

Sediment Control BMPs for Construction Site Storm Water Runoff Control

One of the pollutants contributing to storm water pollution that most people are unaware of is sediment. Sediment contains nitrogen, phosphorous and possibly other contaminants. When rain carries sediment into our local streams and Humboldt Bay, nitrogen and phosphorous trigger algae growth which reduces water clarity, depletes oxygen, creates odors and leads to fish kills. Just the mere presence of extra sediment in our streams and Humboldt Bay increases turbidity (cloudiness) which reduces photosynthesis and food production. Sediment deposition also destroys fish habitat and spawning areas.

Traditional sediment controls (silt fence, sand/gravel bags, drain inlet protection, etc.) are typically 40-50% effective if properly installed and maintained. Therefore, all sediment control measures need to be supplemented with erosion control measures. They require routine maintenance. Once sediment builds up to 1/3 the height of the structure, sediment should be removed off site or to a location where it won't erode back on to the site. All new development and redevelopment projects that could possibly cause sediment runoff from disturbed areas into the storm drain system or watercourse should consider the use of the following Best Management Practices:

- **Scheduling** will reduce the amount of soil exposed and the duration of its exposure to wind, rain and vehicle tracking.
 - **Scheduling:**
 - Incorporates the use of a schedule or flow chart to layout the construction plan.
 - Works out the sequencing and time frame for the initiation and completion of tasks such as site clearing, grading, excavation, pouring foundations, installing utilities, etc.
 - Incorporates erosion and sediment control BMPs.
 - Minimizes land disturbing activities scheduled between October and April. Extra BMPs should be implemented during these months to protect the site from erosion.
 - Should avoid major grading operations between October and April.
 - Should allow enough time before rainfall begins to stabilize soil with vegetation or physical means (i.e. installing temporary sediment trapping devices).
 - **Limitation:**
 - None

- **Silt Fencing** intercepts and slows the flow of sediment laden runoff. Silt fences serve as a filter to slowly release filtered water.
 - **Application:**
 - Silt fences can be used along the perimeter of the project site, along streams and watercourses, at the bottom of exposed slopes and around temporary soil stockpiles (i.e. fill dirt).
 - They need to be installed along level contours.
 - When installing, dig a small ditch and backfill on top of the bottom end of the fence. Make sure the leading end of the bottom end of the fence is pointing towards the slope.
 - The length of slope drained into a stretch of fence should be no greater than 100 feet.
 - Any single stretch of fence should be limited to 500 feet.
 - The last 6 feet on either side of the fence should slope into a "J" or "L" shape to allow for ponding.
 - Individual fence segments should not be connected.
 - Silt fences should be inspected following rain events.
 - When sediment build-up reaches one-third of fence height, the sediment needs to be removed.
 - Undercut, split, torn or slumping silt fences should be repaired or replaced.
 - When project is done or landscaping completed, they can be removed.
 - **Limitation:**
 - Silt fences should not be used in streams, channels or on slopes.

- **Gravel / Sand Bag Barriers** intercept and slow the flow of sediment laden runoff. They serve as a filter to slowly release filtered water.
 - **Application:**
 - Gravel or sand bags can be used along the perimeter of a construction site or parallel to roadways to keep sediment off of paved areas.
 - Stacked gravel or sand bags placed along a level contour to detain runoff from disturbed areas retain sediment suspended in the runoff and release water as sheet flow.
 - They also can be used to divert runoff flow, create a temporary sediment basin or as a check dam.
 - They are more practical than silt fences or fiber rolls for prolonged construction projects because they are more durable.
 - Gravel bags are preferred over sand bags near storm drain inlets because they filter water without preventing it from entering the storm drain.
 - Sand bags can act as a complete water barrier after being inundated with water.
 - Gravel and sand bags need to be inspected after significant storm events.
 - When sediment reaches one-third barrier height, accumulated silt must be removed.
 - All washouts and other damages to barriers need to be repaired as needed.
 - **Limitation:**
 - Installing sand or gravel bags can be labor intensive.
 - They should not be used to detain runoff flows with a high concentration of sediment.
 - Do not completely surround drain inlets with gravel or sand bags. Use sand bags to create an L or J shape from the curb pointing up slope or away from the drain to cause a ponding effect.
 - Never stack sand bags above the level of a curb.

Sediment Control BMPs (continued)

- **Fiber Rolls** are composed of biodegradable fibers stuffed into a photo-degradable open weave netting. They allow water to pass through the fibers and trap suspended sediment, increase filtration rates, slow runoff and reduce erosion.
 - *Application:*
 - Fiber rolls can be used along the face of exposed slopes to shorten slope length and decrease flow velocity.
 - They are very useful at grade breaks where slopes transition to a steeper slope.
 - They also can be used along stream banks to assist stabilization and in drainage swales to slow flows.
 - They should follow the contour lines of the slope and be overlapped.
 - Any split, torn, unraveled or slumping fiber rolls should be repaired or replaced.
 - During prolonged rainfall, they should be inspected daily and repaired when necessary.
 - In most cases, fiber rolls do not need to be removed and can be abandoned in place.
 - If they are not excessively soiled after landscaping is in place, they can be removed and reused.
 - *Limitation:*
 - Fiber rolls are not effective for high surface flows or long and steep slopes.
 - Their primary purpose is not sediment control, although they do provide some sediment removal.
 - They should be used along with other sediment control measures.
- **Storm Drain Inlet Protection** consists of temporary devices constructed around storm drains to improve the quality of water being discharged to inlets by ponding sediment laden runoff and increasing settling time.
 - *Application:*
 - Drain inlet protection is useful where sediment laden surface runoff may enter an inlet.
 - Gravel bag protection is applicable for high flows. However, it is necessary to allow for overtopping to prevent flooding. If overtopping is expected, a drain inlet sediment trap would be appropriate.
 - Silt fences or temporary drain inlet filters could be used as well.
 - All bare areas around inlet must be stabilized, smooth, compact and brought up to the grade of the inlet.
 - Accumulated sediment must be disposed of properly.
 - Inspect all inlets after rainfall events and once every 24 hours during extended rainfall events.
 - *Limitation:*
 - Drain inlet protection is only appropriate for small drainage areas unless used with erosion control measures.
 - Do not allow ponding to encroach into traffic or onto surfaces that are susceptible to erosion.
 - Drain inlet protection requires frequent maintenance to remove sediment deposits.
 - Do not completely surround drain inlets with gravel or sand bags. Use sand bags to create an L or J shape from the curb pointing up slope or away from the drain to cause a ponding effect.
 - Never stack sand bags above the level of a curb.
- **Sediment Basins** is a controlled storm water release structure. They pond runoff and allow sediment to settle out.
 - *Application:*
 - Sediment basins are formed by excavation of earth across a low drainage area.
 - They should be located where a low embankment can be constructed across a swale or excavation, where failure would not cause loss of life or property and in an area accessible for maintenance work (sediment removal, inlet and outlet maintenance, etc.).
 - Rock or vegetation should be used at the basin inlet to prevent erosion.
 - Make sure the riser pipe connection to the horizontal pipe leading through the embankment is water tight.
 - Provide anti-seep collars on the barrel.
 - Outlet structure (corrugated metal or reinforced concrete pipe) should be placed on firm, smooth foundation with base securely anchored with concrete or other means to prevent flotation.
 - Outlet pipe needs to have dewatering holes, an anti-vortex device and trash rack attached to the top of the riser to prevent floating debris from flowing out of the basin or obstructing the system.
 - Outlet protection (rocks) should be used at the pipe outlet to prevent erosion.
 - Following a storm event, dewater within seven days. Install a safety fence around the basin to prevent unauthorized entry
 - *Limitation:*
 - Always seek out erosion control measures before selecting a sediment basin.
 - Basins must be designed by a registered professional civil engineer.
 - They require large surface areas and regular maintenance to remove sediment build up.
- **Dust Control** consists of making the effort to prevent exposed soil from being transported by wind.
 - *Application:*
 - Control measures consist of chemical or structural measures.
 - Chemical measures include water, salts or organic spray on adhesives.
 - Structural measures include blankets, geotextiles or tarps (i.e. to cover unused fill dirt).
 - Dust control should be utilized on all construction sites with exposed soils.
 - It is particularly important in wind-prone areas and areas with silt and clay soils.
 - Dust control is a temporary measure to be utilized as an intermediate treatment between site disturbance and construction, paving or re-vegetation.
 - If an area is exposed to excessive winds or vehicle traffic, it should be inspected daily.
 - *Limitation:*
 - Dust control measures are temporary.
 - Chemical measures require re-application.
 - Structural measures require routine inspections to ensure they stay in place.
 - Excessive use of water to control dust may cause unwanted non-storm water discharges.

Sediment Control BMPs (continued)

- **Straw Bale Barriers** pond runoff and allow sediment to settle out.
 - *Application:*
 - Straw bale barriers can be used as a sediment control measure at the bottom of erodible slopes, at the outfall of culverts/pipes, around the perimeter of a site, around temporary stock piles or spoilage areas and parallel to a roadway to keep sediment off of paved areas.
 - When installing straw bale barriers, make sure they are staked and entrenched to avoid undercutting.
 - *Limitation:*
 - Straw bale barriers should not be used for extended periods of time because they rot and don't stay together.
 - They should not be used as a sediment control measure for steep slopes, paved surfaces or as drain inlet protection.
 - They are also very labor intensive to install and maintain.

- **Construction Site Entrance/Exit** should be stabilized to reduce the tracking of mud onto public roads by construction vehicles.
 - *Application:*
 - Stabilized construction site access should be created for any sites where mud or dirt can be tracked onto public roads, where dust can be problematic during dry weather and on sites adjacent water bodies.
 - A stabilized construction entrance is a pad of aggregate underlain with filter cloth.
 - The purpose is to reduce or eliminate sediment being tracked onto public roadways by construction vehicles.
 - They are moderately effective in removing sediment from vehicles leaving a construction site.
 - If sediment is still being tracked onto public roadways after the entrance has been stabilized, a tire wash should be considered. A tire wash is a ditch filled with aggregate and underlain with a fiber cloth.
 - A drainage ditch needs to be built to convey water from the tire wash to a sediment trapping area.
 - A hose with an automatic shutoff nozzle should be used to wash off tires.
 - *Limitation:*
 - A stabilized entrance requires periodic top dressing of additional stones.
 - They can be expensive especially when used in conjunction with a tire wash because a sediment trap of some kind must be provided to collect runoff.
 - Another limitation of a tire wash is that a double wide access is required to avoid having non-construction vehicles driving through the tire wash.

- **Landscape Management** can reduce erosion, decrease sediment runoff and prevent pollution. The proper use of soil, materials and chemicals used in landscaping can decrease the discharge of pollutants and sediment into the storm drains and waterways.
 - *Application:*
 - Native, non-invasive, drought tolerant and pest tolerant vegetation should be used whenever possible.
 - Minimize the use of chemicals by purchasing less toxic alternatives and using only the minimum amount necessary.
 - Landscaping materials should be stored under tarps to protect them from wind and rain.
 - All landscape related grading and excavation should be scheduled for dry weather.
 - All areas being revegetated should be inspected for establishment of new vegetation and replanted when necessary.
 - Check dams or ditches should be used to divert runoff away from storm drains.
 - Storm drains inlets should be protected with sediment control measures.
 - *Limitation:*
 - Native, non-invasive, drought tolerant and pest tolerant vegetation may not be readily available from suppliers.

- **Preservation of Existing Vegetation** serves as an effective form of erosion and sediment control.
 - *Application:*
 - Before any project begins, efforts should be made to preserve existing vegetation.
 - Clearly mark areas not to be disturbed with construction fencing at all times.
 - All contractors on site should be notified where these areas are.
 - Any damage to these areas must be repaired in accordance with the landscaping plan.
 - *Limitation:*
 - Protecting existing vegetation requires planning and may restrict the area available for construction activities.