

EROSION & SEDIMENT CONTROL



FIELD GUIDE

**NORTHEAST WISCONSIN
STORMWATER CONSORTIUM**

**PO BOX 1861
APPLETON, WI 54912**



EROSION & SEDIMENT CONTROL



WISCONSIN DNR EROSION & SEDIMENT CONTROL BASIC PRINCIPLES

- Prevent soil from leaving your construction site.
- Minimize open area by phasing or sequencing construction and preserving existing vegetation where possible.
- Divert storm water away from disturbed or exposed areas when possible.
- Install BMPs to control erosion and sediment and manage storm water.
- Inspect the site regularly and properly maintain BMPs, especially after rainstorms.
- Revise the plan as site conditions change during construction and improve the plans if BMPs are not effectively controlling erosion and sediment.
- Keep the construction site clean by putting trash in trash cans, keeping storage bins covered, and preventing or removing excess sediment on road and other impervious surfaces.

Inspections of construction BMPs are required at least once every seven days and within 24 hours after a precipitation event of 0.5 inch or more. The Wisconsin DNR—Construction Site Inspection Report Form may be used to document inspections. Best Management Practices must be repaired or replaced within 24 hours of inspection or notification of a problem.

Remember to keep records of maintenance activities and any plan modifications at the construction site, available for review during a DNR inspection.

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DEFINITIONS/ABBREVIATIONS

BMP...Best Management Practice

CONCENTRATED FLOW...Runoff that accumulates or converges into well-defined channels

ECRM...Erosion Control Re-vegetative Mat

EROSION...Process by which soil is moved by wind or water

EROSION CONTROL...Measures taken to prevent soil from becoming dislodged and soil loss

PAL...WisDOT Product Acceptability List

PAM...Polyacrylamide

SEDIMENT...Soil particles that have been displaced by erosion

SEDIMENT CONTROL...Measures taken to capture soil or stop soil from moving after becoming dislodged

SHEET FLOW...An overland flow of water taking the form of a thin, continuous film over relatively smooth soil or rock surfaces

TRM...Turf Reinforcement Mat

USLE...Universal Soil Loss Equation

COMPLETED

N/A

EROSION CONTROL PLAN CHECKLIST

SITE CHARACTERISTICS

- North arrow, scale and site boundary. Indicate and name adjacent street or roadways.
- Location of existing drainage ways, streams, rivers, lakes, wetlands or wells.
- Location of storm sewer inlets.
- Location of existing and proposed buildings and paved areas.
- The disturbed area on the lot.
- Approximate gradient and direction of slopes before grading operations.
- Approximate gradient and direction of slopes after grading operations.
- Overland runoff (sheet flow) coming onto the site from adjacent areas.

EROSION & SEDIMENT CONTROL PRACTICES

- Location of temporary soil storage piles. *Soil storage piles existing more than seven days shall be placed behind silt fence or a manufactured perimeter control device, have PAM or polymer applied, be vegetated, or be covered with a tarp.*
- Location of access drive(s). *Follow Trackout Control Practices Tech Standard 1057*
- Location of sediment controls that will prevent eroded soil from leaving the site. *Silt fence, straw bale barrier, vegetative buffer, manufactured perimeter control devices, sediment trap, sediment basin*
- Location of inlet protection practices both on and off-site.
- Location of diversions. *Although not specifically required by code, it is recommended that concentrated flow (drainage ways) be diverted (re-directed) around disturbed areas. Overland runoff (sheet flow) from adjacent areas should also be diverted around disturbed areas.*
- Location of practices that will be applied to control erosion on steep slopes ($\geq 20\%$). *Such practices include maintain existing vegetation, placement of additional sediment fences, diversions and re-vegetation by sodding or seeding with use of erosion control mats.*
- Location of practices that will control erosion on areas of concentrated runoff flow.
Note: Un-stabilized drainage ways, ditches, diversions and inlets should be protected from erosion through use of such practices as ditch checks, channel erosion mats, staked sod and rip-rap.
- Location of turbidity barrier or silt curtain for activities in, or directly adjacent to, a waterway or water body.
- Location of other planned practices not already noted.

COMPLETED

N/A

EROSION CONTROL PLAN CHECKLIST**MANAGEMENT STRATEGIES**

- Temporary stabilization of disturbed areas.
Note: Disturbed areas left inactive for more than 14 days shall be stabilized by seeding, addition of PAM or other polymers, mulching or covering with a tarp.
- Permanent stabilization of site by seeding and mulching, or other means when final land disturbing activities cease and final grade has been reached on any portion of the site.
- Indicate re-vegetation method:
 - Seed
 - Sod
 - Other _____
 - Exp. date of permanent re-vegetation: _____
 - Re-vegetation responsibility of:
 - Builder
 - Owner/Buyer
 - Is temporary seeding or mulching planned if site is not seed by Sept. 15 or sodded by Nov. 15?
 - Yes
 - No
- Use of downspout and/or sump pump outlet extensions.
Note: It is recommended that flow from downspouts and sump pump outlets be routed through plastic drainage pipe to stable areas such as established sod or pavement.
- Trapping sediment during de-watering operations.
Note: Sediment-laden discharge water from pumping operations shall be treated before discharge from site (sediment removal).
- Proper disposal of building material waste so that pollutants and debris are not carried off-site by wind or water. This includes concrete washout which shall not enter stormdrains, ditches, streets or waterways. Concrete washout should occur at the concrete plant or at a temporary onsite storage facility.
- Maintenance of erosion control practices.**
- Sediment shall be removed from behind sediment fences and barriers before it reaches a depth that is equal to half the height of the barrier
 - Breaks and gaps in silt fence and manufactured perimeter control devices shall be repaired immediately. Decomposing straw bales will be replaced (typical bale life is three months).
 - All sediment that moves off-site due to construction activity shall be cleaned up before the end of the same workday.
 - All sediment that moves off-site due to storm events shall be cleaned up before the end of the next workday.
 - Access drives shall be maintained throughout construction.
 - All installed erosion control practices shall be maintained until the disturbed areas they protect are stabilized.

LAND APPLICATION OF ADDITIVES FOR EROSION CONTROL (1050)



The land application of products containing water-soluble and non-soluble additives such as PAM and other polymers, as temporary soil binding agents to reduce erosion.

USAGE

- ◆ To reduce erosion from wind and water on construction sites and agricultural lands.
- ◆ Additives are intended for direct soil surface application to sites where the timely establishment of vegetation may not be feasible or where cover is absent or inadequate.

APPLICATION

- ◆ Application rates shall not exceed manufacturer's written application rate recommendations nor exceed the WDNR use restrictions.
- ◆ Additives shall not be applied to channel bottoms

MAINTENANCE

- ◆ Maintenance will consist of reapplying additive mixtures to disturbed areas, including high use traffic areas, which interfere in the performance of this practice.
- ◆ Additive mixtures may lose effectiveness in as little as two months due to weather conditions.
- ◆ Additive mixtures should be reapplied in areas where wind and rill erosion is apparent and whenever an area has been graded, driven upon or otherwise disturbed since the previous application.

NON-CHANNEL EROSION MAT

(1052)



A protective soil cover of straw, wood, coconut fiber or other suitable plant residue or plastic fibers formed into a mat, usually with a plastic or biodegradable mesh on one or both sides.

Erosion mats are rolled products available in many varieties and combination of materials and with varying life spans.

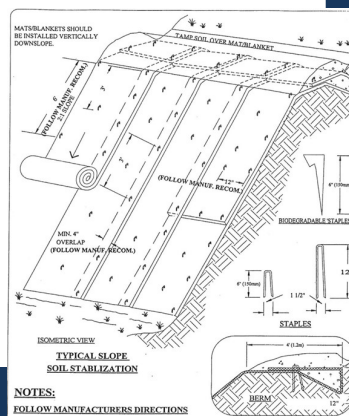
USAGE

- ◆ To protect the surface from the erosive effect of rainfall and prevent sheet erosion during the establishment of grass or other vegetation.
- ◆ To reduce soil moisture loss due to evaporation.

Only mats listed in the WisDOT Erosion Control PAL will be accepted for use in this standard.

CHARACTERISTICS OF A PROPERLY INSTALLED EROSION MAT

- ◆ Erosion mat shall be installed after all topsoiling, fertilizing, liming and seeding is complete.
- ◆ Mat shall be in firm and intimate contact with the soil. It shall be installed and anchored per manufacturers recommendations.
- ◆ TRM shall be installed in conjunction with top-soiling operation and shall be followed by ECRM installation.



CHANNEL EROSION MAT (1053)



A protective soil cover of straw, wood, coconut fiber or other suitable plant residue or plastic fibers formed into a mat, usually with a plastic or biodegradable mesh on one or both sides.

Erosion mats are rolled products available in many varieties and combination of materials and with varying life spans.

USAGE

- ◆ To protect the channel from erosion.
- ◆ To act as turf reinforcement during and after the establishment of grass or other vegetation in the channel.

Only mats listed in the WisDOT Erosion Control PAL will be accepted for use in this standard.

CHARACTERISTICS OF A PROPERLY INSTALLED EROSION MAT

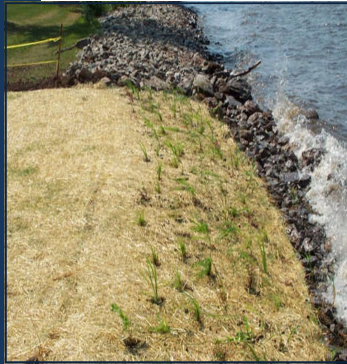
- ◆ Erosion mat shall be installed after all top-soiling, fertilizing, liming and seeding is complete.
- ◆ Mats shall extend for whichever is greater:
 - upslope one-foot minimum vertically from the ditch bottom, or
 - 6 inches higher than the design flow depth.
- ◆ Mat shall be in firm and continuous contact with the soil. It shall be anchored, overlapped, staked and entrenched per manufacturers recommendations.
- ◆ TRM shall be installed in conjunction with top-soiling operation and shall be followed by ECRM installation.

EROSION MAT

CHANNEL ⁽¹⁰⁵³⁾ AND NON-CHANNEL ⁽¹⁰⁵²⁾

MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of ½ inch or greater
- ◆ If there are signs of rilling under the mat, install more staples or more frequent anchoring trenches. If severe enough to prevent vegetation establishment, remove the damaged section. Fill with topsoil, compact, reseed and replace section of mat per manufacturer's recommendations.
- ◆ If reinforcing plastic netting has separated from the mat, remove the plastic and if necessary replace the mat.
- ◆ Maintenance shall be complete as soon as possible with consideration to site conditions.

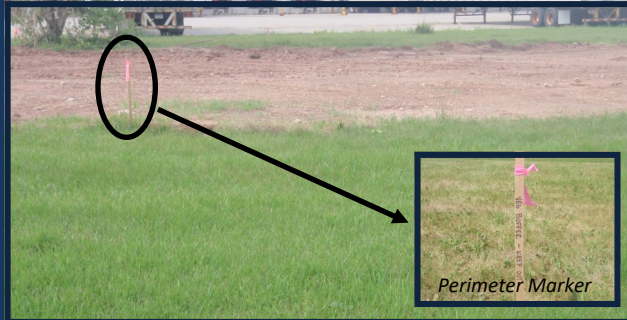


Non-Channel Erosion Mat

OTHER CONSIDERATIONS

- ◆ Select erosion mat that will last long enough for grass or other vegetation to become densely established.
- ◆ It may be difficult to establish permanent vegetation and adequate erosion protection in a channel with continuous flow. Consider riprap or planting wetland species with an erosion mat.
- ◆ To help determine the appropriate channel liner, designers can refer to the design matrix in the back of the WisDOT PAL.
- ◆ To help determine the appropriate non-channel ECRM, designers can refer to the slope erosion control matrix in the back of the WisDOT PAL.
- ◆ At time of installation, document the manufacturer and mat type by saving material labels and manufacturer's installation instructions. Retain documentation until site is stabilized.
- ◆ Urban mats may be used in lieu of sod for non-channel applications.

VEGETATIVE BUFFER FOR CONSTRUCTION SITES (1054)



An area of dense vegetation intended to slow runoff and trap sediment. Vegetative Buffers are commonly referred to as filter or buffer strips.

USAGE

- ◆ Remove sediment in sheet flow by velocity reduction.

MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of $\frac{1}{2}$ inch or greater for proper distribution of flows, sediment accumulation and sign of rill formation.
- ◆ If buffer becomes silt covered, contains rills or is otherwise rendered ineffective, other perimeter sediment control measures shall be installed.
- ◆ Eroded areas shall be repaired and stabilized as soon as possible.
- ◆ A stand of dense vegetation shall be maintained to a height of 3-12 inches.
- ◆ Prior to land disturbance, flag or fence the perimeter of buffers to prevent equipment from creating ruts, compacting the soil and to prevent damage to vegetation.

VEGETATIVE BUFFER, CONT'D (1054)

CHARACTERISTICS OF A PROPERLY VEGETATED BUFFER STRIP

- ◆ Buffer shall be located along the entire length of the down slope edge of the entire disturbed area for which the practice is being applied.
- ◆ The vegetative buffer shall be located on the contour.
- ◆ The width of the buffer shall have slopes less than 5%.
- ◆ The disturbed area draining to the buffer shall have slopes of 6% or less (no stockpiles).
- ◆ The buffer shall have a minimum width of 25 ft. 25 ft is adequate for disturbed areas up to 125 ft upslope from the vegetative buffer. An additional one foot of width shall be added to the buffer for every 5 ft exceeding 125 ft upslope of the disturbed area draining to the buffer.
- ◆ To minimize compaction and destruction of the vegetation, designate the buffer as an area of no disturbance. Buffers shall be clearly show on plans and marked in the field.
- ◆ Buffers shall be densely vegetated prior to upslope soil disturbance.



OTHER CONSIDERATIONS

- ◆ Dense vegetation is defined as an existing stand of 3-12 inch high grassy vegetation that uniformly covers at least 90% of a representative 1 square yard plot.
- ◆ Woody vegetation can not be counted for the 90% coverage. No more than 10% of the overall buffer can be comprised of woody vegetation.

SEDIMENT BALE BARRIER (1055)



Sediment bale barriers for perimeter control consist of a row of entrenched and anchored straw bales, hay bales or equivalent material used to intercept sediment-laden sheet flow from small drainage areas of disturbed soil. *(Bale ditch checks are shown on page 25.)*

USAGE

- ◆ Used to reduce slope length of the disturbed area.
- ◆ Used to intercept and retain transported sediment from disturbed areas.

MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of ½ inch or greater.
- ◆ Replace damaged or decomposed sediment bale barriers.
- ◆ Repair any undercutting or flow channels around the end of the sediment bale barriers.
- ◆ Properly dispose of sediment once deposits reach ½ the height of the sediment bale barrier.
- ◆ Remove & properly dispose of sediment bale barriers and anchoring devices once the upslope area have been permanently stabilized.
- ◆ Sediment deposits remaining after the bale barrier is no longer required shall be dressed to conform to the existing grade, prepared and seeded.

SEDIMENT BALE BARRIER, CONT'D (1055)

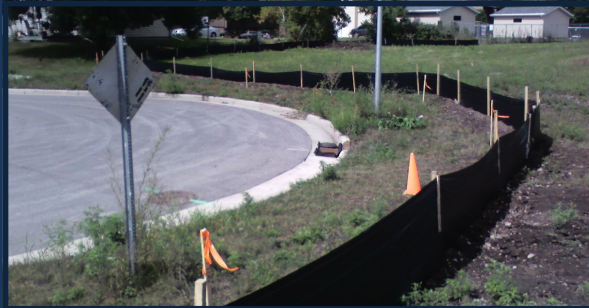
PROPER INSTALLATION

- ◆ At a minimum, sediment bale barriers shall be placed in a single row, lengthwise on the contour, with the ends of adjacent sediment bales barriers tightly abutting one another. The holes between bales shall be chinked (filled by wedging) with straw, hay or equivalent material to prevent water from escaping between the bales.
- ◆ The maximum allowable slope lengths contributing runoff to a sediment bale barrier.

SLOPE	BARRIER ROW SPACING
< 2 %	100 feet
2 to 5 %	75 feet
5 to 10 %	50 feet
10 to 33 %	25 feet
33 to 50%	20 feet
> 50 %	Not Permitted

- ◆ Sediment bale barriers shall not be placed perpendicular to the contour.
- ◆ The end of the barrier shall be extended upslope to prevent water from flowing around the barrier ends.
- ◆ Installed barrier shall be a minimum of 10 inches high and shall not exceed a maximum height of 20 inches from ground level.
- ◆ Entrench barrier to a minimum depth of 4 inches.
- ◆ Barrier shall be backfilled to ground level on the down slope side and to 4 inches above ground level on the upslope side.
- ◆ Anchor barrier with at least two wood stakes, "T" or "U" steel posts or ½ inch rebar driven through at equidistance along the centerline.
- ◆ Drive the first stake in each bale toward the previously laid bale to force the bales together.
- ◆ Drive stake a minimum of 12 inches into the ground to securely anchor the barrier.
- ◆ Install bales so that binding are oriented around the sides rather than along the tops and bottoms of the bales.

SILT FENCE (1056)



Silt fence is a temporary sediment barrier of entrenched permeable geotextile fabric designed to intercept and slow the flow of sediment-laden sheet flow runoff.

USAGE

Install a silt fence prior to soil disturbance in the following construction areas:

- ◆ Where soil erosion occurs.
- ◆ Below the toe of an exposed steep slope.
- ◆ Along streams and other waterways.
- ◆ Around temporary soil stockpiles.
- ◆ Below other small cleared areas.
- ◆ Where effectiveness is required for one year or less.

SILT FENCE SHALL NOT BE USED IN THE FOLLOWING AREAS:

- ◆ Streams, channels, drain inlets or anywhere with a concentrated flow.
- ◆ Where the maximum gradient upslope of the fence is greater than 50%.
- ◆ Where the fence is at a higher elevation than the disturbed area.

MAINTENANCE

- ◆ Silt fences need to be installed and maintained properly to be efficient.
- ◆ Follow DNR installation and performance tips and maintenance procedures carefully to avoid possible regulatory action.

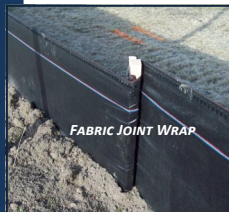
SILT FENCE, CONT'D (1056)

- ◆ Inspect the silt fence weekly, before anticipated rainfall events and within 24 hours after a rainfall of $\frac{1}{2}$ inch or greater.
- ◆ Repair or replace cut, split, torn, slumping or weathered fabric.
- ◆ Repair flow channels around fences.
- ◆ Remove sediment from the fence if it reaches $\frac{1}{2}$ the height of the fence.
- ◆ Dispose of all excess sediment properly.
- ◆ Leave silt fence in place until disturbed areas upland are stabilized.
- ◆ Seed and mulch or discard accumulated sediment once silt fence is removed; backfill and repair all holes and depressions.
- ◆ If silt fence is temporarily removed or damaged, replace or repair fence.



CHARACTERISTICS OF A PROPERLY INSTALLED SILT FENCE

- ◆ Hard wood or steel supports.
- ◆ Fence follows contour, remaining perpendicular to the slope.
- ◆ Posts are placed on the downslope side.
- ◆ Posts shall extend a minimum of 20 inches into the ground.
- ◆ Posts spaced a maximum of 3 ft apart for non-woven fabric and 8 ft for woven fabric.
- ◆ Ends of fence extend upslope to prevent water from flowing around fence.
- ◆ Fabric is attached securely to the posts.
- ◆ A support cord must be used along the top edge of fabric to ensure fabric remains tight between posts.
- ◆ Height of fence shall be between 14 inches and 28 inches. If more than one piece of fabric is used, each end of fabric is securely fastened to a post, posts are then wrapped around each other to produce a stable joint.



TRACKOUT CONTROL PRACTICES (1057)



Practices used to prevent, reduce, or mitigate the trackout of sediment from construction sites.

USAGE

Install tracking pads or use stabilized surfaces to reduce trackout onto roadways. Use sweeping or scraping practices to remove trackout that does occur.

MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of ½ inch or greater.
- ◆ Tracking pad performance shall be maintained by removing sediment from the pad for manufactured trackout devices and top dressing with new stone or surface roughening for stone tracking pads.
- ◆ Any sediment tracked onto a public or private road should be removed by street cleaning, not flushing, before the end of each working day.
- ◆ Remove sediment from stabilized work surfaces daily or as needed.

TRACKOUT CONTROL

PRACTICES, CONT'D (1057)

CHARACTERISTICS OF PROPERLY INSTALLED TRACKOUT PRACTICES

Stone Tracking Pad

- ◆ Trackout control shall be installed prior to any construction traffic leaving the site.
- ◆ Use hard, durable, angular stone or recycled concrete meeting the following gradation:

Sieve Size	% by weight passing
3"	100
2-1/2"	90 - 100
1-1/2"	25 - 60
3/4"	0 - 20
3/8"	0 - 5

Where not available, meet the gradation in WISDOT 2018 Standard Specification, Section 312, Select Crushed Material.

- ◆ The aggregate layer shall be a minimum of 12 inches in thickness
- ◆ On sites with a high water table, or where saturated conditions are expected during the use of the tracking pad, pads shall be underlain with a WisDOT Type R geotextile fabric.
- ◆ The tracking pad shall be the full width of the egress point and shall be a minimum of 50 feet long.

Manufactured Trackout Control Devices

- ◆ Minimum device length of 32 feet for stand alone installations.

Acceptable Stabilized Work Surfaces

- ◆ Aggregate, concrete, asphalt, manufactured mats, or other material that minimizes vehicle contact with soil.

Street Cleaning

- ◆ Use appropriate equipment to clean the road as needed and also at the end of the work day to maintain shovel-clean/broom-clean conditions to protect public safety & reduce sediment delivery to drainage infrastructure.

MULCHING (1058)



The application of organic material to the soil surface to protect it from raindrop impact and overland flow. Mulch covers the soils and absorbs the erosive impact of rainfall and reduces flow velocity of runoff.

USAGE

- ◆ Used to reduce soil erosion.
- ◆ Used to aid in seed germination and establishment of plant cover
- ◆ Used to conserve soil moisture.

MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of ½ inch or greater.
- ◆ Mulch that is displaced shall be reapplied and properly anchored. Maintenance shall be completed as soon as possible.

PROPER INSTALLATION

- ◆ Mulch shall cover a minimum of 80% of the soil surface for unseeded areas. For seeded areas, mulch shall be placed loose and open enough to allow some sunlight to penetrate and air to circulate but still cover a minimum of 70% of the soil surface.
- ◆ Mulch shall be applied at a uniform rate of 1½ to 2 tons per acres for sites that are seeded, and 2 to 3 tons per acre for sites that are not seeded.
- ◆ Wood chips or wood bark shall be applied at a rate of 6 to 9 tons per acre to achieve a minimum of 80% ground cover. This application should result in a layer of wood chips or wood bark ½ to 1½ inches thick.

SEEDING (1059)



Planting seed to establish temporary or permanent vegetation for erosion control.

USAGE

- ◆ Temporary seeding is used to reduce runoff and erosion until permanent vegetation or other erosion control practices can be established.
- ◆ Permanent seeding is used to permanently stabilize areas of exposed soil.

MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of $\frac{1}{2}$ inch or greater during the growing season until vegetation is densely established or permit expires.
- ◆ Repair and reseed areas that have erosion damage as necessary.
- ◆ Limit vehicle traffic and other forms of compaction in areas that are seeded.
- ◆ A fertilizer program should begin with a soil test. Soil tests provide specific fertilizer recommendations for the site and can help to avoid over-application of fertilizers.

STORM DRAIN INLET PROTECTION (1060)



Storm drain inlet protection BMPs are devices that prevent soil and sediment from entering existing storm drains. Inlet protection devices may be enhanced by additional excavation to increase the storage capacity around the inlet.

USAGE

- ◆ Use storm drain inlet protection on every storm drain on the construction site.
- ◆ Storm drain inlet protection is appropriate for use on sites with under one acre disturbed land draining to an inlet.

MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of ½ inch or greater.
- ◆ There should be NO gaps at the interface of the ground and the BMP.
- ◆ Accumulated sediment reaching 1/3 to 1/2 of barrier's height must be periodically removed to maintain effectiveness.
- ◆ Inlet protection devices may be removed once the drainage area is stabilized with appropriate vegetation or impervious area.
- ◆ **When removing BMP use caution. Do not allow accumulated sediment to fall into the storm drain.**

STORM DRAIN INLET PROTECTION, CONT'D (1060)

FILTER FABRIC MATERIAL BARRIERS

Geotextile fabric type FF is required.
Silt fence fabric is not acceptable.

TYPE A

- ◆ Used around inlets on unpaved areas until permanent stabilization methods have been established.
- ◆ Used on inlets prior to installation of curb & gutter and where safety will not be compromised.



TYPE B

- ◆ Used after the casting and grate are in place.



TYPE C

- ◆ Used on street inlets with curb heads.
- ◆ A 2" x 4" (nominal) piece of wood is placed in front of the curb head. It should not block the entire opening and is secured with ties to the grate.



TYPE D, D-M & D-HR

- ◆ Only to be used after castings are in place on the top of the inlet box.

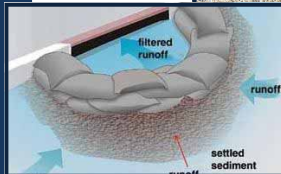


Protection device sits in drain

OTHER METHODS OF INLET PROTECTION

STRAW BALES

SAND / ROCK BAGS



STONE WEEPERS



DEWATERING (1061)



A compartmented container, settling basin, filter or other appropriate BMP through which sediment-laden water is conveyed to trap and retain the sediment.

USAGE

- ◆ Required when pumping sediment-laden water from excavations.
- ◆ Refer to WDNR technical standard for detailed information on allowable BMPs and proper sizing.

MAINTENANCE

- ◆ Remove sediment from devices to maintain effectiveness.
- ◆ Properly dispose of all sediment collected in dewatering devices to prevent discharge to waters of the state.
- ◆ Monitor the following and record results on a daily log kept on site:
 - ◇ Discharge duration & specified pumping rate.
 - ◇ Observed water table at time of dewatering.
 - ◇ Type and amount of chemical used for pH adjustment (if applicable).
 - ◇ Type and amount of polymer used for treatment (if applicable).
 - ◇ Maintenance activities.

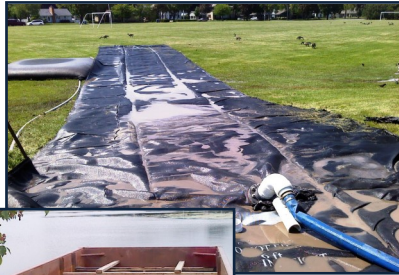
Note: WDNR permits may be required when utilizing de-watering methods.

DEWATERING, CONT'D (1061)

METHODS

- ◆ Geotextile Filter Bag
- ◆ Gravity Based Settling
 - ◇ Portable Sediment Tank
 - ◇ Sediment Trap and Sediment Basin
 - ◇ Wet Detention Basin
- ◆ Filtering Systems
 - ◇ Passive Filtration
 - ◇ Pressurized Filtration

Large
Dewatering
Bag



Dewatering
Tank

PROPER INSTALLATION

- ◆ Follow manufacturer's guidelines for determining size of dewatering BMP for the type of pump used.
- ◆ Minimum size of dewatering bag is 100 square feet.

OTHER CONSIDERATIONS

- ◆ Treatment efficiency can be improved by utilizing polymers. Additional guidance can be found in WDNr technical standard for Water Application of Additives for Sediment Control (1051).

Note: *WDNR permits may be required when utilizing de-watering methods.*

DITCH CHECK (1062)



A ditch check is a small barrier constructed of stone, a double row of straw bales or engineered products on the PAL, placed across a swale or drainage ditch. By reducing the speed at which the water flows through the channel, ditch checks allow sediment to settle and reduce erosion.

USAGE

- ◆ Used in constructed swales or drainage ditches where grading activity is occurring.
- ◆ Used as a temporary measure to control erosion of the channel until permanent stabilization is complete, unless intended to be part of a permanent stormwater management plan.

DITCH CHECKS CAN NEVER BE USED IN NAVIGABLE STREAMS WITHOUT PERMISSION FROM DNR.

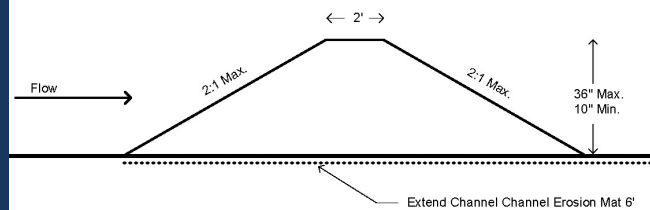
MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of ½ inch or greater.
- ◆ Replace missing rock, bags or bales that have degraded or become damaged.
- ◆ Unless incorporated into a permanent stormwater management system, ditch checks shall be removed once the final grading and stabilization is applied.
- ◆ Accumulated sediment reaching ½ the height of the barrier must be periodically removed to maintain effectiveness.

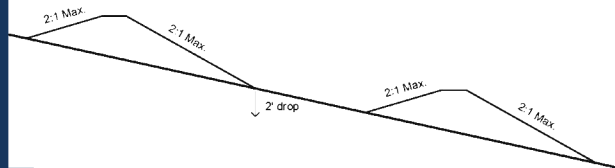
DITCH CHECK, CONT'D (1062)

CHARACTERISTICS OF A PROPERLY INSTALLED DITCH CHECK

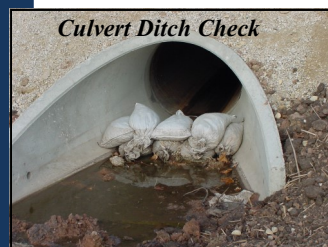
- ◆ Height shall be between 10 and 16 inches for manufactured or biodegradable materials and 36 inches for stone.
- ◆ Center of ditch check must be lower than sides.
- ◆ Stone ditch checks have a top width of 2 ft minimum and walls with slopes of 2:1 (2 horizontal to 1 vertical).



- ◆ One ditch check shall be installed for every two feet of drop in the channel.



- ◆ Shall be placed as to not cause damage or inconvenience to nearby areas if ponding occurs.
- ◆ Fabric is placed at the base of the BMP and extended a minimum of 6 ft to prevent scour and erosion at the base of the BMP.
- ◆ The base of a straw or stone ditch check should be keyed into the soil 6 inches.
- ◆ Stone ditch checks need to be constructed of a well-graded angular stone, with average size of 3 inches or greater. Refer to DNR technical standards for specifics.
- ◆ Ditch checks may be constructed of



Culvert Ditch Check

other materials capable of withstanding the water flow in the channel. Manufactured products listed in WisDOT's PAL are approved.

SEDIMENT TRAP (1063)

SEDIMENT BASIN (1064)



Sediment control devices constructed with an engineered outlet, formed by excavation or embankment to intercept sediment-laden runoff and retain the sediment.

DESIGN

THESE BMPs MUST BE DESIGNED IN ACCORDANCE WITH THE TECHNICAL STANDARDS.

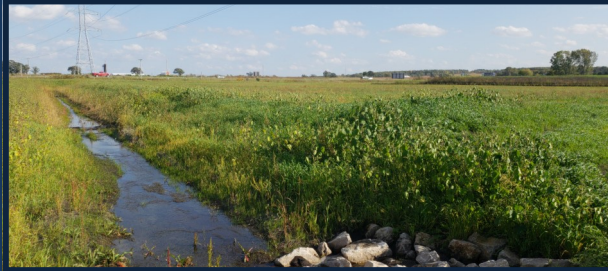
USAGE

- ◆ Detain sediment-laden runoff for sufficient time to allow the majority of the sediment to settle out.
- ◆ Constructed at locations accessible for clean out.
- ◆ Site conditions must allow for runoff to be directed into the basin.
- ◆ Designed to be in place until the drainage area is stabilized.
- ◆ Sediment Traps shall have a maximum drainage areas of five acres.
- ◆ Sediment Basins serve drainage areas up to 100 acres.
- ◆ Water application of polymers can be used to enhance performance but must meet technical standard 1051.

MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of ½ inch or greater.
- ◆ Sediment may need to be removed more frequently. Sediment shall be removed when it reaches a depth of one foot in a sediment trap and a depth of three feet in a sediment basin.
- ◆ Clean the outlet to restore flow capacity if it is clogged.
- ◆ Properly dispose of the sediment removed from the trap.

CONSTRUCTION SITE DIVERSION (1066)



A temporary berm or channel constructed across a slope to collect and divert runoff.

USAGE

- ◆ Constructed to intercept, divert and safely convey runoff at construction sites in order to divert clean water away from disturbed areas.
- ◆ Constructed to redirect sediment laden waters to an appropriate sediment control facility.

MAINTENANCE

- ◆ Inspect BMPs weekly and within 24 hours after a rainfall of ½ inch or greater.
- ◆ Maintenance shall be completed as soon as possible with consideration to site conditions.
- ◆ Accumulated sediment reaching ½ the height of the barrier must be periodically removed to maintain effectiveness.

PROPER INSTALLATION

- ◆ Side slopes of 2:1 (horizontal:vertical) or flatter, top width of two feet & berm height of 1.5 feet
- ◆ Sediment-laden runoff shall be diverted into a sediment control practice.
- ◆ Construct diversions to withstand runoff from a 2.5 inch rainfall in a 24 hour period.
- ◆ Build and stabilize clean water diversions before initiating down slope land disturbing activities.
- ◆ Protect diversions from construction activities.

TEMPORARY GRADING PRACTICES (1067)



Used to minimize construction site erosion. These practices include, but are not limited to surface roughening and temporary ditch sumps.

USAGE

- ◆ These practices may be used in addition to the approved grading plan to reduce erosion and sediment transport during grading operations.

MAINTENANCE

- ◆ These practices shall be inspected and repaired or reinstalled after every runoff event.

PROPER INSTALLATION

Surface Roughening - abrade the soil surface with horizontal ridges and depressions across the slope to reduce runoff velocities.

- ◆ Directional Tracking - drive a tracked vehicle up and down a slope. The tracks create horizontal grooves and ridges. The rough surface slows sheet runoff and helps to prevent rills.
- ◆ Tillage - utilize conventional tillage equipment to create a series of ridges and furrows on the contour no more than 15 inches apart.

Temporary Ditch Sump—are ½ to 5 cubic yard excavations made in a drainage way during earthmoving operations.

- ◆ Excavate sumps (holes) in the rough ditch grade, form a dike on the downstream side of the sump.

DUST CONTROL (1068)



Dust control includes practices used to reduce or prevent the surface and air transport of dust during construction.

USAGE

May be applied at any site but is particularly important for sites with dry exposed soils which may be exposed to wind or vehicular traffic.

- ◆ Used to reduce wind erosion and dust.
- ◆ Used to minimize deposition of dust and wind transported soils into water bodies through runoff or wind action.
- ◆ Used to reduce respiratory problems.
- ◆ Used to minimize low visibility conditions caused by airborne dust.

MAINTENANCE

- ◆ Areas that have dust control practices shall at a minimum be inspected daily.

METHODS

Dust control measures for construction activities include minimization of soil disturbance, applying mulch and establishing vegetation, water spraying, surface roughening, applying polymers, spray-on tackifiers, chlorides and barriers.



TURBIDITY BARRIER (1069) SILT CURTAIN (1070)



A temporary fabric barrier with very low permeability, installed in or near the bed of a waterway or waterbody to minimize sediment transport.

USAGE

- ◆ Provide sediment containment while construction activities are occurring in or directly adjacent to a waterway or waterbody. These locations include but is not limited to:

Dredging	Rip rap placement
Utility work	Streambank restoration
Boat launches	Bridge construction

- ◆ Turbidity Barriers are used in conditions with fine soils and flow velocities not exceeding 5 feet per second unless additional reinforcement is installed. Barriers are installed parallel to flow.
- ◆ Silt Curtains are intended for calm water conditions and used to settle out coarse and granular soils where water depth is equal to or greater than 4 feet. Curtains can be placed parallel or perpendicular to the direction of flow.

MAINTENANCE

- ◆ Inspect daily and repair if necessary.
- ◆ BMPs shall not be removed until the water behind the barrier has equal or greater clarity than the waterway or waterbody.
- ◆ Remove the BMP with care to minimize the release of accumulated sediment.
- ◆ To prevent the spread of exotic species do not reuse turbidity barriers on other sites.

MANUFACTURED PERIMETER CONTROL AND SLOPE INTERRUPTION PRODUCTS (1071)



Includes a variety of products designed to detain or slow the flow of sediment-laden sheet flow runoff from small areas of disturbed soil.

USAGE

- ◆ Only use products listed in the PAL
- ◆ Used to reduce uninterrupted slope length to slow the velocity of runoff so as to retain transported sediment from disturbed areas.
- ◆ Used where only sheet and rill erosion occur unless the product is approved for use in concentrated flow areas.
- ◆ Usage is limited to 12 consecutive months.
- ◆ Where conditions allow for proper installation.
- ◆ These products **cannot** be used:
 - ◇ Below the ordinary high watermark or perpendicular to flow in streams.
 - ◇ Where the maximum gradient upslope of the product is steeper than 50% (2:1).

TYPES

Types of manufactured devices include but are not limited to:

- ◆ Straw wattle.
- ◆ Straw/coconut fiber roll/log.
- ◆ Silt sock.
- ◆ Triangular silt dike.
- ◆ Mulch.
- ◆ Compost.

MANUFACTURED PERIMETER CONTROL AND SLOPE INTERRUPTION PRODUCTS CONT'D (1071)



PLACEMENT

- ◆ Products should be placed perpendicular to the slope whenever possible. J-hooks may be used for sloping installations of log-type products.
- ◆ The ends of product installations should be extended upslope to prevent water from flowing around the ends of the product.
- ◆ Products that are placed on a curved alignment shall be installed at a large enough radius of curvature to prevent kinking.

ENTRENCHMENT

- ◆ Log - Type Products
 - ◇ Disturbed Ground - product installed on disturbed ground shall be entrenched a minimum of 2 inches.
 - ◇ Vegetated Ground - product installed on vegetated ground may be installed without entrenchment but gaps and ruts shall be filled with soil or product filter media.
 - ◇ Frozen Ground - no entrenchment required. Only products approved for installation on frozen ground may be installed.
- ◆ Other products - products other than log-type products shall be entrenched as required by the manufacturer or as specified under Department of Safety and Professional Services product approval stipulations.

OVERLAP

- ◆ Minimum 24 inches or as required by the manufacturer if more restrictive. Overlap should be shingled in the direction of flow.

SUPPORT

- ◆ Stake or anchor as needed to maintain constant ground contact along the entire length of product at all times to prevent lateral movement and/or floatation.

MANUFACTURED PERIMETER CONTROL SLOPE INTERUPTION PRODUCTS

CONT'D (1071)

MAINTENANCE

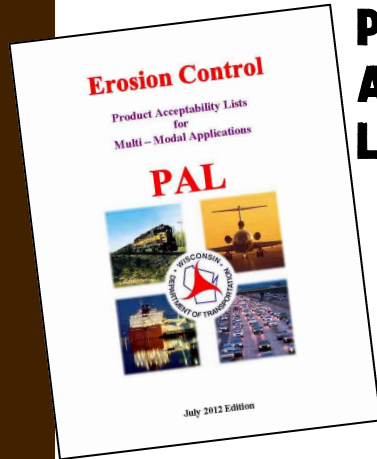
- ◆ Inspect the product weekly and within 24 hours after a rainfall of $\frac{1}{2}$ inch or greater.
- ◆ Product shall have continuous contact with ground. If gaps occur, the voids shall be backfilled with soil and compacted.
- ◆ If sediment reaches $\frac{1}{2}$ of the log-type product height, remove the sediment or position a second log-type product immediately upslope and in contact with the original product.
- ◆ If a product rolls out of position, reposition the product and secure with additional stakes.
- ◆ Holes, rips or tears in the fabric less than 12 inches in length and located on the top $\frac{1}{3}$ of the product may be repaired. Sections of the product with holes larger than 12 inches or on the bottom $\frac{2}{3}$ of the product shall be removed and replaced with new product.
- ◆ Mat products shall be replaced when visible sediment covers 50% of the width or if damaged or degraded. A second mat may be placed on top of the first mat in lieu of replacement.
- ◆ Once the area is stabilized, remove the product and dispose according to regulations and per the manufacturer's recommendations.



OTHER CONSIDERATIONS

- ◆ To protect products from damage in areas of active construction, products should be flagged to improve visibility.
- ◆ Vehicular traffic should be diverted around the product unless allowed under the manufacturer's specifications.
- ◆ When products are used to divert runoff, discharge should be made to a stabilized area or sediment control practice.

WISCONSIN EROSION CONTROL PRODUCT ACCEPTABILITY LIST "PAL"



The PAL includes a slope erosion control matrix and channel control matrix which can aid in selecting the correct BMP on slopes and channels.

For the full version, type the address below into your internet browser.

Wisconsin.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx

DNR CONTACTS



NORTHEAST REGION (NER)

Counties served: Brown,
Calumet, Door, Fond du Lac,
Green Lake, Kewaunee,
Manitowoc, Marinette, Mar-
quette, Menominee, Oconto,

Outagamie, Shawano, Waupaca, Waushara,
Winnebago

GREEN BAY SERVICE CENTER

2984 Shawano Avenue
Green Bay, WI 54313-6727
920-662-5100 phone
Office Hours - Monday thru Friday
8:30 a.m. to 4:00 p.m.

OSHKOSH SERVICE CENTER

625 E County Road Y STE 700
Oshkosh, WI 54903-2565
920-424-3050 phone
Office Hours - Monday thru Friday
8:00 a.m. to 4:00 p.m.

PESHTIGO SERVICE CENTER

101 N Ogden Road Suite A
Peshtigo, WI 54157
715-582-5000 phone
Office Hours - Monday thru Friday
11:00 a.m. to 2:00 p.m.

STURGEON BAY SERVICE CENTER

110 S Neenah Avenue
Sturgeon Bay, WI 54235-2718
920-746-2860 phone
Office Hours - Monday thru Friday
11:00 a.m. to 2:00 p.m.

WAUTOMA SERVICE CENTER

427 E Tower Dr. Suite 100
Wautoma, WI 54982
920-787-4686 phone
Office Hours - Monday thru Friday
11:00 a.m. to 2:00 p.m.

**Contact the municipality you are working
in for local stormwater regulations.**

ADDITIONAL RESOURCES

**NORTHEAST WISCONSIN
STORMWATER CONSORTIUM**
<http://www.newsc.org>

WISCONSIN DNR
<http://www.dnr.wi.gov>

**DEPARTMENT OF SAFETY AND
PROFESSIONAL SERVICES**
<http://dsps.wi.gov/Home>

**PAL - WISCONSIN EROSION
CONTROL PRODUCT
ACCEPTABILITY LIST (PAL)**
wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx

**TECHNICAL STANDARDS CAN BE DOWNLOADED
AND PRINTED FROM**
http://dnr.wi.gov/topic/stormwater/standards/const_standards.html

RENEW OUR WATERS
<http://www.renewourwaters.org>

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Published: January 1, 2019