoid removal of trees and landscape whenever possible or specified in an agreement.
- Maintain access to residences at all times during construction.
- Notify residences within 48 hours of start of construction and construction during nighttime hours. Review permits for additional requirements for nighttime construction.
- Restoration of residential areas must be initiated within 24 hours of completion of construction.



Don't forget!

Erosion control is generally more cost effective than sediment control and requires less maintenance and repair.

Highway and Road Crossings

Roadway crossing and ROW access points must be identified before the start of construction to maintain safe and accessible conditions throughout construction.

Refer to Volume I of the BMP Manual for erosion control and sediment control as most if not all are applicable. A few that stand out follow and are detailed in the following section:

- Preservation of existing vegetation
- Mulch, blankets, and mats
- Silt fence along perimeter of project area adjacent to roadway
- Construction entrance and exits
- Street cleaning



Temporary Wetland Crossings

Temporary wetland crossing options include wood mats, wood panels, wood pallets, bridge decking, expanded metal grating, polyvinyl chloride (PVC) and high density polyethylene (HDPE) pipe mats or plastic road, tire mats, corduroy, pole rails, wood aggregate, and low ground pressure equipment.² Temporary wetland crossings should be avoided unless absolutely necessary. Successful crossings are enhanced with a root or slash mat to provide additional support for equipment and geotextile to segregate the crossing from underlying soil and provide floatation. Temporary wetland crossing options will be discussed in further detail below.



U.S. EPA

²U.S. Department of Agriculture. *Temporary Stream and Wetland Crossing Options for Forest Management*. 1998.

WOOD MATS

Individual cants, sawdust hardwood (oak), or round logs cabled together to make a single-layer crossing.

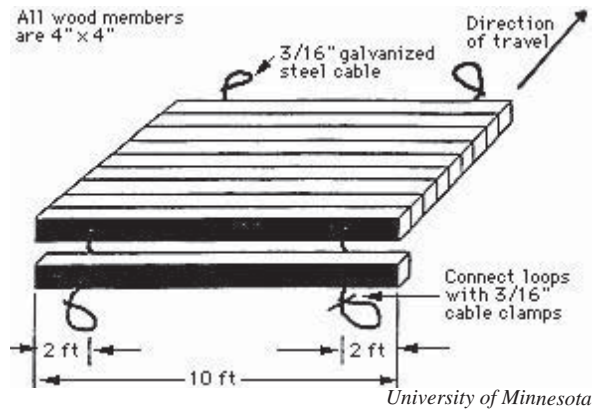
Wood mats provide a surface that protects wetlands during hauling or equipment moving operations.



U.S. Department of Agriculture

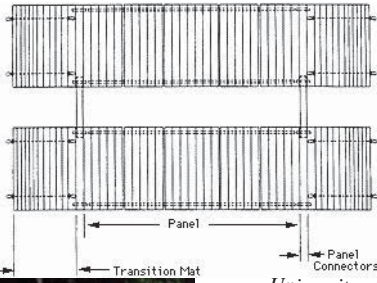


University of Minnesota

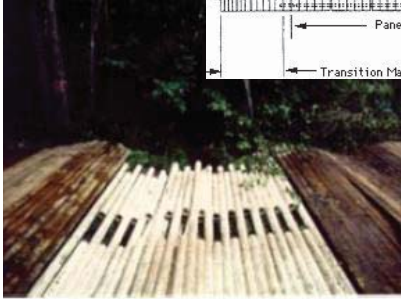


PVC AND HDPE PIPE MATS OR PLASTIC ROAD

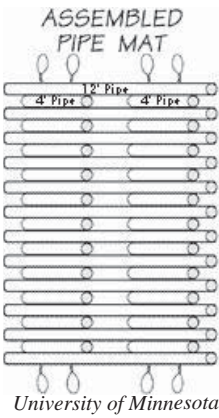
A portable, reusable, lightweight corduroy-type crossing can be created with PVC or HDPE pipe mats.² Pipe mats work as a conduit and allow water to move through the crossing without further wetting the area. This can also be used for stream crossings.



University of Minnesota



USDA



USDA

University of Minnesota

CORDUROY

Corduroy is a crossing made of brush, small logs cut from low value and noncommercial trees on site, or mill slabs that are laid perpendicular (most often) or parallel to the direction of travel.² The greater the surface area of the corduroy the greater the floatation capability of the crossing. Placing geotextile provides additional support and segregation of brush, logs, or mill slabs from underlying soil.



USDA



Erosion Control Magazine

brush or small saw log

WOOD AGGREGATE

Use wood particles, varying in size, to fill soft soil areas. This is a popular method because the wood is relatively light in weight, which gives it better natural flotation than gravel. Wood, being a naturally biodegradable material, will allow water to flow freely through, causing no change to the natural hydrologic flows.



USDA

geotextile fabric

wood aggregate



USDA

Stream and River Crossings

Temporary stream crossing is required to provide safe, erosion free access across a stream for construction equipment.³ Temporary stream crossings are fords, culverts, PVC and HDPE pipe bundles, and portable or on site constructed bridges.² Unless it is absolutely necessary, stream crossing should be avoided. Use existing stream crossing locations if crossing is unavoidable and the existing crossing can withstand the weight. Properly designed, installed, and maintained temporary stream crossings can greatly reduce costs and help meet concerns of regulating agencies.² If a stream crossing is needed, it should be limited to as few as possible and should be as short as possible. To correctly cross a stream, the crossing should be located on a straight segment of the stream channel that has low banks (except for bridge crossings where higher banks are preferred to support the abutments).² Contact a local engineer or hydrologist to determine permitting needs for the stream crossings, if needed. Temporary stream crossing options will be discussed in further detail below.



Massachusetts Stream Crossings Handbook

³California Stormwater Quality Association. *California Stormwater Best Management Practices, Construction*. July 2006. <http://www.cabmphandbooks.com/Documents/Construction/SE-9.pdf> Retrieved July 17, 2006.

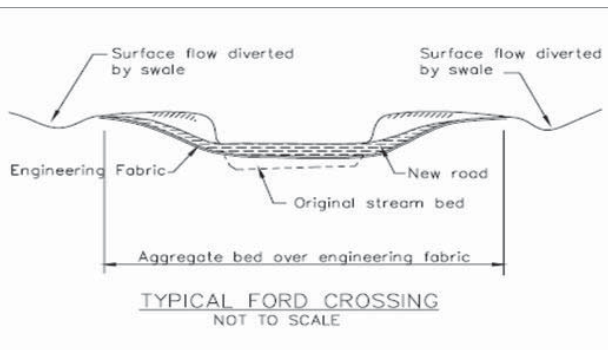
FORDS

A ford utilizing the streambed is used when flows are consistently less than 600 mm (2 feet) deep, as part of the road or access trail, and is best for short-term, limited traffic.

- Fords should not be constructed or used during periods of fish spawning and migration.
- If the crossing location has a mucky or weak streambed a base must be constructed.



North Carolina Forest Service

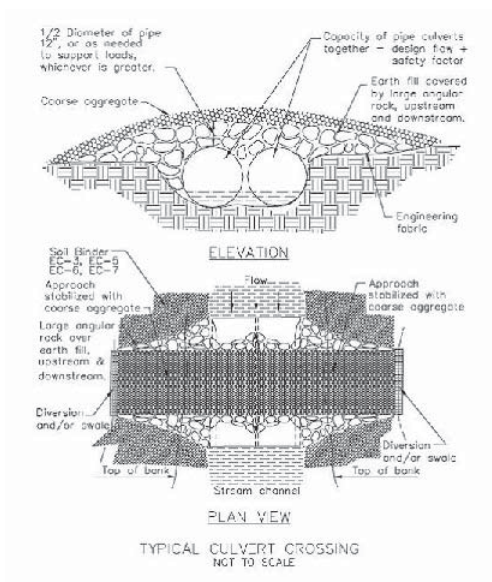


Culverts

A culvert is a structure that conveys water under a road or access trail.² Culverts are the most common methods of crossing intermittent and perennial streams. There are manufactured culverts that come in various shapes, lengths, and diameters. Manufactured culverts are made of corrugated steel, concrete, or polyethylene. Proper sizing with a minimum of a 375-mm (15-inch) diameter and installation of culverts is crucial for a successful crossing. Other materials, such as steel piling, wooden box culverts, and hollow logs can be used as culverts as well.



Ohio Department of Transportation



BRIDGES

Bridges keep fill and equipment out of the water better than any other stream crossing option. Temporary bridges can be constructed from ice, timber, steel, or pre-stressed concrete. A licensed engineer must review the design of any bridge that is fabricated from locally available materials, otherwise, manufactured bridges are made for various span lengths and load capacities.

Ice Bridges

Ice bridges are most common stream crossing methods during winter months with night temperatures below 0 degrees Fahrenheit (°F) with several days to build up thick enough ice. An estimated formula was developed to estimate minimum ice thickness to support a given load.

$$H = 4(P)^{1/2}$$

Where:

H = ice thickness in inches

P = the load or gross weight of the
vehicle plus its contents, in tons

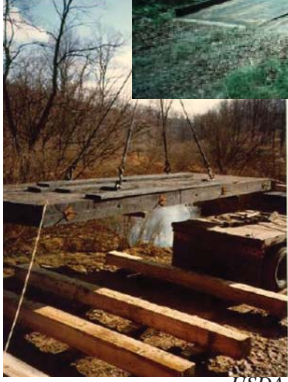


Timber Bridges

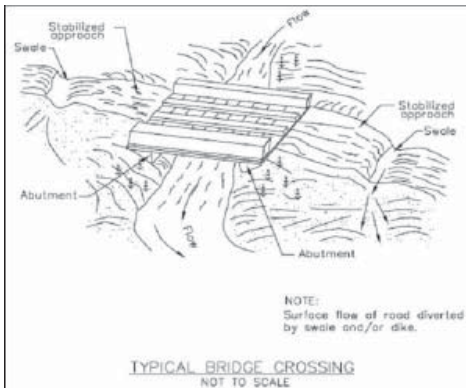
Two common designs for timber bridges are the log stinger bridges and solid sawn stringer bridges with or without a plank deck. Log stinger bridges are built by cabling logs together from trees felled in the area of construction. Solid sawn stringer bridges are built with new lumber, railroad ties, or demolition materials.



Steven E. Taylor, PE



USDA



Temporary Erosion Control

TEMPORARY SEEDING

Stabilizing crop seed mixture, or temporary seeding, used should be in accordance with the following rates and schedule unless otherwise specified in the contract documents.

Location	Species	Season(s)	Application Rate
Illinois and Iowa	Perennial Ryegrass	All	40 lbs/acre
Minnesota and Wisconsin	Winter Wheat	Fall	100 lbs/acre
Minnesota and Wisconsin	Perennial Ryegrass	Spring	100 lbs/acre

MULCHING

Straw or hay can be used as mulch but must be free of noxious weed contaminants. State approval is necessary for mulching in wetlands.

Mulch at a rate of 2 tons per acre.



Common Erosion and Sediment Control BMPs

STREET CLEANING

Cleaning tracked sediments and debris for paved streets prevents unwanted material from washing into surface waters and improves the appearance of public roadways.

Paved roadways adjacent to construction or maintenance sites must be inspected at the end of each day and tracked soil shall be promptly removed.

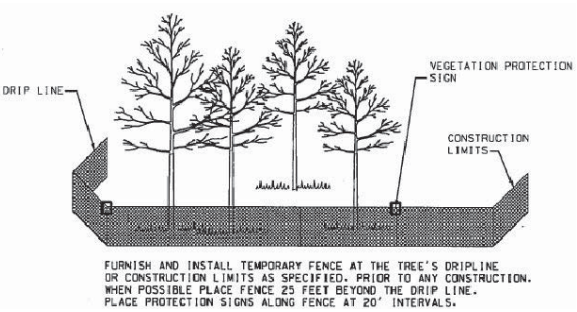
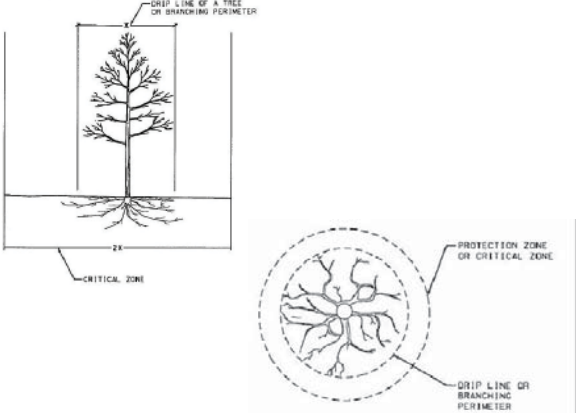


PRESERVATION OF EXISTING VEGETATION

Identify vegetation to be preserved during the planning process. Vegetation to be preserved should then be delineated, in the field and on design drawings, with orange temporary construction fencing.



Minimal Footprint



SILT FENCE

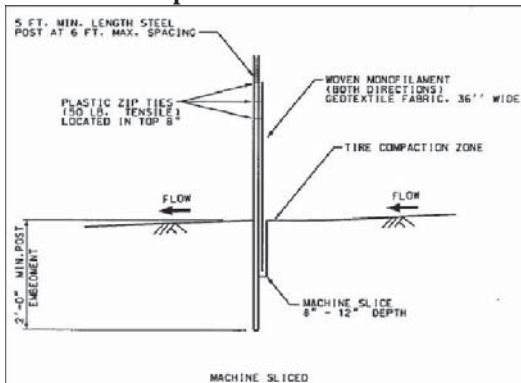
- Place silt fence around staging areas, stockpiles, and trees to protect from damage.
- In addition, place silt fence at the downstream side of access roads to protect streams and ditches. Silt fence shall be either machine sliced or hand installed into the soil.



Incorrect Use of Silt Fence



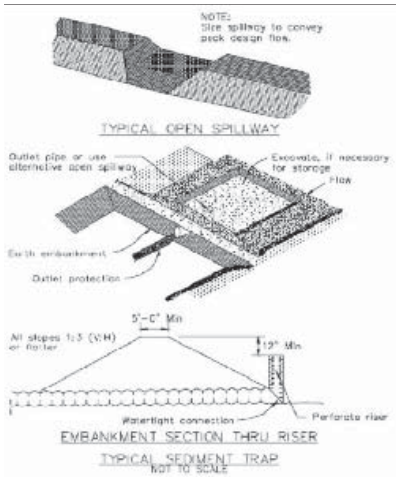
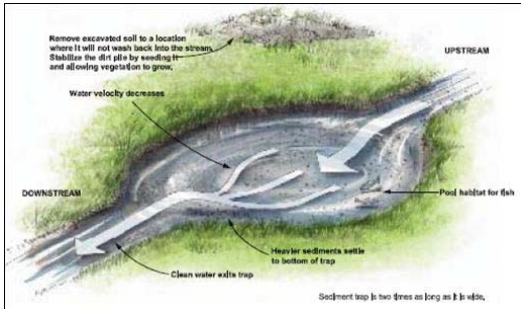
Proper Use of Silt Fence



SEDIMENT TRAP

Sediment traps are a temporary measure with a design life of approximately 6 months to 1 year and are maintained until the site area is permanently protected against erosion by vegetation and/or structures.⁴

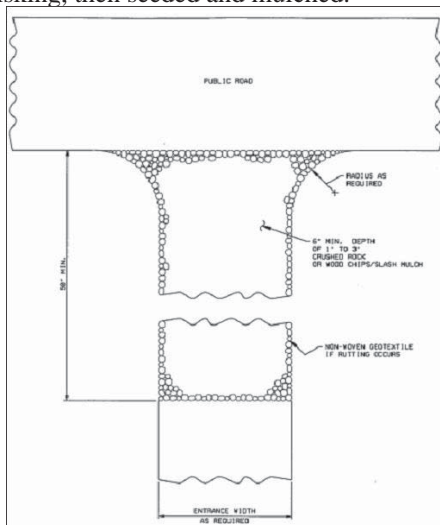
Direct discharge from dewatering operations to a temporary sediment trap constructed with a spillway that consists of geotextile fabric and crushed rocks.



⁴California Stormwater Best Management Practices, Construction. July 2006. <http://www.cabmphandbooks.com/Documents/Construction/SE-9.pdf> Retrieved July 17, 2006.

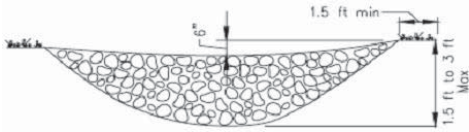
TEMPORARY ENTRANCE/EXIT

- Construct entrances and exits by overlaying a 12-ounce geotextile fabric with a 6-inch layer of 1 to 3 inch diameter washed aggregate or woodchips.
- Vegetation and topsoil should be removed from the shoulder zones to construct the entrances, however, tall vegetation may be mowed.
- If the entrance/exit begins to rut, stabilize by placing a geogrid and additional washed aggregate or woodchips in the roadway.
- Remove the entrance/exit restore the area to the geometry of the intersection at the end of each project.
- Areas outside of the permanent roadway shoulder may require re-grading.
- Compacted soils shall be loosened by ripping or disking, then seeded and mulched.

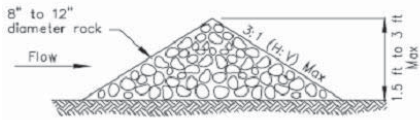


CHECK DAMS

Check dams are made of rocks, straw, logs, lumber, or interlocking pre-cast concrete blocks within a ditch, drainage, swale, or channel to reduce the gradient of a ditch, thus slowing the water, lowering its ability to cause erosion, and allowing sediment to settle out.⁵



ELEVATION

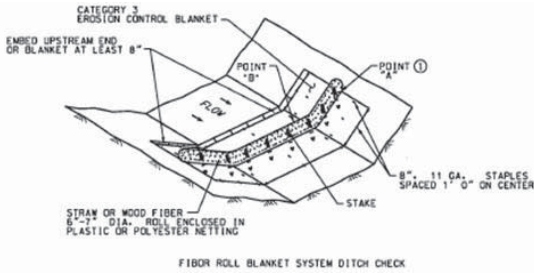


TYPICAL ROCK CHECK DAM SECTION

ROCK CHECK DAM
NOT TO SCALE



GRAVEL BAG CHECK DAM ELEVATION
NOT TO SCALE



FIBOR ROLL BLANKET SYSTEM DITCH CHECK

⁵British Columbia. *Erosion Stormwater Pollution, Check Dam*. July 2006. <http://www.em.gov.bc.ca/Mining/MiningStats/Aggregate%20BMP%20Handbook/BMPs/Check%20Dam.pdf> Retrieved July 10, 2006.

Spill Response and Protocols

1. Identify key spill response personnel.
2. Clean up leaks and spills immediately.
 - Place a stockpile of spill cleanup materials where they will be readily accessible (e.g. near storage and maintenance areas).
 - Utilize dry cleaning methods to clean up spills to minimize the use of water. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then used cleanup materials are also hazardous and must be sent to a certified laundry or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use brooms, shovels, sweepers, or plows.
 - Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
 - Clean up chemical materials with absorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
 - For larger spills, a private spill cleanup company or hazardous material team may be necessary.

Report spills that pose an immediate threat to human health or the environment to local agencies.

- Illinois – Illinois Emergency Management Agency (217) 782-7860 or (800) 728-7860
- Iowa – Iowa DNR (515) 281-8694
- Minnesota – Minnesota Pollution Control Agency (State Duty Office) (651) 649-5451 or (800) 422-0798
- Wisconsin – Wisconsin DNR (800) 943-0003
- Establish a system for tracking incidents. The system should be designed to identify the following:
 - Types and quantities (in some cases) of wastes
 - Patterns in time of occurrence (time of day/night, month, or year)
 - Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills)
 - Responsible parties

Federal regulations require that any oil spilled into a water body or onto an adjoining shoreline must be reported to the National Response Center (NRC) at (800) 424-8802 (24 hour).

Local Seed Vendors

Iowa

Ion Exchange, Inc
1878 Old Mission Drive
Harpers Ferry, IA
(563) 535-7231

Minnesota

Brock White
6784 10th Avenue Southwest
Rochester, MN 55902
(507) 282-2421 or (800) 279-9034

Shooting Star Native Seeds (Seed Only)
20740 County Road 33
Spring Grove, MN 55974
(507) 498-3944

Sodko, Inc. (Sod Only)
20740 County Road 33
Spring Grove, MN 55974
(507) 498-3943

Ramy Turf Products
842 Vandalia Street
St. Paul, MN 55114
(651) 917-0939 or (800) 658-7269

Wisconsin

La Crosse Forage and Turf Seed Corporate
2541 Commerce Street
La Crosse, WI 54603
(608) 783-9560 or (800) 328-1909