



BMP Selection Process

1.1.5 BMP Objectives

Each construction project is unique. Therefore, an understanding of the pollution risks of the construction activity is essential for selecting and implementing BMPs. Defining these risks requires review of the characteristics of the site and the nature of the construction, information which should be assembled for the construction plans. Once these pollution risks are defined, BMP objectives are developed, and BMPs selected. The BMP objectives for construction projects are as follows:

1. **Practice Good Housekeeping:** Perform activities in a manner which keeps potential pollutants from either draining or being transported off-site by managing pollutant sources and modifying construction activities.
2. **Contain Waste:** Dispose of all construction waste in designated areas, and keep stormwater from flowing on to or off of these areas.
3. **Minimize Disturbed Areas:** Only clear land which will be actively under construction in the near term (e.g., within the next 3-4 months), minimize new land disturbance during the rainy season, and do not clear or disturb sensitive areas (e.g., steep slopes, buffers and natural watercourses) and other areas where site improvements will not be constructed.
4. **Stabilize Disturbed Areas:** Provide temporary stabilization of disturbed soils whenever active construction is not occurring on a portion of the site. Provide permanent stabilization during finish grade and landscape the site.
5. **Protect Slopes and Channels:** Outside of approved grading plan area, avoid disturbing steep or unstable slopes. Safely convey runoff from the top of the slope, and stabilize disturbed slopes as quickly as possible. Avoid disturbing natural channels. Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in runoff velocity caused by the project do not erode the channel.
6. **Control Site Perimeter:** Upstream runoff should be diverted around or safely conveyed through the construction project. Such diversions must not cause downstream property damage. Runoff from the project site should be free of excessive sediment and other constituents.
7. **Control Internal Erosion:** Detain sediment laden waters from disturbed, active areas within the site to minimize the risk that sediment will have the opportunity to leave the site.



Site characteristics and contractor activities affect both the potential for erosion and contamination by other constituents used on the construction site. Before defining BMP objectives, you should carefully consider:

1. Site conditions that affect erosion and sedimentation including:
 - a. Soil type, including underlying soil strata that are likely to be exposed to stormwater.
 - b. Natural terrain and slope.
 - c. Final slopes and grades.
 - d. Location of concentrated flows, storm drains, and streams.
 - e. Existing vegetation and ground cover.
2. Climatic factors, which include:
 - a. Seasonal rainfall patterns.
 - b. Appropriate design storm
 - i. quantity of rainfall
 - ii. intensity of rainfall
 - iii. duration of rainfall
3. Type of construction activity.
4. Construction schedules, construction sequencing and phasing of construction.
5. Size of construction project and area to be graded.
6. Location of the construction activity relative to adjacent uses and public improvements.
7. Cost-effectiveness considerations.
8. Types of construction materials and potential pollutants present or that will be brought on-site.
9. Floodplain, Floodway, and buffer requirements.

1.1.6 BMP Categories

Once the BMP objectives are defined, it is necessary to identify the category of BMPs that is best suited to meet each objective.

To determine where to place categories of BMPs, a map of the project site can be prepared with sufficient topographic detail to show existing and proposed drainage patterns and existing and proposed permanent stormwater control structures. The project site map should identify the following:

1. Locations where stormwater enters and exits the site. Include both sheet and channel flow for the existing and final grading contours.



2. Identify locations subject to high rates of erosion such as steep slopes and unlined channels. Long, steep slopes over 100 feet in length are considered as areas of moderate to high erosion potential.
3. Categorize slopes as:
 - a. Low Erosion Potential (0 to 5 percent slope)
 - b. Moderate Erosion Potential (5 to 10 percent slope)
 - c. High Erosion Potential (slope greater than 10 percent)
4. Identify wetlands, springs, sinkholes, floodplains, floodways, sensitive areas or buffers which must not be disturbed, as well as other areas where site improvements will not be constructed. Establish clearing limits around these areas to prevent disturbance by the construction activity.
5. Identify the boundaries of tributary areas for each outfall location. Then calculate the approximate area of each tributary area.
6. Define areas where various contractor activities have a likely risk of causing a runoff or pollutant discharge.

With this site map in hand, categories of BMPs can be selected and located. It is more cost-effective to prevent erosion/pollution than to remove sediment/pollutants, and erosion prevention is achieved most cost-effectively by planning before construction begins and phasing construction activities.

BMPs that can achieve more than one BMP objective should be taken into account when selecting BMPs to achieve maximum cost-effectiveness. For instance, it is not always necessary to install extensive sediment trapping controls during construction. In fact, sediment trapping should be used only as a short-term measure for active construction areas, and replaced by permanent stabilization measures as soon as possible. However, it should be noted that perimeter/outfall control in the form of permanent detention ponds should be built first and used as temporary sediment control by placing a filter on the outlet. After construction is complete and tributary area is stabilized, the permanent outlet configuration can be reestablished.

1.1.7 Selecting BMPs for Construction Site Management (Sections SPD, EPP, SMP)

Certain contractor activities may cause pollution if not properly managed. Not all of the BMPs will apply to every construction site. However, all of the suggested BMPs should be considered, and those which are appropriate for the project at hand should be selected. Considerations for selecting BMPs for contractor activities include the following:



1. Is it expected to rain? BMPs may be different on rainy days vs. dry days, winter vs. summer, etc. For instance, a material storage area may be covered with a tarp during the rainy season, but not in the summer. However, it should be noted that plans should be made for some amount of rain even if it is not expected to generate a flooding event.
2. How much material is used? Less intensive BMP implementation may be necessary if a “small” amount of pollutant containing material is used (however, remember that different materials pollute in different amounts).
3. How much water is used? The more water used and wastewater generated, the more likely that pollutants transported by this water will reach the stormwater system or be transported off-site. Washing out one concrete truck on a flat area of the site may be sufficient (as long as the concrete is safely removed later), but a pit should be constructed if a number of trucks will be washed out at the same site.
4. What are the site conditions? BMPs selected will differ depending on whether the activity is conducted on a slope or flat ground, near a stormwater structure or watercourse, etc. Anticipating problems and conducting activities away from certain sensitive areas will reduce the cost and inconvenience of performing BMPs.
5. What about accidents? Pre-establishing a BMP for each conceivable pollutant discharge may be very costly and significantly disrupt construction. As a rule of thumb, establish controls for common (daily or weekly) activities and be prepared to respond quickly to accidents. Define the difference, not everything can be called an accident and maybe classified as negligent disregard of proper practices.

Therefore, keep in mind that the BMPs for contractor activities are suggested practices which may or may not apply in every case. Construction personnel should be instructed to develop additional or alternative BMPs which are more cost-effective for a particular project. The best BMP is a construction work force aware of the pollution potential of their activities and committed to a clean worksite.

Effective EPSC management first minimizes erosion by keeping the soil protected (e.g. minimize disturbed areas) as long as possible by erosion prevention (EP) and second, directs runoff from disturbed areas to locations where suspended soil materials can be removed prior to discharge from the site by sediment control (SC). The use of source control BMPs to control erosion before it starts is the preferred method of long-term sediment control. However, on active construction areas, there may not be sufficient time for EP BMPs to become established to the point at which they are fully effective before the onset of erosive events. In these situations, SC BMPs can provide a more immediate level of protection by removing suspended sediment from flows before being transported. However, the best protection on active construction sites is generally obtained through simultaneous application of both EP BMPs and SC BMPs. This combination of controls is effective because it prevents most erosion before it starts and has the



ability to capture sediments that become suspended before the transporting flows leave the construction site.

BMPs for erosion prevention and sediment control are selected to meet the BMP objectives based on specific site conditions, construction activities, and cost-effectiveness. Different BMPs may be needed at different times during construction since construction activities are constantly changing site conditions.

The following general items are provided to aid in preparing the project plans and choosing appropriate erosion and sediment control BMPs.

Minimize Disturbed Areas

The first step for selecting BMPs is to compare the project layout and schedule with on-site management measures that, where appropriate, can limit the exposure of the project site to erosion and sedimentation. Scheduling and planning considerations are the least expensive way to limit the need for EPSC controls. Consider the following BMPs:

1. Do not disturb any portion of the site unless an improvement is to be constructed there.
2. The staging and timing of construction can minimize the size of exposed areas and the length of time the areas are exposed and subject to erosion.
3. The staging of grading operations should limit the amount of areas exposed to erosion at any one time. Only the areas that are actively involved in cut and fill operations or are otherwise being graded should be exposed. Exposed areas should be stabilized as soon as grading is complete in that area.
4. Retain existing vegetation and ground cover where feasible, especially along watercourses and along the downstream perimeter of the site.
5. Do not clear any portion of the site until active construction begins.
6. Construct outfall detention or perimeter sedimentation control (with filter weirs/berms and temporary sedimentation control barriers first).
7. Quickly complete construction on each portion of the site.
8. Install cover landscaping and other improvements that permanently stabilize each part of the site immediately after the land has been graded to its final contour.
9. Minimize the amount of denuded areas and any new grading activities during the wet months of December through May.



10. Construct permanent stormwater control facilities (e.g., detention basins) early in the project and use for sediment trapping, slope stabilization, velocity reduction, etc. during the construction period.

Stabilize Disturbed Areas

The purpose of site stabilization BMPs is to prevent erosion by covering disturbed soil. This covering may be vegetative, chemical, or physical. Any exposed soil is subject to erosion—either by rainfall striking the ground, runoff flowing over the soil, wind blowing across the soil, and vehicles driving on the soil. Thus all exposed soils should be stabilized except where active construction is in progress. Locations on a construction site which are particularly subject to erosion and should be stabilized as soon as possible include:

1. Slopes
2. Highly erosive soils
3. Construction entrances
4. Stream channels
5. Soil stockpiles

1.4.3.1 Site Perimeter

1. Disturbed areas or slopes that drain toward adjacent properties, storm drain inlets or receiving waters, should be protected with temporary linear barriers (continuous berms, silt fences, sand bags, rolls, etc.) to reduce or prevent sediment discharge while construction in the area is active. In addition, the contractor should be prepared to stabilize those soils with EP measures prior to the onset of rain.
2. When grading has been completed, the areas should be protected with EP controls such as mulching, seeding, planting, or emulsifiers. The combination of EP measures and SC measures should remain in place until the area is permanently stabilized.
3. Significant offsite flows (especially concentrated flows) that drain onto disturbed areas or slopes should be controlled through use of continuous berms, earth dikes, drainage swales, and lined ditches that will allow for controlled passage or containment of flows.
4. Concentrated flows that are discharged off of the site should be controlled through outlet protection and velocity dissipation devices in order to prevent erosion of downstream areas.
5. Perimeter controls should be placed everywhere runoff enters or leaves the site. They are usually installed just before clearing, grubbing and rough grading begin. Perimeter controls for all but the smallest projects will become overloaded by both runoff and sediment.



Additional controls within the interior of the construction site should supplement perimeter controls once rough grading is complete.

1.4.3.2 Internal Swales and Ditches

1. More often, flows are directed toward internal swales, curbs, and ditches. Until the permanent facilities are constructed, temporary stormwater facilities will be subjected to erosion from concentrated flows.
2. These facilities should be stabilized through temporary check dams, geotextile mats, and under extreme erosive conditions by lining with concrete.
3. Long or steep slopes should be terraced at regular intervals (per local requirements). Terraces will slow down the runoff and provide a place for small amounts of sediment to settle out.
4. Slope benches may be constructed with either ditches along them or back-sloped at a gentle angle toward the hill. These benches and ditches intercept runoff before it can reach an erosive velocity and divert it to a stable outlet.
5. Overland flow velocities can be reduced by creating a rough surface for runoff to cross (e.g. tall grass).

1.4.3.3 Internal Erosion

Once all other erosion and sediment control BMPs have been exhausted, excessive sediment should be removed from the stormwater both within and along the perimeter of the project site. The appropriate controls work on the same principle: the velocity of sediment-laden runoff is slowed by temporary barriers or traps which pond the stormwater to allow sediments to settle out. Appropriate strategies for implementing sedimentation controls include:

1. Direct sediment-laden stormwater to temporary sediment traps.
2. Locate sediment basins and traps at low points below disturbed areas.
3. Protect all existing or newly-installed storm drainage structures from sediment clogging by providing inlet protection for area drains and curb inlets.
4. Construct temporary sediment traps or ponds at the stormwater outfall(s) for the site.
5. Excavate permanent stormwater detention ponds early in the project, use them as sedimentation ponds during construction, remove accumulated sediment, and landscape the ponds when the upstream drainage area is stabilized.



6. Temporary sediment barriers such as:
 - a. Continuous Berms
 - b. Silt Fences
 - c. Sand Bag Barriers
 - d. Brush or Rock Filter

These barriers should only be used in areas where sheet flow runoff occurs. They are less effective or ineffective if the runoff is concentrated into rill or gully flow.

1.4.3.4 Stormwater Inlets and Outfalls

1. Stormwater inlets, including drop inlets, and pipe inlets, should be protected from sediment intrusion if the area draining to the inlet has been disturbed.
2. Stormwater inlet protection can utilize sand bags, sediment traps, or other similar devices.
3. Internal outfalls must also be protected to reduce scour from high velocity flows leaving pipes or other drainage facilities.

1.1.8 BMPs for Good House Keeping (Section GHP)

Most permanent BMPs will be proposed by the developer early in the planning stage of a project. For most projects, there will be no single BMP which addresses all the long-term stormwater quality problems. Instead, a multi-level strategy will be worked out with the Warren County, which incorporates source controls, a series of on-site treatment controls, and community-wide treatment controls.

In most cases permanent BMPs can be implemented most effectively when they can be integrated into other aspects of the project design. This requires that conceptual planning consider stormwater controls rather than as an afterthought to site design. The following should be considered early in the design process.

1. Is a detention/retention facility required for flood control? Often, facilities are required to maintain peak runoff at predevelopment levels to reduce downstream conveyance system damage and other costs associated with flooding. Most permanent BMPs can be incorporated into flood control detention/retention facilities with modest design refinements and limited increases in land area and cost.
2. Planned open space which will be relatively flat (e.g., final grade slopes less than 5 percent) may be merged with stormwater quality/quantity facilities. Such integrated, multi-use areas may achieve several objectives at a modest cost.



3. Infiltration BMPs may serve as groundwater recharge facilities, detention/retention areas may be created in landscaped areas of the project, and vegetated swales/filters may be used as roadside/median or parking lot median vegetated areas.

1.4.5 BMPs for Residential and Homeowners (Section RHP)

Citizens of the City of Glasgow, also hold a stake in the maintenance and improvement of water quality in the community. If residents and property owners would take measures to minimize their impact in their surrounding environment, pollution can be greatly reduced.

Residential and Homeowner BMPs describe methods that individuals can use and employ throughout their community to make ditches, streams and receiving waters safe. The pollutants that they discharge (most of the time unknowingly) can be reduced simply through education. Information on “do’s and don’ts” on chemical treatments (fertilizers, herbicides, insecticides, etc.) and disposal of other hazardous wastes (use of detergents into streams, or dumping petroleum based products into stormwater appurtenances such as catch basins) are just two examples on how to improve the water quality in a community. The City of Glasgow should raise awareness of these BMPs to homeowners and residents via billings or community outreach programs and schools.