

Appendix F

Internal Training Modules and Surveys

MDOT Storm Water Management Plan Module 1: Introduction to Storm Water Management

**Together... Better Roads,
Cleaner Streams**



As part of MDOT's National Pollution Discharge Elimination System's (NPDES) Phase I Storm Water Permits, all municipal separate storm sewer systems (MS4s) serving populations of 100,000 or more must acquire a storm water permit. In Michigan there are 6 phase I municipalities, which include Ann Arbor, Flint, Grand Rapids, Sterling Heights, Warren, and Livonia.

The Michigan Department of Transportation has separate storm sewer systems on state roads within these cities and is required to hold a NPDES Storm Water Permit for each city. As required by the Storm Water NPDES Permit, MDOT has developed a storm water management plan for MDOT facilities within those cities. A portion of the storm water management plan states that MDOT will educate its employees and contractors about storm water management and how to reduce storm water pollution. This series of training modules address the NPDES permit requirements and provides concise and valuable information on storm water management.

The project theme, "Together... Better Roads, Cleaner Streams", was developed in planning discussions with MDOT environmental, communications, and policy staff, with assistance from Tetra Tech MPS. It complements the overall Michigan Department of Transportation Mission Statement.

This is Module 1 of a four part series of short presentations intended to inform staff and contractors about the MDOT Storm Water Program. The topics of the training modules are:

- Module 1- Introduction to Storm Water Management
- Module 2- Best Management Practices
- Module 3- Maintenance Considerations
- Module 4- Illicit Discharge Elimination Program

Module 1: Introduction to Storm Water Management

- Why are Storm Water Permits Needed?
- NPDES Permit Requirements
- Overview of MDOT's Storm Water Management Plan
- Value of the Storm Water Management Plan

Module 1 will define storm water and discuss why MDOT has developed a Storm Water Management Plan. It also reviews the National Pollutant Discharge Elimination System (NPDES), Permit Requirements and provides an overview of MDOT's Storm Water Management Plan.

There will be a survey questionnaire at the end of this presentation.

Storm Water: Contributions to Nonpoint Source Pollution (NPS)

- NPS pollution is caused by rainfall or snowmelt moving over the ground and picking up pollutants, depositing them into lakes, rivers, wetlands, and groundwater.
- Examples of these pollutants include: fertilizers, oil, grease, and sediment



Nonpoint source (NPS) pollution has been determined as a significant threat to water quality in the United States. NPS pollution is caused by rainfall or snowmelt moving over the ground and picking up pollutants, depositing them into lakes, rivers, wetlands, and groundwater.

Ask audience: What other kinds of pollutants they can think of. Then suggest the following list of additional pollutants:

- Pesticides
- Toxic chemicals
- Heavy Metals
- Nutrients from livestock
- Failing septic systems
- Pet waste
- Illegal dumping
- Trash

National Pollutant Discharge Elimination System (NPDES) Program

- Three Parts to NPDES Program
 1. Municipal Program (i.e. MDOT's Stormwater Program)
 2. Construction Program- Notice of Coverage
 - Phase I regulated 5 acres and larger
 - Phase II regulates any construction over 1 acre
 3. Industrial Program-Not applicable to MDOT



NPDES is more than just soil erosion sedimentation control it also includes a much broader scope of storm water management.

There are three main components of the Federal National Pollutant Discharge Elimination (NPDES) Program pertaining to storm water.

1. Municipal Program- Phase I and II – Discussed in this module, more detail on the next slide, MDOT Stormwater Management Program.
2. Construction Program- Phase I and II – This program is primarily focused on soil erosion and sedimentation control. You are familiar with this in your routine projects involving earth disturbance requiring weekly inspections.
3. Industrial Program- Phase I – This program does not impact MDOT

MDOT's NPDES Municipal Program

- Phase I - Six MDOT Phase I Storm Water NPDES permits
- Phase II - Applied for Statewide Permit March 10, 2003, over 300 cities in MI
- MDOT is actively participating with watershed groups including the Rouge River Watershed.



- According to the USEPA, storm water pollutants may affect:
 - water quality
 - recreational activities
 - aesthetic value (appearance, odor, etc.)
 - wildlife habitat
 - normal life-cycle of organisms and animals
- To address this concerns, in 1990, USEPA developed rules establishing Phase I of the National Pollutant Discharge Elimination System. Under the Phase I program, MDOT was required to apply for an NPDES Phase I Storm Water Permit. MDOT then developed a Stormwater Management Plan (SWMP) for each permit it holds.
- MDOT currently has six Phase I permits in Ann Arbor, Flint, Grand Rapids, Livonia, Sterling Heights, and Warren.
- The USEPA developed the Storm Water Phase II Program to further protect, preserve and improve public waters from storm water runoff. Phase II like Phase I requires MS4s, including MDOT, to apply and receive a Phase II storm water permit and then develop a storm water management plan.
- MDOT will also be required to have coverage in all MS4 Municipalities where state roads and storm sewers exist. There are approximately 300 such communities in the State of Michigan.

NPDES Permit Requirements

6 Minimum Measures

(National Pollutant Discharge Elimination System)

1. Public Education and Outreach
2. Public Involvement
3. Illicit Discharge Elimination Program
4. Pollution Prevention and Good Housekeeping
5. Construction Site Runoff Control
6. Post-Construction Runoff Control



MDOT, under permit requirements, must address and include 6 minimum control measures in its storm water management plan.

1. Public Education and Outreach- requires the permittee to have a public education program to promote, publicize, and facilitate watershed education for the purpose of encouraging the public to reduce the discharge of pollutants in storm water.
2. Public Involvement/Participation- requires the permittee to encourage public input in all aspects of the storm water management program.
3. Illicit Discharge Elimination Program-requires the permittee to develop a illicit discharge elimination program that will prohibit and eliminate illicit discharges to the permittee's drainage system.
4. Pollution Prevention and Good Housekeeping- MDOT has developed operation and maintenance practices which seek to reduce pollutant runoff from roadway facilities and maintenance operations. It also includes the development of a training program and the selection of appropriate BMPs that address typical pollutants sources.
5. Construction Site Runoff Control- The permittee is required to revise, as necessary, implement and enforce a program to address storm water runoff from areas of construction activity that discharge into the permittee's drainage system. Currently, MDOT has APA Status and a manual approved by MDEQ.
6. Post Construction Runoff Control- requires the permittee to implement and enforce a program to address storm water runoff from new development and redevelopment projects that discharge into the drainage system.

MDOT's Storm Water Management Plan

Focuses On:

- Highway runoff pollutants
- Illicit connections to storm sewers or drains
- Design, construction, and maintenance practices
- Public education and employee training



To address these issues and the six minimum measures required by the permit, MDOT has submitted a Storm Water Management Plan to MDEQ. This plan is briefly described in the upcoming slides.

Additionally, MDOT is in the process of developing a Drainage Manual to address design, construction, and the use of best management practices for MDOT projects.

This plan is available on the MDOT Stormwater Public Website and also each Regional Stormwater Coordinator has a copy.

Public Education Plan Activities



- Coordination with Phase 1 Communities
- Public Education Database
- Internal Training Program & Materials
- Public Web Site

<http://www.michigan.gov/stormwater>



- MDOT's public education activities have two specific target audiences:
 - Employees and contractors
 - General public
- The public web site was recently released and is a good source for additional data. Please take a look and check it out! www.michigan.gov/stormwater
- MDOT has developed an Internal Training Plan, which this presentation is a part of!!

MDOT Action Plan to Meet MDEQ Requirements

- General Training
- Staff-Specific Training
 - Regions, TSC, Design Support, Construction & Technology Area, Maintenance, & Real Estate
- Storm Water Information through MDOT Publications (Ex. MDOT Today)

Our Mission: Working Together... Better Roads, Cleaner Streams

Clean water is something that is easily taken for granted. According to the U.S. Environmental Protection Agency, the number one threat to water quality is polluted runoff. Runoff is precipitation that falls on highways and roads, then carries pollutants and debris into streams, rivers, lakes and ponds. Pollutants and debris can include sediment from construction sites, oil and leaking chemicals from cars and trucks, excess fertilizer from our yards, and a host of other pollutants. It will take our combined efforts to help reduce the amount of potential pollutants that enter Michigan's waterways.

One way to address this threat to water quality is to develop and implement a Storm Water Management Plan. This is exactly what MDOT is doing. This plan has a common mission: **Working Together, Better Roads, Cleaner Streams.** The three major components of the plan are the Erosion Discharge Elimination System, the Public Education Plan, and the Storm Water Pollution Prevention Plan. ■

POLLUTION - Where Does it Come From?

Most contaminants are made up of common items used by millions. Businesses and homeowners should be thinking to the end of the road, yard, driveway, sidewalk and gutter. At night we know the you can think to help keep pollution from entering lakes and streams in storm water runoff.

Future Articles Tell How You Can Help

This article is a preview to a series of articles that will appear in future publications of MDOT Today. The topics, their authors and topics what you can do to help protect Michigan's precious water resources.

<ul style="list-style-type: none"> • MDOT Storm Water Management Plan • What is Storm Water Runoff? • Storm Drain Blockages - You Dumped What Down a Storm Drain? • Street Curb to Your Lawn and Garden 	<ul style="list-style-type: none"> • Household Items in Your Home • Is Your Home Impervious? • "Pet Waste Friendly" • Car Care and Your Water • What's the Connection?
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Note: A Web site currently under development will provide additional information plus links to related sites.

Storm Water Management
MDOT

Tips to Keep Your Rivers, Lakes and Streams Clean

- Never dump anything down a storm drain!
- Use an oil pan when changing oil to keep fluids off the pavement. Check local body shops and quick lube to find a place to appropriately dispose of used oil.
- Dispose of pet wastes in a trash can.
- Leave grass clippings on your lawn as an alternative nutrient to fertilizer. If fertilizer is necessary, choose a slow-release product and use your seed to find out how much fertilizer your lawn actually needs.
- Wash your car on your lawn to excess water, chemicals, and dirt are filtered through the lawn.
- Keep household hazardous wastes - such as harsh cleaners, paints, car fluids and batteries - from entering lakes and streams by disposing at a household hazardous waste center.
- Use a broom (rather than a hose) to clean up grass clippings and dirt.
- Keep a trash bag in your car...and use it!

MDOT's general training plan aims to give the MDOT staff an awareness of the Storm Water Management Plan along with the requirements it has and how this affects the way MDOT does business. A brochure, litter bag, business card, and a series of articles have been developed to aid in this task. Look for future articles in MDOT Today!

An example article from MDOT today is shown on the right of the slide!

The staff-specific training is geared toward specific areas of MDOT that perform or have an affect of water quality and decisions that affect water quality.

Illicit Discharge Elimination Activities



- Inventory of Outfalls in MDOT Right-of-Way
- Field Investigation and Follow-Up for Suspected Problems
- Mapping of Outfalls into ArcView GIS and Database
- Responsible for Water Quality at MDOT Outfalls



•An **outfall** is defined as: the point at which the MDOT defined stormwater drainage system exits the MDOT ROW, enters a non-MDOT drainage system, or enters a U.S. water body.

•The illicit discharge elimination activities include completing an inventory and field investigation for all outfalls in the MDOT right-of-way for the Phase I communities.

•All the outfall information is being tracked in Arc View GIS with yearly updates using construction and as-built drawings.

•This process is approximately 95% complete for the Phase I Communities. After MDOT receives its Phase II permit, this program will be expanded to all MDOT Right of Ways in Michigan that are within the municipal boundaries of Phase II communities named in the the Federal Register and confirmed by the Michigan Department of Environmental Quality.

MDOT Storm Water Pollution Prevention

- Storm Water BMP Development for MDOT Projects
- Use of MDEQ PEAS Phone Number to Report Illicit Discharges **1-800-292-4706**
- Provided MDOT Outfall Maps for Local Emergency Personnel in:
 - Ann Arbor, Flint, Grand Rapids, Warren, Sterling Heights, and Livonia



MDOT has developed information on Storm Water Best Management Practices (BMPs) for use on MDOT projects. These BMPs will be documented in the new MDOT Drainage Manual. It will explain how to choose BMPs and where design detail sheets can be found.

MDOT also worked with MDEQ to share the Pollution Emergency Alerting System (PEAS), hotline for reporting illicit connections. The procedure for using PEAS will be explained in detail in Module 4, Illicit Discharge Elimination Program. **1-800-292-4706**

Drainage Manual

- Outline of MDOT's Policy and Procedure for the Design of Drainage Facilities
- Chapter 9: Storm Water Best Management Practices (BMPs)
 - BMPs are both structural and managerial practices used to treat, prevent, or reduce water pollution.



The Drainage Manual is being developed to provide MDOT designers and design consultants MDOT's guidance in the design of drainage facilities and outline for MDOT's design and operation personnel. The Drainage Manual will address all drainage issues, with a special focus on water quality concerns and best management practices.

MDOT's Storm Water Management Program best management practices (BMP's), which are structural and managerial practices used to treat, prevent, or reduce water pollution will also be included in the manual.

Please contact Kristin Schuster or Gary Croskey in MDOT's Design Support Area for any questions about the Drainage Manual.

What is the Value of MDOT's Storm Water Management Program?

- **Improve Water Quality**
- **Promote Public Awareness**
- **Develop Pollution Prevention Programs in MDOT**
- **Manage Storm Water Runoff**
- **Eliminate Illicit Discharges**

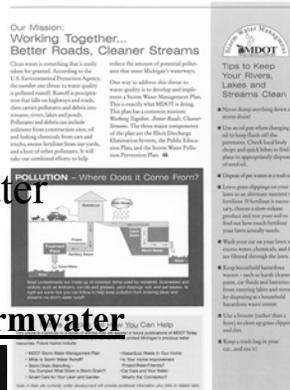


Discuss list on slide. In addition to these items, the Storm Water Management Program was developed to comply with mandatory State and Federal Regulations.

Where to Learn More

- MDOT's Public Web Site
 - Download the Storm Water Management Plan & Annual Report
- MDOT Articles & Brochures
- Coming Soon: Stormwater Resource Center!

<http://www.michigan.gov/stormwater>



Examples of work done as part of MDOT's Internal Training Plan; from left to right are, an example article from MDOT today, and the brochure developed for public education on MDOT's Storm Water Management Plan.

More information can be seen on yet another example of MDOT's Internal Training Program, the MDOT public web site. This site is found by first going to MDOT's web page: <http://www.michigan.gov/stormwater> going to the bottom of the page and clicking "here" to go to MDOT's Storm Water Management Web site. MDOT's Phase I Storm Water Management Plan and Annual Report for July 2001 through June 2002 are available to download on MDOT's public website.

Training Videos and other resources will be found in the Stormwater Resource Center for check out. The location of the Stormwater Resource Center has yet to be determined. It will likely be housed in the MDOT Lansing Library.

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Gary Niemi (North Region) (231) 941-1986

Dan Hamlin (Southwest Region) (269) 337-3914

Please contact the following individuals in the region for more information on MDOT's Storm Water Management Program.

MDOT Storm Water Management Plan Module 2: Best Management Practices

**Together... Better Roads,
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Module 2: Best Management Practices (BMPs)

- NPDES Requirements
- MDOT's Drainage Manual
- BMP Definition
- Structural, Vegetative, & Managerial BMPs
- MDOT Approved BMPs
- Maintenance Considerations for BMPs

Module 2 will introduce MDOT employees to Best Management Practices (BMPs) and how these practices will be incorporated into many aspects of MDOT's work. The presentation will review NPDES Requirements, define what BMPs are, describe Structural, Vegetative, & Managerial BMPs, and give a brief description of MDOT approved BMPs and how these will be incorporated in MDOT's new Drainage Manual.

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National Pollutant Discharge Elimination System (NPDES) Program

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Municipal NPDES Permit Requirements

6 Minimum Measures

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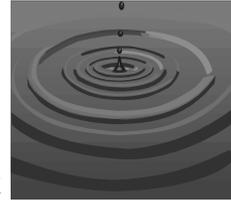


MDOT, under the existing and the up coming urbanized area permit requirements, must address and include 6 minimum control measures in its storm water management plan.

1. Public Education and Outreach- requires the permittee to have a public education program to promote, publicize, and facilitate watershed education for the purpose of encouraging the public to reduce the discharge of pollutants in storm water.
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6. Post Construction Runoff Control- requires the permittee to implement and enforce a program to address storm water runoff from new development and redevelopment projects that discharge into the drainage system.

MDOT's New Drainage Manual

- Three Key Areas with a Water Quality Focus
 - Policy
 - Design Procedures
 - Design Criteria
- Chapter 9: Stormwater Best Management Practices
- Contact Molly Lameroux or Kristin Schuster for additional assistance or questions



Three key areas with a water quality focus are presented in the Drainage Manual, which include, Policy, Design Procedures, and Design Criteria. A key feature of the manual is the chapter on BMPs.

What is a Best Management Practice (BMP)?

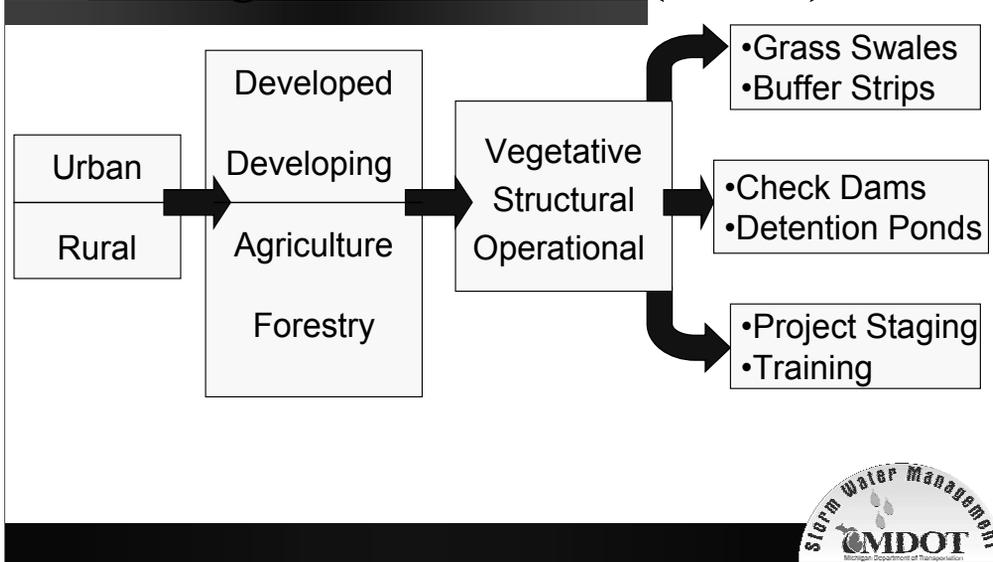
- BMPs are structural, operational, or vegetative practices used to treat, prevent, or reduce water pollution.



BMPs are structural, operational, or vegetative practices used to treat, prevent, or reduce water pollution.

This picture shows a turbidity curtain being used on M-27 in Downtown Cheboygan, Michigan. The project involved a slope stabilization and a widening of the road. Notice the difference of color of the water on either side of the turbidity curtain. This BMP has prevented a large sedimentation problem from occurring.

Categories and Examples of Best Management Practices (BMPs)



- BMPs can serve both urban and rural applications. The BMPs may differ within an urban landscape depending on whether the landscape is in the process of being developed. Rural BMPs can also differ based on the type of land use (i.e. agricultural vs. forestry).
- There are three main categories of BMPs, vegetative, structural, and operational. These categories of BMPs apply for both urban and rural applications. Under each of these categories exists a large inventory of BMP options for implementation.
- In trying to develop an approach to move from inventory to implementation, categorizing BMPs by appropriate land use, pollutant(s) addressed by each, etc, can help in prioritization and selection.
- BMPs should also be selected based on the “treatment train” concept. For example, what series of BMPs will work best with each other to produce the most cost effective and efficient method to remove pollutants and/or protect resources.
- Be aware that many of these BMPs may have secondary impacts of their own and that the overall goal is to avoid detrimental impacts/changes to the natural systems and processes - avoidance is preferred over methods that simply mitigate impacts.

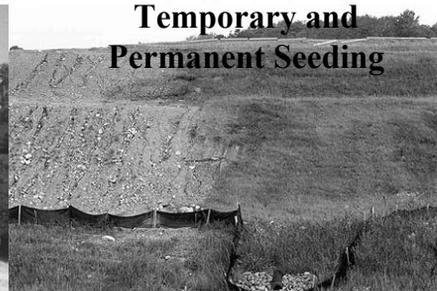
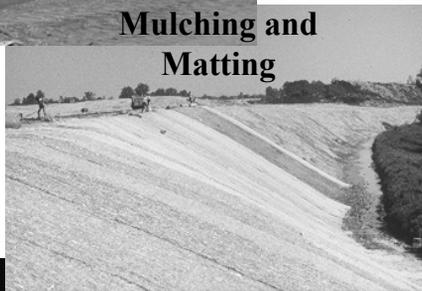
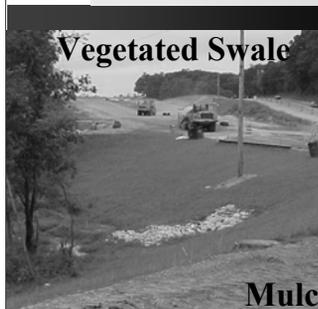
Vegetative BMPs

- Vegetative Controls – reduce the amount of pollution at the source
 - Vegetative Filter Strip
 - Vegetated Swale
 - Temporary Seeding for Erosion Control
 - Permanent Seeding for Stabilization
 - Use of Mulching and Matting to Establish Vegetation



- Vegetative controls reduce the amount of pollution at the source by preserving existing vegetation or re-establishing vegetation.
- Vegetative BMPs allow for storm water to infiltrate, reduce erosion, and filter sediments and other pollutants.
- In the urban landscape vegetative BMPs are most easily applied to developing land. Utilizing Vegetative BMPs in existing highly developed areas can be difficult because of the need for space.

Vegetative BMP Examples



Highlight examples of vegetative BMPs

- Vegetative Filter Strip are a specified width of buffer between construction sites and adjacent watercourses. The buffer helps acts as a filter to reduce soil erosion and sedimentation from entering the watercourse.
- Vegetated Swales are vegetated shallow channels with a dense stand of vegetation covering the side slopes and channel bottom that treat concentrated flows. As storm water runoff flows through these channels, it is treated through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils.
- Temporary Seeding and Permanent Seeding for Erosion Control is an inexpensive, yet effective, method of stabilizing flat areas and slopes.
- Use of Mulching and Matting to Establish Vegetation covers exposed soil areas with straw mulch, mulch blankets, or high velocity mulch blankets.

Refer to Chapter 9 of MDOT's Drainage Manual for more information.

Structural BMPs (Permanent)

- Structural Controls – physical structures that trap runoff and remove pollutants.

- Detention Ponds (Basin)
- Check Dams
- Infiltration Basins/Trenches
- Filter Berms
- Diversion Ditches

Check Dam



- Structural BMPs are physical structures that trap runoff and filter or treat pollutants.
- Structural BMPs can be used in most situations and have a wide range of costs.
- The check dam in the picture shows a new design for a check dam called a “permeable runoff device”. It is used to eliminate the need for stone check dams and can be both installed and removed by one person instead of heavy machinery. It can also be recycled when finished and used on a different project.
- Review example list on next slide.

Structural BMP Examples



Review Examples

- Check Dam is a device constructed across ditch lines used to reduce velocity of concentrated flows in the ditch and to protect vegetation.
- Geotextile Silt Fences are a permeable barrier used to capture sediment from sheet flow. This BMP must be maintained on a regular basis or when sediment has accumulated to half the height of the silt fence.
- Gravel filter berms are used to clean water as it flows through. Gravel filter berms are to be placed wherever a concentrated water flow requires filtering before leaving the construction site.
- Ponds (Basins) are designed to capture a storm water runoff volume, hold this volume and infiltrate it into the ground over a period of days. Basins are typically not designed to retain a permanent pool of water.
- Drop Inlet Structures are a temporary or permanent device used to trap sediment from stormwater before it enters the storm sewer system. This BMP must be maintained on a regular basis or when sediment has accumulated to half the height of the inlet.

Refer to Chapter 9 of MDOT's Drainage Manual for more information.

Operational BMPs

- Operational Controls – plans and maintenance operations that treat the pollutant source.
 - Riparian Buffer Zone
 - Street Sweeping
 - Catch Basin Cleaning
 - Spill Response and Prevention Plan
 - BMP Inspection and Maintenance Plan
 - Staff Training



Operational Controls are best management practices that seek to plan work to minimize negative impacts on water quality. Making sure the soil erosion BMPs are on plans and reviewing maintenance operations to reduce runoff potential are both examples of operational BMPs. Also street sweeping during dry weather can remove significant amounts of pollutant laden street dirt and trash while preventing its travel to the nearest water body. Catch Basins should be cleaned at least 1-2 times per year to keep them from building up large amounts of sediments. Delay of catch basin cleanout leads to improperly operating catch basins. It is also important to follow the Spill Response and Prevention Plan to avoid and treat spills when necessary. Make sure you know where to access your workplace's plan if you deal with hazardous chemicals. Finally, all BMPs will need to be maintained to some level after construction. This can vary widely depending on the type of BMP.

Operational BMPs

BMP Inspection and Maintenance



Spill Response and Prevention Plan



A person works to prevent a spill from entering a storm sewer (DAWG, 2000)

Street Sweeping



Here are some photos of the BMPs discussed the in last slide.

Refer to Chapter 9 of MDOT's Drainage Manual for more information.

Examples of MDOT Approved BMPs

Non-Structural BMPs

Employee Training
 Litter Control/Street Sweeping
 Identify & Prohibit Illicit Discharges to Storm Drains
 Clean and Maintain Storm Drain Channels, Storm Inlet, and Catch Basins
 Snow and Ice Control Operations
 Following Spill Response and Prevention Plan
 Used Oil Recycling Program

Structural BMPs

Biofilters
 Check Dam
 Catch Basin Inlet Devices
 Diversion Dike
 Energy Dissipators
 Geotextile Silt Fence
 Gravel Filter Berms
 Infiltration Trench /Drain Fields
 Pond (Basin)
 Sediment Basin/Traps
 Mulching and Matting



This is a list of examples of MDOT Approved BMPs: Details and additional BMPs will soon be available in the Drainage Manual, Chapter 9.

Structural BMPs

- **Biofilters** are of two types: swales and strips. Vegetated Swales are vegetated shallow channels with a dense stand of vegetation covering the side slopes and channel bottom that treat concentrated flows. Infiltration (Vegetative Filter) Strips are densely vegetated, uniformly graded areas that intercept sheet flow and are usually placed parallel to the contributing surface.
- **Check Dam** is a device constructed across ditch lines used to reduce velocity of concentrated flows in the ditch and to protect vegetation.
- **Concrete Grid Pavements** are lattice grid structures with grassed or pervious material placed in the grid openings. Their use, however, is generally restricted to parking areas and driveways.
- **Catch Basin Inlet Devices** are devices that are inserted into storm drain inlets to filter, or absorb sediment, pollutants, and oil and grease. These devices are typically placed at locations with a high potential for contamination.
- **Dry Detention Basins** are basins that are dry between storms. During a storm the basin fills. A bottom outlet releases the storm water slowly to provide time for sediments to settle.
- **Diversion Dike** is a temporary or permanent ridge of compacted earth constructed across sloping land to protect work or sensitive areas from upslope runoff by diverting flow away.
- **Energy Dissipators** are used to control erosion in a channel or conduit by reducing the velocity of flow and dissipate energy at outlets of channels or conduits.
- **Geotextile Silt Fences** are a permeable barrier used to capture sediment from sheet flow.
- **Gravel filter berms** are used to clean water as it flows through. Gravel filter berms are to be placed wherever a concentrated water flow requires filtering before leaving the construction site.
- **Infiltration Drainfields** are infiltration systems that capture a volume of runoff and infiltrate it into the ground. The system consists of a pretreatment structure, a manifold system, and a drainfield.
- **Infiltration Trench** is a gravel-filled trench designed to infiltrate storm water into the ground. Typically infiltration trenches can only capture a small amount of runoff, and therefore, may be designed to capture the first flush of the runoff event. For this reason, they are typically used with other BMPs, such as detention basins to control peak flows.
- **Ponds (Basins)** are designed to capture a storm water runoff volume, hold this volume and infiltrate it into the ground over a period of days. Basins are typically not designed to retain a permanent pool of water.
- **Sediment Basin/Traps** (Size greater than 5 cubic yards) are used to trap sediments from an upstream construction site. Provides a pool for velocities to slow down and sediment to drop out of traveling water.
- **Mulching and Matting** is used to provide immediate stabilization on a site after earth disturbing activities. Seeding should be included in the mulch or spread prior to mulching and matting.

Non-Structural

- Employee Training
- Litter Control/Street Sweeping
- Identify & Prohibit Illicit Discharges to Storm Drains
- Clean and Maintain Storm Drain Channels, Storm Inlet, and Catch Basins
- Snow and Ice Control Operations
- Following Spill Response and Prevention Plan/Used Oil Recycling Program

Maintenance Considerations for BMPs

- Regular maintenance required on BMPs
- Documentation required for maintenance and inspections
- Annual Reporting to MDEQ
- Reporting Process under construction



Once a BMP is installed, it will always require regular maintenance and routine inspections. Documentation on maintenance activities and inspections should be kept in a log book.

A reporting mechanism should be in place to assure inspections and maintenance are being kept up to date, this will be implemented by following the MDEQ issued permits and submitting annual reports describing the maintenance activities and inspections.

For More Information on BMPs

- MDOT Public Website

<http://www.michigan.gov/stormwater>

- 141 BMPs Fact Sheets
available at:

**[http://cfpub.epa.gov/npdes/stormwater/
menuofbmps/menu.cfm](http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm)**



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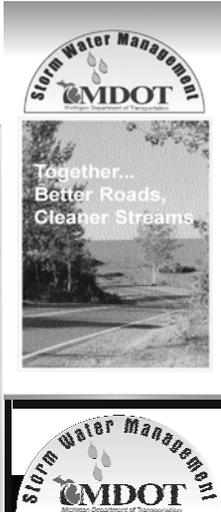
Additionally the USEPA has developed fact sheets on a large number of BMPs which are described based on Phase II's six minimum control measures. The web site shows the Phase II requirements for that minimum measure and the BMPs which could be used to implement the measure.

- Public education and outreach on storm water impacts.
- Public involvement/participation.
- Illicit discharge detection and elimination.
- Construction site storm water runoff control.
- Post-construction storm water management in new development and redevelopment.
- Pollution prevention/good housekeeping for municipal operations.

Where to Learn More

- MDOT's Public Web Site
 - Download the Storm Water Management Plan & Annual Report
- MDOT Articles & Brochures
- Coming Soon: Stormwater Resource Center!

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Please contact the following individuals in the region for more information on MDOT's Storm Water Management Program.

MDOT Storm Water Management Plan Module 3: Maintenance Considerations

**Together... Better Roads,
Cleaner Streams**



As part of MDOT's National Pollution Discharge Elimination System's (NPDES) Phase I Storm Water Permits, all municipal separate storm sewer systems (MS4s) serving populations of 100,000 or more must acquire a storm water permit. In Michigan there are 6 phase I municipalities, which include Ann Arbor, Flint, Grand Rapids, Sterling Heights, Warren, and Livonia.

The Michigan Department of Transportation has separate storm sewer systems on state roads within these cities and is required to hold a NPDES Storm Water Permit for each city. As required by the Storm Water NPDES Permit, MDOT has developed a storm water management plan for MDOT facilities within those cities. A portion of the storm water management plan states that MDOT will educate its employees and contractors about storm water management and how to reduce storm water pollution. This series of training modules address the NPDES permit requirements and provides concise and valuable information on storm water management.

The project theme, "Together... Better Roads, Cleaner Streams", was developed in planning discussions with MDOT environmental, communications, and policy staff, with assistance from Tetra Tech MPS. It complements the overall Michigan Department of Transportation Mission Statement.

This is Module 3 of a four part series of short presentations intended to inform staff and contractors about the MDOT Storm Water Program. The topics of the training modules are:

Module 1- Introduction to Storm Water Management

Module 2- Best Management Practices

Module 3- Maintenance Considerations

Module 4- Illicit Discharge Elimination Program

National Pollutant Discharge Elimination System (NPDES) Program

- Three Parts to NPDES Program
 1. Municipal Program (i.e. MDOT's Stormwater Program)
 2. Construction Program-Notice of Coverage
 - Phase I regulated 5 acres and larger
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 3. Industrial Program-Not applicable to MDOT



NPDES is more than just soil erosion sedimentation control it also includes a much broader scope of storm water management.

There are three main components of the Federal National Pollutant Discharge Elimination (NPDES) Program pertaining to storm water.

1. Municipal Program- Phase I and II – Discussed in this module, more detail on the next slide, MDOT Stormwater Management Program.
2. Construction Program- Phase I and II – This program is primarily focused on soil erosion and sedimentation control. You are familiar with this in your routine projects involving earth disturbance requiring weekly inspections.
3. Industrial Program- Phase I – This program does not impact MDOT

MDOT's NPDES Municipal Program

- Phase I - Six MDOT Phase I Storm Water NPDES permits
- Phase II - Applied for Statewide Permit March 10, 2003, over 300 cities in MI
- MDOT is actively participating with watershed groups including the Rouge River Watershed.



- According to the USEPA, storm water pollutants may affect:
 - water quality
 - recreational activities
 - aesthetic value (appearance, odor, etc.)
 - wildlife habitat
 - normal life-cycle of organisms and animals
- To address this concerns, in 1990, USEPA developed rules establishing Phase I of the National Pollutant Discharge Elimination System. Under the Phase I program, MDOT was required to apply for an NPDES Phase I Storm Water Permit. MDOT then developed a Stormwater Management Plan (SWMP) for each permit it holds.
- MDOT currently has six Phase I permits in Ann Arbor, Flint, Grand Rapids, Livonia, Sterling Heights, and Warren.
- The USEPA developed the Storm Water Phase II Program to further protect, preserve and improve public waters from storm water runoff. Phase II like Phase I requires MS4s, including MDOT, to apply and receive a Phase II storm water permit and then develop a storm water management plan.
- MDOT will also be required to have coverage in all MS4 Municipalities where state roads and storm sewers exist. There are approximately 300 such communities in the State of Michigan.

Module 3: Maintenance Considerations

- Where Does the Pollution Come From?
- Pollution Prevention
 - Soil Erosion
 - Vehicle Maintenance
 - Equipment & Material Storage
- Illicit Discharges/Connections
- What To Do If You Suspect a Problem
- Where to Learn More



Training Module 3 seeks to educate MDOT employees, contractors, contract counties and municipalities on storm water maintenance consideration. This presentation will include a discussion of where pollution comes from, pollution prevention/good housekeeping, illicit discharges/connections, what to do if you suspect a problem, and where to learn more.

There will be a survey questionnaire at the end of this presentation.

Where does Pollution Come From?

- Leaky fluids from improperly maintained equipment
- Washing vehicles and equipment (soap and dirt)
- Runoff from materials storage areas
- Servicing of equipment in inappropriate locations
- Improper disposal of materials



Where does Pollution Come From?

- Leaky fluids such as oils, brake fluid, and antifreeze are a real problem; these fluids get washed away when it rains and cause heavy metals to build up in local waterways.
- Servicing of equipment in inappropriate locations; for example servicing a vehicle outside in a parking lot. After servicing a vehicle, any drippings such as oils and grease would be washed off by the rain to the nearest waterway. These materials are pollutants and impact water quality.
- Runoff from storage of materials such as salt or sand piles.
- Washing vehicles and equipment outside where the runoff is not properly collected and treated.
- Improper disposal of materials into catch basins, storm sewers, ditches or similar. For example waste oils, debris, sanitary wastes, etc.

Where does Pollution Come From?

Continued

- Soil erosion
- Eroding/exposed drainage ditches
- Trash and debris in waterways
- Improper salt handling procedures
- Sanitary discharges to the storm drainage system
- Non-storm water discharges



Where does Pollution Come From?

- Soil erosion from earth disturbing activities; soil erosion is increased dramatically due to the exposed earth.
- Failing drainage ditches; can fail if vegetation is not properly maintained in them once again causing erosion to occur. Also a drainage ditch can fail when more flow than what the capacity of the drainage ditch is carried through the ditch. This excess flow can contribute to higher velocities, which in turn can erode the drainage ditch. Open ditches, which can experience failure contribute large amounts of sediment to the rivers and streams.
- Improper salt loading procedures; excess salt should be swept up after loading the salt truck along with any excess salt around buildings and driveways to avoid runoff to nearby lakes and streams.
- Sanitary discharges to the storm drainage system; this is where someone has accidentally or intentionally discharged sanitary sewage into the storm drainage system.
- Examples of non-storm water discharges include floor drains or a car wash discharging to the storm water drainage system.

Last Resort: Example of Oil Spill Containment



This picture shows a containment boom installed to collect oil or other floatable pollutants after a spill has occurred.

Example Sources of Soil Erosion and Sedimentation

- Earth disturbing practices
 - Slope flattening
 - Cutting back banks
 - Ditching operations
- Eroding drainage ditches or swales
- Improper stockpiling of materials
- Lack of timely stabilization of soils



Soil erosion is a natural process. This erosion process is accelerated dramatically due to exposed earth, this is why it is critical to develop and follow through with your soil erosion and sedimentation control plan. This additional erosion adversely impacts lakes, streams and wetlands by causing increased turbidity, picking up other pollutants, and causing sedimentation which can fill in habitat for fish and macroinvertebrates.

Soil Erosion and Sedimentation

- How to Prevent Storm Water Pollution
 - Follow the MDOT Soil Erosion and Sedimentation Control Manual and the Maintenance Performance Guide
 - Timely stabilization of exposed soils
 - Properly maintain all drainage systems
 - Correct placement of spoil piles



How to prevent storm water pollution

- Follow instructions in the MDOT Soil Erosion and Sedimentation Control Manual
- Properly maintain all open drainage systems
- Soil Erosion Controls are required by law to implement and maintain on ALL MDOT ACTIVITIES!
- Timely Stabilization of Soils- Legally this must be done within 5 days.



This slide shows a large sediment plume heading into Lake Michigan from Lake Macatawa due to storm water runoff and nonpoint source pollution. It will take the education of all our government agencies, local municipalities and residents working together to reduce the amount of sediment eroding from our landscape across the state.

Lake Macatawa is located near Holland, Michigan.

Vehicle Maintenance and Washing

- Maintain vehicles indoors
- Assure that interior floor drains are not discharging to the storm drainage system
- Don't allow wash water to discharge to a storm drain
- Wash vehicles in designated areas



***KNOW WHERE
YOUR STORM
WATER GOES***



Vehicle Maintenance and Washing

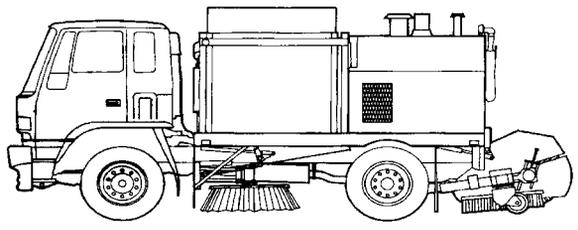
- Dirt, oil, grease, and salt are likely to be attached to trucks and heavy duty vehicles.
- Be sure to clean/wash these vehicle near a sanitary sewer drain to ensure proper wastewater treatment.
- ALWAYS AVOID discharging to a storm sewer, the wash water will go directly to the nearest stream.
- Vehicle maintenance should be done indoors in an appropriate servicing garage.
- Interior floor drains should not discharge to the storm drainage system.

At HOME:

Always wash your car on your lawn, away from storm drains to avoid runoff to local lakes and streams!!!

Examples of Equipment

- Trucks and street sweepers
- Other examples???



Presenter to engage the audience to ask for examples of equipment!

Examples

- Trucks
- Street sweepers
- Snowplows
- Lawn mowing equipment
- Catch basin cleaning equipment
- Tar kettles
- Spray rigs
- Endloaders
- Backhoe/Bulldozer

Equipment Storage

- How to Prevent Storm Water Pollution
 - Properly maintain all equipment
 - Wash equipment prior to storage
 - Maintain storm water BMPs
 - Interior floor drains are not discharging to the storm drainage system



How to Prevent Storm Water Pollution

- Properly maintain all equipment to prevent leaking of polluting materials such as oils, antifreeze, hydraulic fluid and brake fluids. These chemicals if discharged to a natural waterbody have the potential of doing significant harm to the aquatic ecosystem.
- Wash equipment appropriately prior to storage. Sediment that accumulates on a vehicle or grass clippings on a lawn mower are also considered pollutants. These should be washed off in an appropriate area prior to storage.
- Maintain storm water BMPs, such as oil and water separators, berms around loading pads, sweeping excess salt, etc.
- Check to make sure that floor drains are not discharging to the storm drainage system.

Example Material Storage

- Sand, Salt
- Other examples???
- A good rule of thumb:
 - When it rains, check to make sure your materials aren't leaving the site.



Presenter to engage the audience to ask for examples of equipment!

Example Material Storage Facilities:

- Sand
- Salt
- Asphalt cold patch
- Pesticides
- Fertilizers
- Fuel
- Oils
- Paint
- Solvent

Material Storage

- How to Prevent Storm Water Pollution
 - Keep polluting materials in secondary containment
 - Follow your PIPP - Pollution Incident Prevention Plan
 - Be familiar with your spill containment equipment
 - Keep materials away from drainage facilities
 - Maintain a clean storage yard
 - Maintain BMPs to address typical pollutants that may escape the site in storm water runoff



How to Prevent Storm Water Pollution

- Polluting materials must be kept in approved secondary containment. Keep materials protected by storing them inside, under a permanent roof, or covered with a tarp to prevent the rain from washing the material away.
- Keep the materials away from drainage facilities. For example; don't store a pile of sand next to a catch basin or next to the edge of a county drain.
- Spill containment equipment includes absorbent socks, floor dry or other. Employees should know where the equipment is stored, how to use it and how to properly dispose of it.
- Maintaining a clean storage yard is important. After loading and unloading materials excess material tracked away from the pile should be swept up to prevent wash off during a rain storm.
- Providing BMPs for the storage yard is also important. Typical BMPs may include sediment traps if the storage yard is paved. If the storage yard is unpaved, BMPs may include vegetative buffer strips around the perimeter, silt fence and rock aprons for trucks to drive over and drop the dirt from their tires prior to driving out on public streets.

Illicit Connections & Discharges

- When pollutants discharge into a storm drain from a specific source into the MDOT right-of-way
- Sources include:
 - Sewer Tap
 - Floor Drains
 - Wash Water from Carwashes/Laundromats
 - Dumping Motor Oil
 - OTHERS???



This pollutant discharge may be a result of specific prohibited activities taking place near MDOT's ROW.

Presenter to engage the audience to ask for examples of other sources!!

Sources of illicit connections include:

- Sanitary sewer tap
- wash water from Laundromats or carwashes,
- floor drains,
- overland drainage from a carwash,
- dumping used motor oil in or around a catch basin
- other similar sources.

Illicit Connections and Discharges

- Recognizing the Problem

- A bad odor like rotten eggs or sewage
- High turbidity, oil sheen
- Floatables such as sewage and toilet paper
- Vegetation (algae)
- Dry weather flow



Recognizing a Problem-Illicit connection indicators

- A bad odor like rotten eggs or sewage
- High turbidity (cloudiness, not able to see though), oil sheen
- Floatables such sewage and toilet paper
- Vegetation (algae)
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Training Module 4 provides additional education about illicit connections and discharges. Maintenance crews are encouraged to learn more about these issues

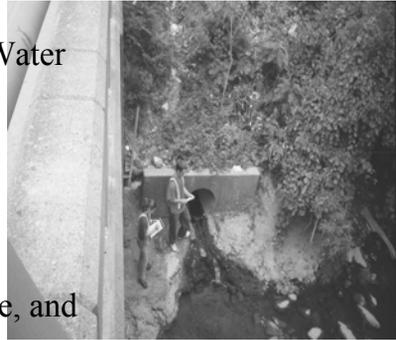
Steps to follow if you suspect a problem

- Non-Emergency

- Notify your supervisor immediately
- Notify the MDOT Regional Storm Water Coordinator

- Pollution Emergency

- Call Local First Responder (911)
- Call PEAS Hotline **1-800-292-4706**
- Notify your Supervisor, Maintenance, and Regional Storm Water Coordinator



Examples of Non-Emergency – see previous slide

Non-Emergency

- Notify your supervisor immediately
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Pollution Emergency: An environmental pollution emergency (defined by the critical materials register) includes tanker accidents, pipeline breaks, releases of hazardous substances, oil, salt, or other polluting materials. If this occurs calls PEAS. PEAS is the Pollution Emergency Alerting System.

What information do you need to pass on to the emergency responders, supervisor and coordinators?

- Location
- Extent of spill or discharge
- Source of spill or discharge if known
- Nearby water bodies
- Call back information

Where to Learn More

- MDOT's Public Web Site
 - Download the Storm Water Management Plan & Annual Report
- MDOT Articles & Brochures
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MDOT Storm Water Management Plan Module 4: Illicit Discharge Elimination Program

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- MDOT will also be required to have coverage in all MS4 Municipalities where state roads and storm sewers exist. There are approximately 300 such communities in the State of Michigan.

Module 4: Illicit Discharge Elimination Program (IDEP)

- Overview
- Definitions
- Locating an Illicit Connection/Discharge
- What to Do if You Suspect a Problem
- Where to Learn More



Module 4 will explain the illicit discharge elimination program and define what an illicit discharge/connection is. It will also explain how illicit connections are located, what to do if you find one, the PEAS (Pollution Emergency Alerting System) steps, and how to ensure that illicit connections are eliminated in future work.

There will be a survey questionnaire at the end of this presentation.

MDOT's Illicit Discharge Elimination Program Overview

- Inventory and Mapping Outfalls using Arc View GIS and Database
- Field Investigation of All Outfalls with Follow-Up for Suspected Problems



The illicit discharge plan is seeking to complete an inventory and field investigations of all outfalls in the MDOT right-of-way in the Phase I and Phase II communities. All the outfall information is being tracked in Arc view GIS with yearly updates using construction and as-built maps. This work is being done by our storm water consultants. Information is available in the annual reports, which is available on the public web site. Additional information is available from the Regional Storm Water Coordinators.

The permit requires MDOT take actions to eliminate illicit discharges and connections.

Illicit Connections & Discharges

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- Sources include:
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 - Floor Drains
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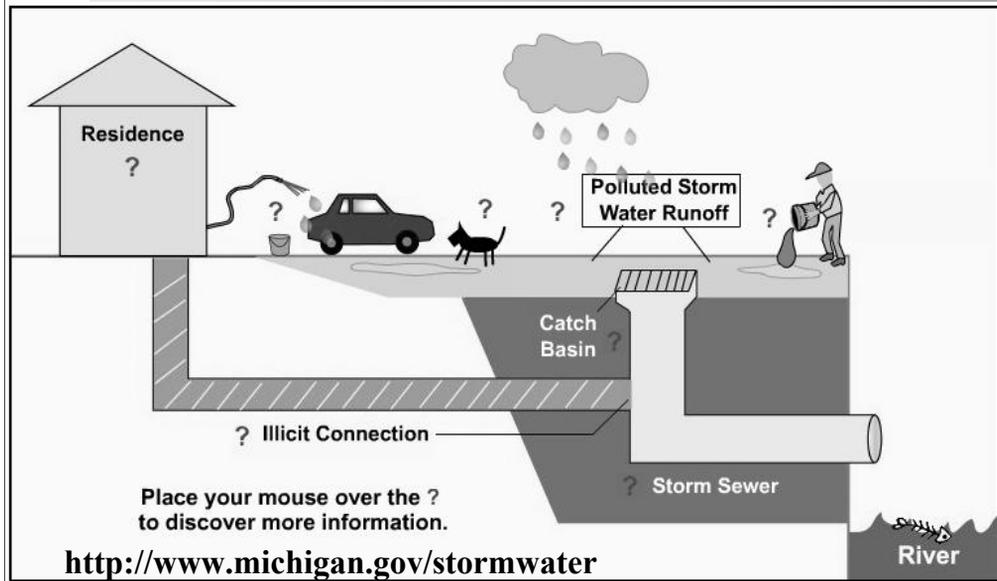


Presenter to engage the audience to ask for examples of other sources!!

Sources of illicit connections include:

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- other similar sources.

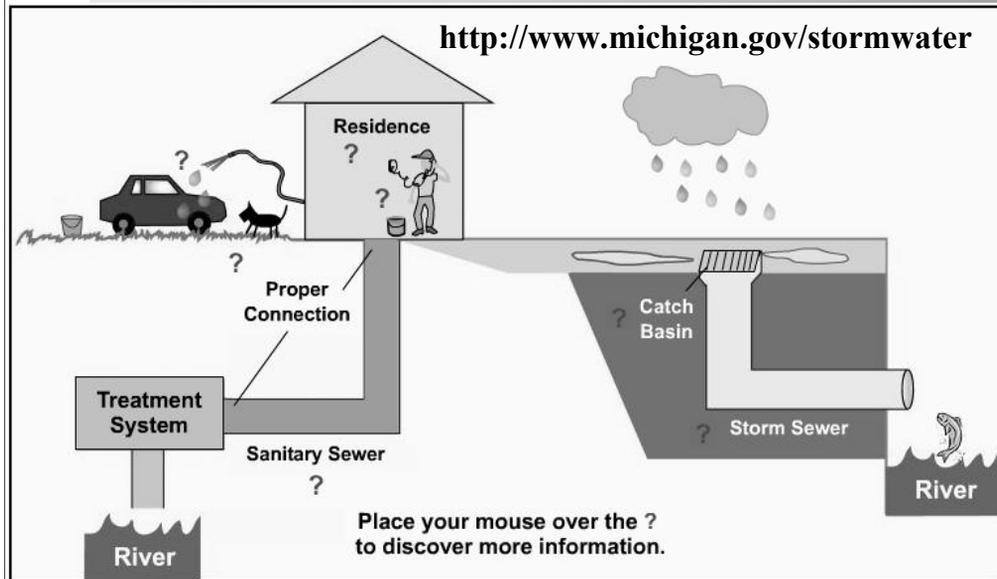
Illicit Discharge/Connection



This slide depicts an animated graphic located on MDOT's Storm Water Web site. This site is found by first going to MDOT's Storm Water Public web page at this address <http://www.michigan.gov/stormwater>. Then click on the left side of the screen on **Illicit Discharge- Don't**.

This graphic shows how **NOT** to connect to storm sewer and other detrimental water quality habits. Up on the right hand side of the graphic, someone is pouring used oil down the storm drain. This drains to the river, not to the local treatment plant. Also, the car washing water is running directly into the storm drain as well. Car washing should be done on grass to absorb and filter the wash water or in maintenance designated sites. The residence or business has an illicit connection leading their sanitary or industrial waste erroneously into the storm drain. Pet waste is also a major concern when it is left on the sidewalk or yard. Much of the nutrients and bacteria runoff during rain events into local streams untreated. Dispose of pet waste properly. These are all examples of illicit discharges and connections.

Correct Connections



This slide depicts an animated graphic located on MDOT's Storm Water Web site. This site is found by first going to MDOT's Storm Water Public web page at this address <http://www.michigan.gov/stormwater>. Then click on the left side of the screen on **Illicit Discharge- Do**.

Of special note, the catch basin in this diagram is only taking storm water to the stream. Other potential pollutants such as car washing runoff, sanitary sewer, industrial waste, and pet waste are being disposed of properly (not in the storm drain, but sanitary sewer and garbage).

How to Recognize an Illicit Connection

- Illicit Connection Indicators

- A bad odor like rotten eggs or sewage
- High turbidity, oil sheen
- Floatables such as sewage and/or toilet paper
- Vegetation (algae)
- Dry weather flow



Most Illicit Connections will be located by personnel from Maintenance, Construction, or Contractors.

Dry weather flow means water coming out of a storm drain during dry weather conditions when you wouldn't normally expect to see flow.

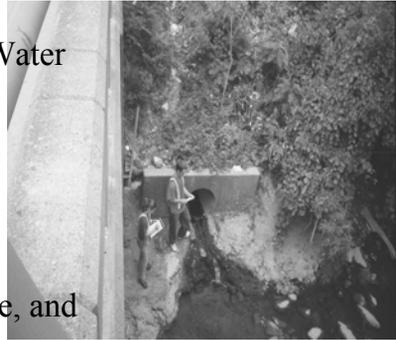
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Examples of Non-Emergency – see previous slide

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- Notify your supervisor immediately
- Notify your MDOT Regional Storm Water Coordinator (See last slide for list)

Pollution Emergency: An environmental pollution emergency (defined by the critical materials register) includes tanker accidents, pipeline breaks, releases of hazardous substances, oil, salt, or other polluting materials. If this occurs calls PEAS. PEAS is the Pollution Emergency Alerting System.

What information do you need to pass on to the emergency responders, supervisor and coordinators:

- Location
- Extent of spill or discharge
- Source of spill or discharge if known
- Nearby water bodies
- Call back information

Where to Learn More

- MDOT's Public Web Site
 - Download the Stormwater Management Plan & Annual Report
- MDOT Articles & Brochures
- Coming Soon: Stormwater Resource Center!

<http://www.michigan.gov/stormwater>



Examples of work done as part of MDOT's Internal Training Plan; from left to right are, an example article from MDOT today, and the brochure developed for public education on MDOT's Storm Water Management Plan.

More information can be seen on yet another example of MDOT's Internal Training Program, the MDOT public web site. This site is found by first going to MDOT's web page: <http://www.michigan.gov/stormwater> going to the bottom of the page and clicking "here" to go to MDOT's Storm Water Management Web site. MDOT's Phase I Storm Water Management Plan and Annual Report for July 2001 through June 2002 are available to download on MDOT's public website.

Training Videos and other resources will be found in the Stormwater Resource Center for check out. The location of the Stormwater Resource Center has yet to be determined. It will likely be housed in the MDOT Lansing Library.

Storm Water Program Manager: Seth Philips (517) 373-1908

Lansing Support Areas: Gary Croskey (517) 335-2171

Molly Lamrouex (517) 373-8351

Kristin Schuster (517) 373-3397

Region Staff Storm Water Coordinators:

Bob Batt (University Region) (517) 750-0410

Todd Neiss (Grand Region) (616) 451-3091

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Julie VanPortfliet (Superior Region) (906) 786-1830

Gary Niemi (North Region) (231) 941-1986

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Please contact the following individuals in the region for more information on MDOT's Storm Water Management Program.

MDOT Stormwater Internal Training Module 1 Questionnaire

Name: _____

Date: _____

Presenter: _____

Module #1

1. Q: Name three examples of non-point source pollution?

2. Q: What does NPDES stand for?

N _____

P _____

D _____

E _____

S _____

3. Q: Name 3 of the six minimum measures for NPDES permit requirements?

4. Q: Where can you find a copy of MDOT's Stormwater Management Plan?

MDOT Stormwater Internal Training Module 2 Questionnaire

Name: _____

Date: _____

Presenter: _____

Module #2

1. Q: What does BMP stand for?

2. Q: Name a Structural BMP

3. Q: Name a Vegetative BMP
 - a) Applying fertilizer
 - b) Vegetative Buffers
 - c) Mulching and Matting
 - d) Seeding
 - e) b, c, and d

4. Q: Name an Operational BMP
 - a) BMP inspection and maintenance
 - b) Spill response and prevention plan
 - c) Street sweeping
 - d) Installing silt fences
 - e) a, b, and c

Match the BMPs with its category on the left

- | | | |
|----|---------------------------|--------------------------------|
| 5. | Non-Structural BMPs _____ | a.) Spill Response Prevention |
| | Structural BMPs _____ | b.) Used Oil Recycling Program |
| | | c.) Ponds (Basins) |
| | | d.) Mulching and Matting |
| | | e.) Infiltration Basin |

MDOT Stormwater Internal Training Module 3 Questionnaire

Name: _____

Date: _____

Presenter: _____

Module #3

1. Q: Who contributes to non-point source pollution?
 - a.) Your neighbor
 - b.) Yourself
 - c.) Pets
 - d.) B and C are true
 - e.) All the above

2. Q: Name sources of non point source pollution:
 - a) Leaky fluids including oil, brake fluid, and antifreeze
 - b) Washing vehicles and equipment
 - c) Salt and sand piles
 - d) Fertilizers, herbicides and insecticides runoff
 - e) All of the above

3. Q: List two ways to recognize Illicit Connections or Discharge Problems?

4. Q: Name a source where soil erosion and sedimentation are likely to occur without adequate control?

5. Q: True or False-Should you wash your vehicle near storm water drain? If not, where should you wash it?

6. Q: What is a Pollution Prevention Method?
 - a) Provide BMPs on storm water runoff
 - b) Read MDOT's Storm Water Management Plan
 - c) Keep your grass cut short
 - d) Apply fertilizers only before heavy rain

MDOT Stormwater Internal Training Module 4 Questionnaire

Name: _____

Date: _____

Presenter: _____

Module #4

1. Q: What does IDEP stand for?

2. Q: If you locate a potential illicit connection that **is not a major emergency**, whom should you contact?
 - a) Your supervisor
 - b) Your regional storm water coordinator
 - c) Both A & B
 - d) Call PEAS

3. Q: If you locate an illicit connection/discharge that **is an emergency**, whom should you contact?
 - a) Call Local First Responder (911)
 - b) Your supervisor
 - c) Your regional storm water coordinator
 - d) Call PEAS
 - e) All of the Above

4. Q: Why is storm water pollution a problem?
 - a) Harms wildlife habitat
 - b) Increases recreational activities
 - c) Decrease aesthetic values
 - d) Degrades the quality of Michigan's water
 - e) All above are true
 - f) A, C, and D are true

Match the term with its definition:

- | | |
|----------------------------|---|
| 5. ____ Storm water runoff | a.) Discharge from your separate storm sewer drainage system directly to waters of the state |
| 6. ____ Impervious surface | b.) When pollutants are discharging into a storm drain from a specific source overland into the MDOT right-of-way |
| 7. ____ Outfall | c.) Water that flows off roofs, driveways, parking lots and streets |
| 8. ____ Illicit Connection | d.) Roofs, driveways, parking areas, sidewalks, decks, patios, concrete or asphalt streets |
| 9. ____ Illicit Discharge | e.) When a pipe intended for a sanitary sewer ends up in a storm drain |

MDOT Stormwater Internal Training Module Answer Key

Module #1 Answer Key

1. Q: Name three examples of non-point source pollution?
A: Fertilizers, oil, pet waste, illegal dumping, failing septic systems, and trash

2. Q: What does NPDES stand for?
A: National
Pollutant
Discharge
Elimination
System

3. Q: Name 3 of the six minimum measures for NPDES permit requirements?
A: Public Education and Outreach
Public Involvement
Illicit Discharge Detection and Elimination
Pollution Prevention and Good Housekeeping
Construction Site Runoff Control
Post-Construction Runoff Control

4. Q: Where can you find a copy of MDOT's Stormwater Management Plan?
A: MDOT's Stormwater Public Website: <http://www.michigan.gov/stormwater>

Module #2 Answer Key

1. Q: What does BMP stand for?
A: Best Management Practices
2. Q: Name a Structural BMP
A: a) Street Sweeping
b) Detention basin
c) Picking pet waste
d) Project Phasing
3. Q: Name a Vegetative BMP
A: a) Applying fertilizer
b) Vegetative Buffers
c) Mulching and Matting
d) Seeding
e) **b, c, and d**
4. Q: Name an Operational BMP
A: a) BMP inspection and maintenance
b) Spill response and prevention plan
c) Street sweeping
d) Installing silt fences
e) **a, b, and c**
5. Non-Structural BMPs A, B, _____ a) Spill Response Prevention
Structural BMPs C, D, E, _____ b) Used Oil Recycling Program
c) Ponds (Basins)
d) Mulching and Matting
e) Infiltration Basin

Module #3 Answer Key

1. Q: Who contributes to non-point source pollution?
A: a.) Your neighbor
b.) Yourself
c.) Pets
d.) B and C are true
e.) **All the above**

2. Q: Name one place where non point source pollution comes from?
A: a.) Leaky fluids including oil, brake fluid, and antifreeze
b.) Washing vehicles and equipment
c.) Salt and sand piles
d.) Fertilizers, herbicides and insecticides runoff
e.) **All of the above**

3. Q: List two ways to recognize Illicit Connections or Discharge Problems?
A: odor, algae, dry weather flow, floatables

4. Q: Name a source where soil erosion and sedimentation are likely to occur without adequate control?
A: Construction sites
Failing drainage ditches and swales
New and reconstruction

5. Q: True or False-Should you wash your vehicle near storm water drain? If not, where should you wash it?
A: False, wash it on your lawn.

6. Q: What is a Pollution Prevention Method?
A: a) **Provide BMPs on storm water runoff**
b) Read MDOT's Storm Water Management Plan
c) Keep your grass cut short
d) Apply fertilizers only before heavy rain

Module #4 Answer Key

1. Q: What does IDEP stand for?
A: Illicit Discharge Elimination Program

2. Q: If you locate a potential illicit connection that **is not a major emergency**, whom should you contact?
A: a) Your supervisor
b) Your regional storm water coordinator
c) **Both A & B**
d) Call PEAS

3. Q: If you locate an illicit connection/discharge that **is an emergency**, whom should you contact?
A: a) Call Local First Responder (911)
b) Your supervisor
c) Your regional storm water coordinator
d) Call PEAS
e) **All of the Above**

4. Q: Why is storm water pollution a problem?
A: a) Harms wildlife habitat
b) Increases recreational activities
c) Decrease aesthetic values
d) Degrades the quality of Michigan's water
e) All above are true
f) **A, C, and D are true**

Match the two sides together

- | | |
|--------------------------------|---|
| 5. <u>C</u> Storm water runoff | a.) Discharge from your separate storm sewer drainage system directly to waters of the state |
| 6. <u>D</u> Impervious surface | b.) When pollutants are discharging into a storm drain from a specific source overland into the MDOT right-of-way |
| 7. <u>A</u> Outfall | c.) Water that flows off roofs, driveways, parking lots and streets |
| 8. <u>E</u> Illicit Connection | d.) Roofs, driveways, parking areas, sidewalks, decks, patios, concrete or asphalt streets |
| 9. <u>B</u> Illicit Discharge | e.) When a pipe intended for a sanitary sewer ends up in a storm drain |