



II. Standards and Commitment



A. TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL

Erosion and sedimentation control is the use of practices and procedures to minimize erosion and to settle out sediment before surface water leaves the job site. Incorporating these practices and procedures into a construction project requires proper planning, and knowledge and experience to develop and apply erosion and sedimentation controls (ESC).

1. THE ESC PLAN

An ESC plan may have different names: at the Maine Department of Environmental Protection (DEP) it is a **Storm Water Pollution Prevention Plan (SWPPP)** while at MaineDOT it is a **Soil Erosion and Water Pollution Control Plan (SEWPCP)**. The name may change, but it serves the same purpose – documenting what practices and management procedures will be used to prevent a discharge of sediment and pollutants. When they apply, state and federal regulations require assurance that the proper BMPs will be installed in the right sequence and maintained for their intended use – they require a written plan. But the real value of the plan is for the contractor to think through the process of integrating BMPs into the construction project. It is essential that the person writing the SEWPCP understand the construction process and the basic principles of ESC and how the BMPs function. The complexity of a SEWPCP depends on the size and complexity of the project, the amount of exposed soil, the proximity of the project to a water body, and the sensitivity of the waterbody. If the project is completed in a single day, the plan may be to seed and mulch all disturbed areas and inspect and maintain the site until the grass grows; it may not even require sedimentation control. If the project is large, complex, and extends over multiple construction seasons then sequencing of construction and BMP installation with the phases of the project may be complicated, and inspection and maintenance will require more time and effort. Depending on weather or changes in project scope, the plan may require revision, but the process is the same and a good planner has the knowledge, experience, and tools to do the job well.

2. SIX PRINCIPLES OF EROSION AND SEDIMENTATION CONTROL

When developing a SEWPCP for a construction project, the following six principles will help guide you in developing and implementing the plan. All six general principles apply to all earthmoving construction sites, but all sub-categories may not.

a. Know the Watershed

i. Know where the project is located in the watershed and how much of the watershed is above the site

Before choosing BMPs, look for signs of concentrated flow (either storm water or spring runoff). If they exist, look at the watershed above the backslopes, private driveways that concentrate flow to road ditches, and length of ditches and off site watersheds that flow to them. Are there indications of seeps and continuous flow?

ii. Know the soils and materials that you are working with

Are they highly erodible? Do they drain well? Are you dealing with steep slopes on which it may be difficult to establish vegetation?

iii. Land use, location, and time of year

Look at the land use cover. In general, wooded areas will produce runoff slowly but for a longer time. Urban areas will quickly produce larger amounts of runoff for a given rainfall. Anticipating flow rates is critical to good water management.

Consider how much sun the project site gets. If you are on the north side of a slope, soils may not dry out and grass grows slowly. If you are in an open area exposed to the sun and wind, the soil may dry out too quickly, grass may need to be watered, and dust control will be a concern.

The time of year has similar effects on soil moisture and establishment of vegetation. Also consider that summer thunderstorms are quick-hitting and intense while fall and spring rains tend to be less intense but last longer.

iv. Know where the water goes when it leaves the site and what the water resources are

If not identified in the plans, assume that any stream, lake, pond, or wetland should be avoided and protected before any earthmoving occurs. When in doubt, ask. Always walk or drive the site, use a map if necessary, and identify where the water goes and how far away your project is from the water resources. More importantly, how does it get there? If it is sheet flow through a buffer there is an opportunity for treatment; if it is concentrated flow, there is not.

b. Construction Timing and Phasing

i. Minimize clearing

Keep disturbed areas small. Only open up what you can manage. The smaller the bare soil area exposed to rainfall and runoff, the less erosion there will be. Minimize soil disturbance during clearing and delay or stage the grubbing operation wherever possible.

Avoid clearing steep and long slopes. It always depends on the site but slopes greater than 3:1 and longer than 50 feet are areas where you should be cautious.

ii. Build from the bottom up

On projects where the excavation is used to build the fills, plan and stage the work such that the bare soil area is kept to a minimum.

For all concentrated flow channels (ditches), stabilize the outlet first and build from the bottom up. Only excavate what can be stabilized or protected by the end of the work day. All cross culvert outlets should be armored before the end of the work day.

iii. Winter stabilization

Time of year is critical for stabilization. Spring thaws and rain events are the most erosive times of the year. Surface soils are usually saturated and have little strength, and vegetation is laid down or dead providing less protection from rainfall and runoff. If construction will extend into late fall or later, consider the need for appropriate erosion and sedimentation controls will be in place and functioning as the snow melts the following year.

iv. In-water work

Fishery agencies usually require that work within a stream, or other water body only occur during certain months of the year, typically mid July through September. Scheduling operations within those months requires coordination and planning.

c. Control the Water

i. Divert, disperse, detain

The key to E&S control is to keep the depth (volume) and velocity of water as low as possible. Whenever possible:

Divert clean water away from the exposed soil. Use temporary ditches, hillside diversions, and downspouts to carry water from the uphill watershed away from exposed soil. This may be around or through the site. Be sure that constructed channels are stable before they receive runoff. Because it takes time for vegetative channels to stabilize, this will usually require using riprap or plastic sheeting to divert the water.

Disperse the flows. Where practicable keep runoff water in sheet flow and treat smaller areas with sedimentation control BMPs such as Erosion Control Mix Berms and Silt Fence. Smaller quantities of water in sheet flow are easier to handle than concentrated flow.

Detain dirty water. Whether in sheet flow or concentrated flow, detaining the water – slowing it down – removes sediment. Use appropriate sedimentation control BMPs.

ii. New permanent channels

Before permitting permanent channels to carry water they shall be stabilized. This may require the installation of temporary erosion control BMPs or temporarily diverting flows.

iii. While grading

On projects with slopes that will not have final cover for periods longer than a week, in addition to mulch, consider using land grading BMPs to slow down the runoff. Even at the end of each day all pockets and diversions created with a pass of a bulldozer blade or excavator bucket can help other BMPs to detain and slow the water down.

d. Soil Stabilization

i. Temporary stabilization

Mulch is the most effective BMP! Stop erosion before it starts! Most sites should have temporary mulch applied at the end of each work day.

Mulch will protect the soil from raindrop impact and promote infiltration of runoff into the soil. This will decrease the volume of water that runs off the site. Mulch will also slow down sheet runoff. Refer to the mulch BMPs for various types of covers.

Remember slope and slope length are critical to when sheet erosion turns into rill erosion, and then gully erosion. Consider using grading techniques in combination with mulches to limit slope length.

ii. Permanent stabilization

Place final treatments as soon as possible after final grading.

Install permanent erosion control BMPs, such as riprap downspouts, or stone ditch protection, as part of the slope or ditch construction.

e. Keep Sediment On-Site

i. Last line of defense/first BMP

Sedimentation control is the last line of defense in keeping sediment out of water resources, but it should be the first BMP installed as insurance against not having 100% erosion control. It provides a final treatment of all runoff.

f. Management

i. Assign responsibility

As with any job that needs to be done, there must be someone in charge. For E&S control that person needs to be an employee of the Prime Contractor that has the authority to ensure that the SEWPCP is followed and practices maintained.

ii. Inspect and maintain

As with equipment maintenance, E&S control maintenance requires inspection and, if needed, correction at least once a week and before, during, and after storm events. E&S control is a daily activity on an earthmoving construction project, so treating E&S control as a daily activity like fueling and lubing equipment will prevent unexpected problems.

iii. Follow-up; remove temporary sediment control barriers

Temporary measures such as temporary check dams, sediment barriers, temporary slope drains, etc. must be removed when disturbed areas have been permanently stabilized. If left on-site, temporary measures may actually cause erosion and be an eyesore for years. Erosion Control Mix filter berms may not have to be removed. In most circumstances they can be spread out, seeded and left to decompose. However silt fence and hay bale barriers must be removed from the site. Areas disturbed during the removal of these devices must be properly stabilized.

3. SPILL PREVENTION

Although spill prevention is not specifically covered in this manual it is a water quality issue that must be addressed during construction. Leaks from hydraulic hoses or fuel spills and leaks can have great impacts on surface and ground water resources. To minimize the environmental impacts associated with unplanned releases, it is important to ensure that “good housekeeping” practices are followed and that prompt actions are taken to respond to spills or leaks. Unto that end, the contractor shall use proper fuel filling procedures, maintain equipment to prevent leaks, have “spill kits” on the job site to clean up spills if they occur and develop a project specific plan for responding to releases. Most importantly, they should know who to call if there is a spill and the proper procedures for reporting and clean-up.

4. MAINEDOT PROCEDURES

a. Project Development

Most regulated construction projects are required to have an ESC plan written before a permit is issued and construction begins. These plans are usually written by the design team well before construction begins. The disadvantage of this process is there are usually unanticipated site conditions, weather, or contractor resources that require modification to the plan. The MaineDOT through an agreement with the Maine DEP (see Stormwater Memorandum of Agreement) have resolved this issue by having the contractor who is doing the work write and implement the SEWPCP. It is a contract specification and bid item: Standard Specification 656 – Temporary Soil Erosion and Water Pollution Control (see Appendix C) that provides the requirements for the contractor to incorporate into their SEWPCP. The advantage of this method is that the contractor takes ownership of the SEWPCP. They are responsible for developing the construction schedule for the project, and the SEWPCP becomes part of that process. The MaineDOT approves the SEWPCP before any work begins, oversees its implementation, and has the authority to assure full compliance. The Surface Water Quality Unit (SWQU) of the Environmental Office at MaineDOT maintains this specification and this manual, and assists Project Development in compliance of this.

b. Maintenance and Operations

When construction projects are undertaken by MaineDOT Maintenance and Operations (M&O) crews, the crew foreman or superintendent write the SEWPCP in the same manner as the contractor, describing how the proper BMPs are incorporated into the project and how they are inspected and maintained. Internal policies and procedures are in place to assure the SEWPCP is implemented. The SWQU assists the Region Environmental Coordinators in overseeing this program and provides training to all field crews on a biennial basis.

5. SEWPCP CONTENT

The SEWPCP is not only for the benefit of the contractor to address erosion and sedimentation control, it is also a permit requirement and part of the construction contract with MaineDOT. Because the MaineDOT reviews and approves the SEWPCP before any work begins on a project, we look for specific items in our reviews. The following are items that, when they apply to the project, should be addressed in a SEWPCP:

- a. name of the person preparing the SEWPCP;
- b. name of the on-site person responsible for implementation of the plan with phone numbers or pager numbers that can be used to contact the person in case of emergency;
- c. the schedule and sequence of all activities involving soil disturbance;
- d. emergency storm response procedures including a list of materials which will be kept on-site to handle emergencies, and procedures for corrective action in case of BMP failure;
- e. a narrative of how the SEWPCP meets or exceeds the requirements of Section II of the BMP manual;
- f. type and location of all temporary erosion and sedimentation control measures, including temporary measures for winter stabilization between November 1st to April 1st;
- g. mulching type, thickness of mulch, and frequency of application for disturbed earth areas;

- h. location and frequency of temporary seeding;
- i. dust control procedures for staging areas, stockpile areas, haul roads, and any other areas;
- j. location and method of temporary sedimentation control at inlets and outlets of existing and proposed catch basins and at outlet areas;
- k. description of all in-water work, including the timing of work, temporary stream diversions and the types, location, and size of cofferdams;
- l. description of the design and location of any sedimentation basins for dewatering the cofferdams, including alternative plans when the sedimentation basin overflows;
- m. inspection and maintenance schedules for all erosion and sedimentation control measures, temporary and permanent, including the method, frequency, and disposal location of sediment removed, and maintenance of temporary winter stabilization BMPs;
- n. procedures and schedule for removal of all temporary erosion and sedimentation control measures;
- o. a Spill Prevention Control and Countermeasure Plan (SPCCP).

B. POST CONSTRUCTION STORMWATER MANAGEMENT AND COMPLIANCE

In the first publication of this manual, the MaineDOT and Maine Turnpike Authority (MTA) committed to implementing basic permanent stormwater practices to control long term impacts. These practices focused on long term erosion control and permanent stabilization of areas that are subject to concentrated flows such as waterways, downspouts, and culvert inlets and outlets. These permanent stormwater practices are incorporated as design standards for all projects.

Erosion and sedimentation from disturbed soils on construction sites is not the only type of non-point source pollution that is associated with transportation projects. Impervious surfaces of roads, bridges, and parking areas can also be a source of non-point source pollution. Runoff from these surfaces may carry nutrients, salt, heavy metals, and petroleum products to the water resources. Research has shown that the quantity of pollutants from road systems is directly related to the Average Annual Daily Traffic (AADT). There needs to be approximately 30,000 cars per day traveling over a road section before there is a significant pollutant load. Parking lots have a higher potential but that too depends on the number of vehicles that use them. Melt water from winter snow piles have also shown high levels of chlorides from winter salt application.

Impervious areas also increase the rate of runoff and decrease infiltration rates to the groundwater table. These changes in the hydrologic cycle can disrupt stream channels causing bank and bed erosion, increased water temperatures, and decreased groundwater discharge to streams during periods of little rain.

Controlling stormwater quantity can be difficult on transportation systems. Roads are impervious and for safety concerns water must be removed from the surface as quickly as possible. Right-of-way constraints require ditches to be constructed parallel to the road, limiting the available area for BMP installation. Also, road drainage systems are connected to commercial and residential development off site and may carry pollutants from these areas.

Permanent stormwater BMPs for post construction runoff are available, but they are still being developed for transportation systems. The MaineDOT has begun gathering information to publish a design manual for permanent stormwater BMPs for transportation systems. In the interim, the Surface Water Quality Unit will provide guidance to designers in evaluating the feasibility and the design of these BMPs.

In recent years state and Federal regulations have been enacted to require treatment of post construction runoff. The next section will describe how the MaineDOT addresses these requirements.

C. REGULATORY COMPLIANCE FOR MAINEDOT AND MTA

State and federal regulations require the MaineDOT and MTA to address both stormwater quality and quantity during the construction process and for post construction runoff. These regulations vary and are increasing in number and complexity. This section describes the standards and procedures for compliance by the MaineDOT and MTA with applicable stormwater regulations administered by the DEP.

1. STORMWATER MANAGEMENT LAW

The standards for compliance with the Stormwater Management Law are documented in the DEP Chapter 500 Stormwater Management Rules. These rules are triggered by the extent of disturbed area, and have conditions for Lakes Most at Risk and Urban Impaired Stream watersheds.

a. Memorandum of Agreement

In 1998 MaineDOT, the MTA, and the DEP signed a Memorandum of Agreement (MOA) to address how state transportation system projects would meet the DEP Chapter 500 Stormwater Management Rules.

Through the years this MOA has been revised in response to regulatory changes. On December 27, 2006, the state adopted major revisions to the Maine Stormwater Management Rules. The MOA and by reference this BMP manual have been revised to reflect both the regulatory changes and institutional knowledge gained through the application of best management practices over time.

In the MOA, DEP recognizes that state transportation projects collectively have the potential to disturb significant amounts of soil, but because the majority of these individual projects disturb less than one acre, they do not trigger compliance requirements of the current regulations.

The MaineDOT and MTA recognize that obtaining individual stormwater permits from DEP for projects meeting the DEP's Stormwater Management Rules thresholds could adversely affect the schedule and budget for projects.

The MOA gives MaineDOT and MTA the oversight authority for projects that trigger the Stormwater Management Rules. In return, MaineDOT and MTA agree that all construction and maintenance projects that involve earthmoving (not just the projects that trigger Stormwater Management Rules) will have an ESC plan and procedures in place to insure that this plan is followed; and when the standards for permanent stormwater management are triggered the MaineDOT and MTA will, where practicable, install BMPs to mitigate stormwater impacts.

This agreement has been a success for all of the agencies involved. MDEP is assured that extensive E&S and stormwater controls occur on all projects and MaineDOT and MTA have more control over their own budget and schedule and the flexibility to use BMPs that best suit state transportation system projects. This agreement took a great deal of effort, negotiation, and trust to develop and demonstrates how agencies can work together toward a common goal.

The current MOA (Appendix B) states the specific provisions for complying with the standards of the Chapter 500 Stormwater Management Rule. The following details the commitments, procedures, and standards that the MaineDOT and the MTA will use to comply with the MOA.

b. Basic Standard

As stated in the MOA, ESC plans are prepared for all earthmoving construction projects undertaken by the MaineDOT and the MTA. MaineDOT has developed Standard Specification 656, Temporary Soil Erosion and Water Pollution Control, which requires the contractor to develop a Soil Erosion and Water Pollution Control Plan (SEWPCP), have it approved by MaineDOT, and implement it for the life of the contract. This standard has requirements for documenting inspections and maintenance as well as a Spill Prevention Control and Countermeasures Plan. Earthmoving construction and maintenance projects carried out by state employees are also required to develop and implement a SEWPCP. This manual is referenced and incorporated into that standard and provides guidance and specifications for BMP implementation. These requirements are administered by the Surface Water Quality Unit (SWQU) of MaineDOT's Environmental Office.

MTA incorporates a modified version of the Standard Specification 656 in contract documents for all contracted projects involving earthwork or potential stormwater impacts to achieve the same goals as the MaineDOT process. These modifications are primarily related to MTA preferences relative to the bidding and payment processes. The equivalent of MaineDOT's SEWPCP is prepared under the direction of a licensed professional engineer and included in the bid documents. Earthmoving construction and maintenance projects carried out by MTA employees are supervised by an MTA designee who has been certified through DEP's Nonpoint Source Training and Resource Center or equivalent or are licensed professional engineers experienced in stormwater rule requirements.

The standards implemented by MaineDOT and MTA for temporary erosion and sedimentation control exceed the standards required in the Basic Standard in both extent of projects that apply and level of BMP implementation.

c. General Standard and Phosphorous Standard

The General Standard is triggered when a project exceeds specified thresholds for impervious and developed areas. This standard addresses the primary nonpoint source concerns in stream systems: channel protection, pollutant removal, runoff cooling, flood control, and groundwater recharge. This is of particular concern in urban impaired stream watersheds. One of the major changes to the Chapter 500 Stormwater Management Rule is the inclusion of standards for unnatural flow quantities related to channel erosion. Prolonged higher than normal flows (not necessarily larger peak flows) from urbanized watersheds result in excessive instream erosion and instability and decreased stream base flow because of the extent of impervious surface and engineered drainage systems. These factors also dramatically decrease natural infiltration and recharge related to the streams.

The Phosphorous Standard is triggered when the project is in the watershed of a Lake Most at Risk as identified in MDEP's Chapter 502. This standard addresses water quality and pollutant loads carried by the runoff, in particular the phosphorous associated with sediment. Temperature is also a concern. Water quantity is not.

These two standards establish thresholds and permanent treatment standards for both water quality and water quantity impacts to the surface water resources of the state. They were written with traditional site development in mind: housing and commercial projects. Linear transportation systems differ from these traditional sites in that they typically cross many sub-watersheds with multiple points of discharge and the total increase in developed and impervious areas for a project are tempered.

Linear public transportation systems do not conform well with the performance standards in the appendices of the MDEP's Chapter 500, Stormwater Management Rules. The extent and design of impervious areas are restrictive by federal standards and drainage patterns are limited by the extent of right-of-way. But nationwide, state transportation agencies and permanent best management practices for stormwater management are being developed utilizing the principles of low impact development, bio-retention, and filtration systems within the drainage right-of-way.

When linear projects trigger the thresholds for the General Standard or the Phosphorous Standard the MaineDOT and the MTA have agreed to evaluate runoff impacts and, where practicable, utilize existing practices and new technologies to treat highway runoff at levels comparable to those specified in these standards.

Except for redevelopment, non linear portions of projects that trigger the General Standard of the Chapter 500 Stormwater Management Rules shall comply with those requirements.

The MaineDOT has a representative of the Surface Water Quality Unit (SWQU) assigned to every construction project team providing the needed oversight and review of each project from design kickoff, through construction and closeout and the MTA equivalent is a licensed professional engineer experienced in stormwater applications. These team members will assess the project. When necessary they recommend the design and installation of permanent stormwater BMPs. An assessment of source, impact, and receiving waters is made with recommendations for needed permanent BMPs.

d. Urban Impaired Stream Standard and Flooding Standard

Projects that are not associated with an existing travel corridor, and are located within the watershed of an urban impaired stream, and trigger the Urban Impaired Stream Standard shall meet the Urban Impaired Stream Standard in the Chapter 500 Stormwater Management Rules. Projects that trigger the thresholds of the Flooding Standard shall apply design and engineering measures to the extent practicable to avoid adverse impacts to offsite property.

e. Maintenance

The MaineDOT has inventoried every permanent practice installed and has an annual inspection and maintenance schedule incorporated into the Maintenance and Operations Bureau to ensure long term viability of these practices.

2. MAINE CONSTRUCTION GENERAL PERMIT

a. Standard

The Maine Construction General Permit (MCGP) is a permit required under the National Pollutant Discharge Elimination System Phase II of the Clean Water Act. The DEP has delegated authority from the Environmental Protection Agency to administer it in the state of Maine. The project specific requirements for an ESC plan, housekeeping, and inspection and maintenance are almost identical to the requirements of the Chapter 500 Stormwater Management Rules, Basic Standard. As described in Section II.C.1.b. above the standards and procedures of the MaineDOT and the MTA will also exceed the standards of the MCGP.

b. Submittals

There is additional administrative documentation required by EPA. The following describes how the MaineDOT and the MTA will comply with those requirements.

Notice of Intent – The MaineDOT and the MTA will submit a single Notice of Intent (NOI) at the beginning of the construction season for all projects with all required data for each project tabulated in an attachment or retained on file and, if requested, available for project specific review.

All records will be retained for three years beyond the construction end date.

Notice of Termination – The MaineDOT and the MTA will submit a single Notice of Termination (NOT) at the end of the construction season for all projects with all required data for each project tabulated in an attachment.

D. GUIDANCE FOR SENSITIVE WATER BODIES

1. HISTORY

Section IIB of the first edition of this manual required that “sensitive water bodies need to have additional erosion controls beyond the standard practices” and “the primary difference for a project in the watershed of one of these resources will be that the project must use a combination of BMPs to protect the resource, and one of the BMPs must be an erosion control BMP versus a sedimentation control BMP.” In addition, it required five other temporary erosion and sedimentation control issues be considered and that long term stormwater treatment and stabilization be provided.

A list of these sensitive waterbodies was compiled by MaineDOT and provided in the Appendix of the first edition of this manual. The Special Provision to the Standard Specification 656 Temporary Soil Erosion and Water Pollution Control would inform the contractor that a project was in a sensitive watershed and require them to follow Section IIB of the BMP Manual.

This list of sensitive waterbodies was more extensive than that required under DEP’s Chapter 500 Stormwater Management Rules and resulted in the vast majority of the MaineDOT projects falling within a sensitive watershed requiring this higher level of treatment. This level of treatment became the standard for contractors doing work for MaineDOT. For example, in addition to the installation of sedimentation control BMPs, daily mulching of disturbed areas is common. Therefore, designating certain waterbodies as “sensitive” became redundant.

2. STANDARD

The MaineDOT Surface Water Quality Unit (SWQU) has found that within this large group of projects in sensitive waterbody watersheds, there are those that, because of the combination of the sensitivity of the waterbody, scope of work, proximity of the project to the waterbody, the time of year, etc. do require an even higher level of treatment. That assessment is made by a representative from the SWQU in consultation with regulatory and resource agencies as well as other members of the project design team. These projects will now be called SENSITIVE PROJECTS.

The higher level of treatment will be reflected in project specific requirements included in the project contract via Special Provisions to the Standard Specification 656. The contractor will address those site specific requirements in their SEWPCP, which is approved by the MaineDOT and implemented by the contractor with assistance and oversight by the project Resident and the SWQU representative. In addition, a higher level of inspection and compliance assurance by MaineDOT is required.

Projects within the following watersheds are required to be designated as SENSITIVE PROJECTS:

- ▶ Lakes Most at Risk Watersheds
- ▶ Urban Impaired Streams
- ▶ Atlantic salmon Distinct Population Segments

As noted above, the SWQU may designate a project sensitive when other factors warrant it. For example, large projects with extensive land clearing, steep slopes or close proximity to waterbodies.

In addition to a higher level of treatment during construction, permanent stormwater practices are incorporated into the design as needed.

