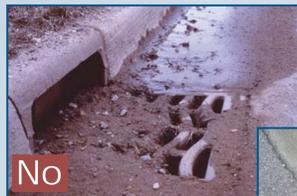


# Storm Water *and* the Construction Industry

An ounce of prevention is worth a pound of cure!



## Storm Drain Inlet Protection



- Use aggregate or other appropriate material to cover the storm drain inlet to filter out trash and debris.
- Make sure the aggregate size is appropriate (usually 1 to 2 inches in diameter).
- If you use inlet filters, maintain them regularly.



## Vegetative Buffers



- Protect and install vegetative buffers along water bodies to slow and filter storm water runoff.
- Maintain buffers.
- Do not disturb areas outside the specified limits of earth disturbance.



## Construction Entrances



- Remove mud and soil from the tires of construction vehicles before they enter a paved roadway.
- Properly size entrance BMPs for all vehicles anticipated on the construction site.
- Make sure that the construction entrance does not become buried in soil.

## Silt Fencing



- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried underground.
- Securely attach the material to the stakes.
- Don't place the silt fence across a waterway or use it as a check dam.
- Make sure that storm water does not flow around the silt fence.
- Periodically remove sediment from behind the silt fence.

# Maintain Your BMPs!

for Soil Erosion & Sedimentation Control



[www.michigan.gov/stormwatermgt](http://www.michigan.gov/stormwatermgt)

## Site Stabilization



- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed.
- Stabilize inactive construction areas whenever practical.



## Protect Natural Features



- Minimize clearing.
- Minimize the amount of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, stream buffers, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.



## Soil Stockpiles



- Cover or seed all soil stockpiles.
- Surround stockpiles with a silt fence, if required, to prevent off-site sedimentation.



## Construction Phasing



- Sequence construction activities so that soil exposure is minimized.
- Schedule work to limit grading to 50 stations of dual roadway or 100 stations of single roadway.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities to be completed within five days of final grading or within 24 hours if within 150 feet of a waterway.



## Slopes



- Rough grade or terrace slopes.
- Break up long slopes with sediment barriers, or divert storm water away from slopes.



# Planning and Implementing Erosion and Sediment Control Practices

## Preventing Polluted Runoff at Construction Sites

### Why is Erosion and Sediment Control So Important?

Everyone in Michigan is affected by erosion and off-site sedimentation. Construction is one of the major causes of erosion in Michigan and sediment is the greatest pollutant by volume entering our lakes and streams with over 100 tons of sediment per acre, per year generated on some construction sites. Sediment is the product of uncontrolled erosion which results in loss of fertile topsoil, filling of lakes and streams, increased flooding, damage to plant and animal life, and structural damage to buildings and roads.

### Construction Sites and Polluted Runoff

As storm water flows over a construction site, it picks up pollutants like sediment, debris, and chemicals that end up in our streams, lakes, rivers, and wetlands. So, preventing soil erosion and sedimentation is an important responsibility at all construction sites. High volumes of storm water can also cause stream bank erosion, and destroy downstream aquatic habitat.

In addition to the environmental impact, uncontrolled erosion can have a significant financial impact on a construction project. It costs money and time to repair gullies, replace vegetation, clean sediment-clogged storm drains, replace poorly installed Best Management Practices (BMPs), and mitigate damage to other people's property and our natural resources.

However, when construction site operators use BMPs, they protect our streams, rivers, lakes, and wetlands. They also save themselves time and money.

Several BMPs are shown on the front of this poster. These BMPs are so important that the federal Clean Water Act includes the National Pollutant Discharge Elimination System (NPDES) Storm Water Permitting Program for construction projects that disturb (clearing, grading, and excavation) one or more acres. In Michigan, administration of the NPDES Storm Water Permitting Program is delegated to the Michigan Department of Environmental Quality (MDEQ).

Michigan has two statutes/rules (known as Part 31 and Part 91 of Act 451) that are used to regulate soil erosion and sedimentation control (SESC) on construction projects. Together, these rules require the following:

- Develop and implement an SESC Plan
- Submit a permit application
- Comply with the permit, including maintaining BMPs, inspecting the site, and stabilizing the site at the end of construction activity

### I Think I Need a Permit. Where do I Start?

A good place to start is to contact your county or municipal enforcing agency (CEA/MEA) for details of the permitting process. Visit the MDEQ's SESC Home page at [www.michigan.gov/deq](http://www.michigan.gov/deq) then "Land" for a list of county and municipal enforcing agencies in your area.

Being subject to municipal erosion and sediment control requirements does not release you from the requirements of the NPDES program at the state level. Although you must comply with both sets of requirements, in most cases they have been designed to be complementary. Remain in contact with both permitting authorities, the CEA/MEA and the MDEQ, to find out exactly what you need to do and to minimize duplication of efforts.

### Determine Your Eligibility

If construction activity disturbs one or more acres of land, or is within 500 feet of a water body, the operator must obtain a "Part 91" permit and follow its terms and conditions

In addition to obtaining a Part 91 permit, operators with sites disturbing five or more acres must submit a Notice of Coverage (NOC) application and a site location map to the MDEQ, and pay the appropriate storm water fee. Construction activities must not begin until the NOC is filed and authorization to proceed is received.

For construction with multiple operators, all operators must have permit coverage for their individual parts of the larger development, no matter how large or small each operation happens to be. When there are multiple operators at one site, they are encouraged to develop and share one comprehensive SESC Plan and to obtain permit coverage as co-permittees.

If the operator is an authorized public agency (APA), it is exempt from obtaining a Part 91 permit from the CEA/MEA, but must notify the county or municipal agency of each proposed earth change. APAs are still required to submit an NOC to the MDEQ if the earth disturbance is five or more acres.

### Develop an SESC Plan

In Michigan, the permit applicant must submit an SESC Plan with the Part 91 permit application which includes the following information:

- A map showing the site location, predominant land features, proximity to lakes, streams, and wetlands, and contour intervals or slope information
- Soil information
- Physical limits of each earth change
- Location of existing and proposed on-site drainage patterns and dewatering facilities
- Timing and sequence of each proposed earth change
- Description of all temporary and permanent erosion and sedimentation control measures
- A schedule for maintaining all control measures
- Any other information required by the permitting agency

### Apply for Permit Coverage

Once you understand your permit requirements and have developed an SESC Plan, you can submit a Part 91 permit application to the permitting authority. This must be done before beginning any land disturbance on the site.

### Implement the SESC Plan

Be prepared to implement the BMPs in your SESC Plan before construction begins. Ensure that BMPs are properly maintained, and upgrade and repair them as necessary.

## Erosion and Sedimentation Control Practices are Only As Good As Their Installation and Maintenance

Document References:  
Michigan Department of Environmental Quality. Soil Erosion and Sedimentation Control Home page via: <http://www.michigan.gov/deq> then "Land". Last accessed December 2005.  
Mikula, D. and H. Croswick. Michigan Department of Environmental Quality. Soil Erosion and Sedimentation Control Training Manual. 2004 Edition.  
United States Environmental Protection Agency. Storm Water and the Construction Industry Poster via: <http://www.epa.gov/npdes/pubs/swposter-final-fullsize.pdf>. Last accessed December 2005.

## An Ounce of Prevention is Worth a Pound of Cure!

It's far more efficient and cost-effective to **PREVENT** pollution than it is to try to correct problems later. Installing and maintaining simple BMPs and pollution prevention techniques on site can greatly reduce the potential for storm water pollution and can also **SAVE YOU MONEY!**

### Helpful Definitions

**SESC** Soil Erosion and Sedimentation Control  
**NOC** Notice of Coverage  
**NOT** Notice of Termination  
**CEA/MEA** County or Municipal Enforcing Agency  
**APA** Authorized Public Agency

**Best Management Practice (BMP)** A BMP is a method used to prevent or control storm water runoff and the discharge of pollutants, including sediment into local water bodies. Silt fences, inlet protection, and site-stabilization techniques are typical BMPs on a construction site.

**Operator** An operator is someone who has control over and the ability to modify construction plans and specifications (e.g., owner, general contractor) or someone who has control over the day-to-day operations at a site that are necessary to ensure compliance with the permit requirements. It is the responsibility of a construction site owner or operator to manage storm water runoff and prevent erosion during all stages of a project. There may be more than one operator at a site who meets the definition and must apply for permit coverage.



### Preconstruction Checklist

- Site Description, including:**
  - Nature of the activity
  - Intended sequence of major construction activities
  - Total area of the site
  - Existing soil type and rainfall runoff data
  - A site map with:
    - Drainage patterns
    - Approximate slopes after major grading
    - Area of soil disturbance
    - Outline of areas which will not be disturbed
    - Location of major structural and nonstructural soil erosion controls
    - Areas where stabilization practices are expected to occur
    - Surface waters
    - Storm water discharge locations
  - Name(s) of the receiving water(s)
- Description of Controls:**
  - Erosion and sediment controls, including:
    - Stabilization practices for all areas disturbed by construction
    - Structural practices for all drainage/discharge locations
  - Storm water management controls, including:
    - Measures used to control pollutants from getting into storm water discharges after construction activities are complete
    - Velocity dissipation devices to provide non-erosive flow conditions from the discharge point along the length of any outfall channel
  - Other controls, including:
    - Waste disposal practices that prevent discharge of solid materials
    - Measures to minimize offset tracking of sediments by construction vehicles
    - Measures to ensure compliance with state or municipal waste disposal, sanitary sewer, or septic system regulations
  - Description of BMP implementation phasing during the construction
- State and Municipal Requirements Incorporated Into the Plan**
- Identify Inspection and Maintenance Procedures for Control Measures**
- Contractor Certification and SESC Plan Approval**

### Implementation Checklist

- Maintain Records of Construction Activities, including:**
  - Dates when major grading activities occur
  - Dates when construction activities temporarily cease on the site or a portion of the site
  - Dates when construction activities permanently cease on the site or a portion of the site
  - Dates when stabilization measures are completed on the site
- Prepare Inspection Reports Summarizing:**
  - Name and operator number of the Certified Storm Water Operator
  - BMPs/areas inspected
  - Observed conditions
  - Corrective actions taken/needed
- Report Releases of Reportable Quantities of Oil or Hazardous Materials:**
  - Immediately notify the National Response Center at 800-424-8802
  - Report releases to your permitting authority immediately, or as specified in your permit. You must also provide a written report within 14 days.
  - Update the Plan to include:
    - The date of the release
    - Circumstances leading to the release
    - Steps taken to prevent reoccurrence of the release
- Modify Plan as Necessary:**
  - Incorporate requests of the permitting authority to bring the Plan into compliance
  - Address changes in design, construction operation, or maintenance that affect the potential for discharge of pollutants

## Only Rain In The Drain! Soil Erosion and Pollution Runoff Control Tips



- Design the site to allow storm water to infiltrate into the ground and keep it out of storm drains. Eliminate or minimize the use of storm water collection and conveyance systems while maximizing the use of storm water infiltration and bioretention techniques.
- Minimize the amount of exposed soil on site:
  - To the extent possible, plan the project in stages to minimize the amount of area that is bare and subject to erosion. The less soil exposed, the easier and cheaper it is to control erosion.
  - Vegetate disturbed areas with permanent or temporary seeding immediately upon reaching final grade.
  - Vegetate or cover stockpiles that will not be used immediately.
- Reduce the velocity of storm water both onto and away from the project area:
  - Interceptors, diversions, vegetated buffers, and check dams are a few of the BMPs that can be used to slow down storm water as it travels across and away from the project site.
  - Diversion measures can also be used to direct flow away from exposed areas toward stable portions of the site.
  - Never use silt fences or other types of perimeter filters to reduce the velocity of runoff.
- Protect defined channels immediately with measures adequate to handle expected storm flows:
  - Sod, geotextile, natural fiber, riprap, or other stabilization measures should be used to allow the channels to carry water without causing erosion. Use softer measures like geotextile or vegetation where possible to prevent downstream impacts.
- Keep sediment on site:
  - Place aggregate or stone at construction site vehicle exits to accommodate at least two tire revolutions of large construction vehicles. Much of the soil on the tires will fall off before the vehicle gets to the street.
  - Regular street sweeping at the construction entrance will prevent soil from entering storm drains. Do not hose paved areas.
  - Sediment traps and basins are temporary structures and should be used in conjunction with other measures, such as check dams, to reduce the amount of erosion.

- Maintaining all BMPs is critical to ensure their effectiveness during the life of the project:
  - Regularly remove collected sediment from silt fences, berms, traps, and other BMPs.
  - Ensure that geotextiles and mulch remain in place until vegetation is well established.
  - Maintain fences that protect sensitive areas, silt fences, diversion structures, and other BMPs.
- You will also need to select other controls to address potential pollutant sources on your site. Construction materials, debris, trash, fuel, paint, and stockpiles become pollution sources when it rains. Basic pollution prevention practices can significantly reduce the amount of pollution leaving construction sites. The following are some simple practices that should be included in the Plan and implemented on-site:
  - Keep potential sources of pollution out of the rain, as practicable (e.g., inside a building, covered with plastic or tarps, or sealed tightly in a leak-proof container).
- Clearly identify a protected, lined area for concrete truck washouts. This area should be located away from streams, storm drain inlets, or ditches and should be cleaned out periodically.
- Park, refuel, and maintain vehicles and equipment in one area of the site to minimize the area exposed to possible spills and fuel storage. This area should be well away from streams, storm drain inlets, or ditches. Keep spill kits close by and clean up any spills or leaks immediately, including spills on pavement or earthen surfaces.
- Practice good housekeeping. Keep the construction site free of litter, construction debris, and leaking containers. Keep all waste in one area to minimize cleaning.
- Never hose down paved surfaces to clean dust, debris, or trash. This water could wash directly into storm drains or streams. Sweep up materials and dispose of them in the trash. Never bury trash or debris.
- Properly dispose of hazardous materials.

## Developing and Implementing an SESC Plan

Operators must have a Soil Erosion and Sedimentation Control (SESC) Plan (hereinafter referred to as "Plan") that includes erosion and sediment control and pollution prevention BMPs. The following provides general information for selecting and applying your Plan's project-specific SESC BMPs. Please note that the Michigan Department of Transportation (MDOT), as an authorized public agency (APA), has an approved Plan which contractors are required to follow when working on MDOT projects. In general, Plans require:

- Advance planning and training to ensure proper implementation of the BMPs.
- Erosion and sediment control BMPs to remain in place until the area is permanently stabilized with vegetation.
- Pollution prevention BMPs to keep the construction site "clean."
- Regular inspection of the construction site to ensure proper installation and maintenance of BMPs.

Fortunately, the practices and measures that must be included in your Plan are already part of the standard operating procedures at many construction sites. There is a wealth of information available on developing plans. Please contact your permitting authority for help in finding additional guidance materials.

There are six steps associated with developing and implementing a Plan.

### 1. Site Evaluation and Design Development

- Collect site information
- Develop site plan design
- Prepare a pollution prevention site map

The first step in preparing a Plan is to define the characteristics of the site and the type of construction that will occur. This involves collecting site information, identifying natural features that should be protected, developing a site plan design, describing the nature of the construction activity, and preparing a pollution prevention site map.

### 2. Assessment

- Measure the site area
- Determine the drainage areas
- Calculate the storm water runoff

The next step is assessing the impact the project will have on storm water runoff. Determine the drainage areas and estimate the runoff amounts and velocities. For more information on calculating runoff, go to [www.michigan.gov/deq](http://www.michigan.gov/deq). Click on "SESC" on the "Land" home page and see the latest SESC Training Manual.

### 3. Control Selection and Plan Design

- Review and incorporate state and municipal requirements
- Select erosion and sediment controls
- Select other controls
- Select storm water management controls
- Indicate the location of controls on the site map
- Prepare an inspection and maintenance plan and a sequence of major activities
- Coordinate controls with construction activities/staging

In the third step, you will actually document your procedures to prevent and control polluted storm water runoff. You must delineate areas that will not be disturbed, including critical natural areas like streambanks, floodplains, and trees. You must also identify the BMPs you will use to protect these areas.

Phasing your project to minimize the amount of exposed soil at any given time is a highly effective way to prevent erosion. Erosion control measures designed to prevent soil from being mobilized include diversions to route storm water away from exposed soils and stabilization with vegetation, mulch, and geotextiles. Sedimentation control measures designed to remove sediment from storm water or prevent it from leaving the site include silt fences, sediment traps, and diversions.

You will need to select erosion and sediment controls that are appropriate for your particular site. This includes stabilization measures for protecting disturbed areas and structural controls for diverting runoff and removing sediment. The appropriateness of the control measures will depend on several factors, but will be influenced most directly by the site characteristics.

Some stabilization measures you might consider are temporary seeding, permanent seeding, and mulching. Structural control measures include earth dikes, silt fences, and sediment traps. No single BMP will meet all of the erosion and sedimentation control needs of a construction site. A combination of BMPs is necessary.

### 4. Certification and Notification

- Certify the Plan
- Submit Notice of Coverage (NOC)

Once the Plan has been developed, the county or municipal enforcing agency must approve it. Once approved, you must submit the NOC to the MDEQ if your site disturbs five or more acres of land. Your permit might require that the Plan be kept on site, so be sure to keep it available for the staff implementing the Plan.

### 5. Implementing and Maintaining a Plan

- Implement controls
- Inspect and maintain controls
- Update/change the Plan, as field conditions dictate
- Report releases of hazardous materials

A Plan describes the practices and activities you will use to prevent storm water contamination and meet the NPDES permit requirements. Make sure that the Plan is implemented and that the Plan is updated as necessary to reflect changes on the site.

Erosion and sedimentation control practices are only as good as their installation and maintenance. Train those who will be installing the BMPs and immediately inspect their work to ensure that the BMPs have been installed correctly.

All construction activities must be inspected by a Certified Storm Water Operator once each week and after every precipitation event that results in a discharge from the site. Any necessary repairs or maintenance must be performed immediately. Many BMPs are designed to handle a limited amount of sediment. If not maintained, they will become ineffective and a source of sediment pollution.

It is also important to keep records of BMP installation, implementation, inspections, and maintenance. Keep track of major grading activities that occur on the site, when construction activities cease (temporarily or permanently), and when a site is temporarily or permanently stabilized.

If construction plans change at any time, or if more appropriate BMPs are chosen for the site, update the Plan accordingly.

### 6. Completing the Project: Final Stabilization and Termination of Permit

- Final stabilization
- Notice of Termination (NOT)
- Record retention

The MDEQ requires that a Notice of Termination (NOT) be submitted signifying that the construction activity is completed. A NOT is required when:

- Final stabilization has been achieved on all portions of the site for which the permittee is responsible.
- Another operator has assumed control over all areas of the site that have not received final stabilization. That operator would need to submit a new permit application to the permitting authority.
- For residential construction only, temporary stabilization of a lot has been completed prior to transference of ownership to the homeowner, with the homeowner being made aware of the need to perform final stabilization.

Permittees must keep the inspection log, a copy of their permit application, and their Plan for at least three years following final stabilization. This period may be longer depending on municipal requirements.



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