

## Chapter 1: Preventative BMPs

### BMP 101: Preserving Natural Vegetation

#### *Purpose*

The purpose of preserving natural vegetation is to reduce erosion wherever practicable. Limiting site disturbance is the single most effective method for reducing erosion. For example, conifers can hold up to about 50% of all rain that falls during a storm. Up to 20%-30% of this rain may never reach the ground but is taken up by the tree or evaporates. Another benefit is that the rain held in the tree can be released slowly to the ground after the storm.

#### *Conditions of Use*

- Natural vegetation should be preserved on steep slopes, near perennial and intermittent watercourses or swales, and on building sites in wooded areas.
- As required by local governments.

#### *Design and Installation Specifications*

Natural vegetation can be preserved in natural clumps or as individual trees, shrubs and vines. The preservation of individual plants is more difficult because heavy equipment is generally used to remove unwanted vegetation. The points to remember when attempting to save individual plants are:

- Is the plant worth saving? Consider the location, species, size, age, vigor, and the work involved. Local governments may also have ordinances to save natural vegetation and trees.
- Fence or clearly mark areas around trees that are to be saved. It is preferable to keep ground disturbance away from the trees at least as far out as the drip-line. Plants need protection from three kinds of injuries:
  - **Construction Equipment** - This injury can be above or below the ground level. Damage results from scarring, cutting of roots, and compaction of the soil. Placing a fenced buffer zone around plants to be saved prior to construction can prevent construction equipment injuries.
  - **Grade Changes** - Changing the natural ground level will alter grades, which affects the plant's ability to obtain the necessary air, water, and minerals. Minor fills usually do not cause problems although sensitivity between species does vary and should be checked. Trees can tolerate fill of 6" or less. For shrubs and other plants, the fill should be less.

When there are major changes in grade, it may become necessary to supply air to the roots of plants. This can be done by placing a layer of gravel and a tile system over the roots before the fill is made. A tile system protects a tree from a raised grade. The tile system should be laid out on the original grade leading from a dry well around the tree trunk. The system should then be covered with small stones to allow air to circulate over the root area.

Lowering the natural ground level can seriously damage trees and shrubs. The highest percentage of the plant roots are in the upper 12" of the soil and cuts of only 2" to 3" can cause serious injury. To protect the roots it may be necessary to terrace the immediate area around the plants to be saved. If roots are exposed, construction of retaining walls may be needed to keep the soil in place. Plants can also be preserved by leaving them on an undisturbed, gently sloping mound. To increase the chances for survival, it is best to limit grade changes and other soil disturbances to areas outside the drip-line of the plant.

- **Excavations** - Protect trees and other plants when excavating for drain fields, power, water, and sewer lines. Where possible, the trenches should be routed around trees and large shrubs. When this is not possible, it is best to tunnel under them. This can be done with hand tools or with power augers. If it is not possible to route the trench around plants to be saved, then the following should be observed.
  - Cut as few roots as possible. When you have to cut, cut clean. Paint cut root ends with a wood dressing like asphalt base paint. Backfill the trench as soon as possible and tunnel beneath root

systems as close to the center of the main trunk to preserve most of the important feeder roots. Some problems that can be encountered with a few specific trees are:

- Maple, Dogwood, Western red cedar, and Douglas fir do not readily adjust to changes in environment and special care should be taken to protect these trees.
- Cottonwoods, maples, and willows have water-seeking roots. These can cause trouble in sewer lines and infiltration fields. On the other hand, they thrive in high moisture conditions that other trees would not. Disease can become established through damaged limbs, trunks, roots, and freshly cut stumps. Diseased and weakened trees are also susceptible to insect attack.

### ***Maintenance Standards***

- Inspect flagged and/or fenced areas regularly to make sure flagging or fencing has not been removed or damaged. If the flagging or fencing has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.
- If tree roots have been exposed or injured, “prune” cleanly with an appropriate pruning saw or loppers directly above the damaged roots and recover with native soils. Treatment of sap-flowing trees (fir, hemlock, pine, soft maples) is not advised as sap forms a natural healing barrier.

## **BMP 102: Buffer Zones**

### ***Purpose***

An undisturbed area or strip of natural vegetation or an established suitable planting that will provide a living filter to reduce soil erosion and runoff velocities.

### ***Conditions of Use***

Natural buffer zones are used along streams, wetlands and other bodies of water that need protection from erosion and sedimentation. Vegetative buffer zones can be used to protect natural swales and can be incorporated into the natural landscaping of an area.

Critical-areas buffer zones should not be used as sediment treatment areas. These areas shall remain completely undisturbed. The local permitting authority may expand the buffer widths temporarily to allow the use of the expanded area for removal of sediment.

### ***Design and Installation Specifications***

- Preserving natural vegetation or plantings in clumps, blocks, or strips is generally the easiest and most successful method.
- Leave all unstable steep slopes in natural vegetation.
- Mark clearing limits and keep all equipment and construction debris out of the natural areas. Steel construction fencing is the most effective method in protecting sensitive areas and buffers. Alternatively, wire-backed silt fence on steel posts is marginally effective. Flagging alone is typically not effective.
- Keep all excavations outside the drip-line of trees and shrubs.
- Do not push debris or extra soil into the buffer zone area because it will cause damage from burying and smothering.
- Vegetative buffer zones for streams, lakes or other waterways shall be established by the local permitting authority or other state or federal permits or approvals.

### ***Maintenance Standards***

Inspect the area frequently to make sure flagging remains in place and the area remains undisturbed.

## BMP 103: Wetland Preservation, Creations, and Re-creation

### ***Purpose***

A recognized or historical location of ponding water surrounded by an undisturbed area and strip of natural vegetation. Ponding occurs because it matches the elevation of the ground water table. May or may not be attached to a recognized drainage area or passageway of storm water runoff. Existing areas to be preserved will have natural vegetation or established suitable plantings that provide a living filter. Creation of “new” or “reclaimed” wetlands should contain vegetation similar to the nearest wetland that protect against soil erosion, reduce runoff velocities, and other similar benefits while withstanding long periods of saturated or super-saturated soil conditions.

### ***Conditions of Use***

Natural buffers used to stabilize erosion and sedimentation while being incorporated into the natural landscaping of an area. The permitting authorities may require, expand, or extend in exchange for other requested improvements or developments.

### ***Design and Installation Specifications***

- Preserving natural vegetation is generally the easiest and most successful method.
- Transplanting in clumps, blocks, or strips from existing sites that match as closely as possible in the same watershed provides the best materials when reclaiming or establishing new wetland areas.
- Mark clearing limits and keep all equipment and construction debris out of the natural areas. Steel construction fencing is the most effective method in protecting sensitive areas and buffers. Alternatively, wire-backed silt fence on steel posts is marginally effective. Flagging alone is typically not effective.
- Keep all excavations outside the drip-line of trees and shrubs.
- Do not push debris or extra soil into the buffer zone area because it will cause damage from burying and smothering.
- Vegetative buffer zones for streams, lakes or other waterways shall be established by the local permitting authority or other state or federal permits or approvals.

### ***Maintenance Standards***

- Inspect the area frequently to make sure fencing and flagging remains in place and the area remains undisturbed.
- Reclaimed or new areas will need inspection every 4 weeks for at least one year after planting to check for damaged or dead vegetation; whether too little, sufficient, or too much groundwater is available for the vegetation present; invasive species overtaking area; and whether area is correctly “operating” as wanted.

## BMP 104: Floodways and Floodplains

### ***Purpose***

A recognized or historical location of running water; a recognized drainage area or passageway of storm water runoff. Most locations have been estimated or mapped by the Federal Emergency Management Agency (FEMA) as a part of their National Flood Insurance Program’s (NFIP) Flood Insurance Rate Map (FIRM) system. These maps help the government determine the likelihood that a particular area may or may not be flooded; the approximate elevation that the water may reach in a particular flooding event; and whether additional insurance should be requested by insurance, mortgage, and other title-related companies on particular pieces of property near these locations.

***Conditions of Use***

If one of these potentials falls within a development area, the limits of the mapped or unstudied floodway or floodplain should be determined prior design as many municipalities have minimum elevation requirements for structures within their limits.

The existence of one or both of these items can also affect whether development can occur; the size of the disturbance area; whether cut materials can be removed or fill materials can be placed on the site; the type of fill materials that can be added; the number and types of construction and post-construction BMPs required; whether a Corps of Engineers permit is required; whether there are additional restrictions on the site that are not obvious from a visual inspection of the site (such as unmarked or mitigated wetlands); and numerous other items.

***Design and Installation Specifications***

If an unstudied potential floodway or floodplain is found to exist within a site under consideration for development is located, additional design criteria will be considered and may require that the local municipality's floodplain administrator is contacted for guidance to meet all federal, state, and local requirements for the development to progress. This may include official studying of the stretch of the drainage way that the site is located within. An official study usually covers over a mile stretch of a "main" channel and several "major" tributaries.

If the drainage channel (stream, creek, ditch, etc.) or water body is found to have limitations on it (TMDL, ELG, etc.), additional restrictions may be placed on the site that may require additional numbers and types of construction and post-construction BMPs required.

***Maintenance Standards***

Stable floodway areas should be reviewed after every major storm (as defined locally) to verify the channel has retained its stability. Repairs and maintenance should be limited to banks and vegetation to maintain water flow; removal of blockages (potential or perceived); erosion and scour prevention; and slope stability.

Floodplains should be reviewed annually (preferably during winter months) to check for channel, bank slope, and vegetation stability; erosion and scour development; newly placed or recently exposed at-grade or below-grade utility crossings; addition or removal of structures, certain types of fencing, excessive amounts of newly planted or removed large trees, landscaping, or other vegetative areas; the creation of rills and gullies; etc.

Floodway and floodplain areas should be maintained and cleared of excessive amounts of small brush and debris by brush-hogging or hand-clearing at least once a year. Larger debris should be reviewed on a case-by-case basis to determine if it is creating (or the result of) an erosion or scour problem, but if the area is stable then it should be left alone - as long as it does not become a potential (floating) blockage to downstream vehicular crossings (bridges, culverts, drain pipes, etc.).

**BMP 105: Watershed vs. Site Drainage*****Purpose***

When drainage for a development is considered, both the increased runoff from the development as well as the "built-out" improvements to the entire watershed should be considered.

In some cases, the development area may only be a very small fraction of the entire watershed. This means the site discharging flow may: contribute pollutants to the receiving flow that previously had either not been present or were below levels of significance to the flow; increase the quantity of water to create far-reaching up- and/or down-stream flooding or erosion conditions; significantly change the quality or other characteristics of the water flow; or have no effect at all.

In other cases, the development site may occur at the top of a watershed, so may affect several different

watersheds. If this occurs and water runoff is “re-located” from one watershed to another, there can be a more visual affect on both watersheds (drying of one, increased flow in another).

Soil conditions should also be considered when looking at the discharging flow. If the site is in a karst region, the pre-development runoff may be discharging to what appears to be a surface water body, but disturbance of the soil’s surface or subgrade conditions may expose a more pervious medium for the runoff to pass through when discharging. This can lead to “disappearing” stream conditions that may greatly affect both up- and down-stream neighbors, particularly in more rural areas that depend on the surface water bodies to irrigate crops or grazing animals.

### ***Conditions of Use***

Northwest Arkansas is in a highly karst region that has known environmentally sensitive habitats, so subgrade conditions should be carefully reviewed and be suspected as highly varied throughout an entire development of any significant size (over 1.00 acre).

Because Northwest Arkansas also has large areas of very “flat” terrain compared to other very larger areas of extreme slopes, the location of each development site can not always be approached with a “one size fits all” attitude. Not reviewing the difficulties of pre-developed and adjoining terrains, runoff drainage ways, and how the during construction and the post-developed site will change both of these can have significant impacts on the life-expectancy and maintenance schedule of any BMP attempted to be used.

### ***Design and Installation Specifications***

BMPs should be reviewed to verify that those selected for use and shown in the SWP3 living document are designed for use in the terrain conditions of the site. Depending on the BMP selected, it may work on that type of terrain but used more frequently than is practical during construction. Larger developments may have their final “permanent” BMPs installed during an early phase of the development, but if not maintained or other intermediate BMPs installed, it could fail prior to the end of the development phase. This means that something that was supposedly complete, may have to be removed, disposed of, and replaced before the project can be accepted by either the owner, developer, or municipality where it is located.

### ***Maintenance Standards***

All discharge inlets and outfalls of all developments should be reviewed at least once every other year to check for stability; erosion, rills, gullies, and scour development; blockages by vegetation or man-made objects; cleanliness; connectivity to any piping; etc. If repairs, cleaning, re-grading, or replacement are needed they should be scheduled to occur as quickly as possible but preferably during the dry season to avoid polluting the waters connected to the inlet/outlet.

## **BMP 110: Dust Prevention and Control**

### ***Purpose***

Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters.

### ***Conditions of Use***

Dust prevention and control is needed in areas (including roadways) subject to surface and air movement of dust on-site and off-site impacts roadways, drainage ways, or surface waters.

### ***Design and Installation Specifications***

- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.

- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition, if stable. Maintain the original ground cover as long as practical.
- Leave or create natural windbreaks or construct artificial windscreens. Artificial ones can be designed as enclosures for small dust sources. Some screens also have “blinding” or opaque qualities to help “obscure” the view of the site while reducing the amount of wind-carried particles transported off the site.
- Sprinkle and spray unpaved areas with water or other approved liquids until surface is wet. Repeat as needed. To prevent carryout of mud and other solids onto street, refer to Stabilized Construction Exit (BMP 210).
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative. Follow the manufacturer’s instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP 226) added to water and applied from a water truck can increase the infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may actually reduce the quantity of water needed for dust control. Since the wholesale cost is relatively inexpensive, this is an extremely cost-effective dust control method.

Examples of techniques that can be used:

- Lowering speed limits. High vehicle speeds increase the amount of dust stirred up from unpaved roads and lots.
- Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
- Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (smaller than 0.075 mm) in the surface improvement to between 10% and 20%.
- Use geo-textile fabrics to increase the strength of new roads or roads under reconstruction.
- Encourage the use of alternate, stabilized routes that could be graveled, paved, matted, or padded.
- Restrict use by tracked vehicles and heavy trucks to prevent damage to road surface and base.
- Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
- Pave unpaved permanent roads and other trafficked areas.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Limit dust-causing work on windy days.
- Contact ADEQ for guidance and training on other dust control measures. Compliance with the local municipality constitutes compliance with this BMP.

### ***Maintenance Standards***

Re-spray disturbed areas as necessary to keep dust to a minimum.

If natural windbreaks are created or left in place, they should be inspected at least once a month to review for health and vigor. Dead trees and plants that were to exist at the end of the construction project should be replaced with similar sized and types of vegetation that meet the jurisdictional and project standards.

If artificial windscreens are erected they should be inspected at least once a week on both sides for evidence of any “escaping” dust. Damaged sections should be repaired and/or replaced in a timely manner.

If a screen shows evidence of considerable dust collection, it may need to be cleaned, repaired, and/or replaced. It may need to be supported during the process to prevent the collected particles from escaping.

If water is used for cleaning, it needs to be treated by a water runoff BMP.

Depending on the amount of collection on the screen, additional measures may also be required to prevent the fine particles from becoming airborne and reaching the screen. For example, the erection of an artificial windscreen between a row of natural vegetation (to remain after construction) and an internal

access route could reduce or prevent the accumulation of particles on the existing vegetation.

## BMP 120: Kits and Containment Materials

### ***Purpose***

Quantities of erosion prevention and sediment control materials can be kept on the project site at all times to be used for emergency situations such as unexpected heavy summer rains. Having these materials on-site reduces the time needed to implement BMPs when inspections indicate that existing BMPs are not meeting the Construction SWPPP requirements. In addition, contractors can save money by buying some materials in bulk and storing them at their office or yard.

1. A first aid kit should be kept on-site for emergencies.
2. A spill kit should be kept on-site to prevent, treat, and/or clean-up leaks and spills of materials and/or fluids from equipment used on-site.

### ***Conditions of Use***

Construction projects of any size or type can benefit from having materials on hand. A small commercial development project could have a roll of plastic and some gravel available for immediate protection of bare soil and temporary berm construction. A large earthwork project, such as highway construction, might have several tons of straw, several rolls of plastic, flexible pipe, sandbags, geo-textile fabric and steel T-posts.

Materials are stockpiled and readily available before any site clearing, grubbing, or earthwork begins. A large contractor or developer could keep a stockpile of materials that are available to be used on several projects.

If storage space at the project site is at a premium, the contractor could maintain the materials at their office or yard. However, the office or yard must be less than an hour from the project site.

### ***Design and Installation Specifications***

A first aid kit should include – at a minimum - sanitary hand/face wipes, tape, roll gauze, eye wash, bandages, pressure bandages, local emergency services contact information, and CPR and first aid instructions. Company contacts for accident-reporting and insurance contacts should also be listed.

Spill and leak prevention, treatment, and clean-up items include oil pans and/or buckets; kitty-litter, sand, gravel, or other absorbent materials that can be swept; absorbent pads and/or booms for containing liquids on dry surfaces or can be placed across flowing-waters; tarps; stakes and/or posts for holding or supporting fabric, pads, booms, or tarps in place; brooms and dustpans; mop and bucket; etc. The spill kit should also include, at a minimum:

- Water Resistant Nylon Bag (1 each)
- Oil Absorbent Socks 3"x 4' (3 each)
- Oil Absorbent Socks 3"x 10' (2 each)
- Oil Absorbent Pads 17"x19" (12 each)
- Splash Resistant Goggles (1 pair)
- Nitrile Gloves (3 pairs each of multiple sizes)
- Disposable Bags with Ties (10 each)
- Instructions for each item included in kit
- Emergency contact information for local emergency services
- Emergency contact information for company contacts (i.e. 24-hour hotlines)
- Material Safety Data Sheets (MSDS) for all materials stored on-site.

Depending on project type, size, complexity, and length, erosion and sediment control materials and quantities may vary. A good minimum list of items that will cover numerous situations includes:

**Table 1: On-Hand Containment Materials**

<b>Material</b>	<b>Measure</b>	<b>Quantity</b>
Clear plastic, 6 mm	100-foot roll	1 to 2 rolls
Drain pipe, 6" or 8" diameter	25-foot section	4 to 6 sections
Sand- or gravel-filled bags	each	25 to 50 each
Straw or other mulch	approx 50 lbs	10 to 20 bales
Gravel	tons or cubic yards	2 to 4 tons
Geo-textile fabric	100-foot roll	1 to 2 rolls
Catch basin protection (inlet)	each	2 to 4 each
Steel T-posts	each	12 to 24 each

***Maintenance Standards***

Each item in the first aid and spill kits should have an expiration date on it. All items should be replaced as they are used, or every twelve (12) months.

All materials with the exception of the steel T-posts, and gravel should be kept covered and out of both sun and rain. Re-stock materials used as needed. Fabrics and bags should be replaced at the beginning of each new project.

**BMP 121: Material Delivery*****Purpose***

Prevent, reduce, or eliminate the discharge of pollutants from material delivery by storing materials in designated areas.

***Conditions of Use***

These procedures are suitable for use at all construction sites with delivery of materials.

***Design and Installation Specifications***

The following steps should be taken to minimize risk:

- Temporary storage area should be located away from vehicular traffic, near the construction entrance(s), and away from waterways or storm drains.
- Material Safety Data Sheets (MSDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers.
- Hazardous material storage on-site should be minimized.
- During the wet weather season (Oct 1 – April 30), consider storing materials in a covered area.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, in secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting.

**Material Delivery Areas:**

- Liquids, petroleum products, and substances listed in 40 CFR Parts 4-53 110, 117, or 302 shall be delivered in approved containers and drums; shall not be overfilled; and shall be stored in temporary secondary containment facilities with the volume capacity of 110% of the largest container within its boundary, or 110% of the sum of all containers within the containment field, whichever is greater.
- Sufficient access and separation should be provided to allow for spill cleanup and emergency response.
- During the wet weather season (Oct 1 – April 30), each delivery and storage facility shall be covered during non-working days, prior to and during rain events.

***Maintenance Standards***

All delivery areas should be reviewed daily for cleanliness; organization; sufficient separation between stored containers; and space for delivery vehicles to park, maneuver, and access all storage areas.

**BMP 122: Material Storage*****Purpose***

Prevent, reduce, or eliminate the discharge of pollutants from material storage to the storm water system or watercourses by minimizing the storage of hazardous materials onsite and by storing materials in a designated area.

***Conditions of Use***

These procedures are suitable for use at all construction sites with storage of any material, but in particular for the following:

- Petroleum products such as fuel, oil and grease
- Soil stabilizers and binders (e.g. PAM)
- Fertilizers, pesticides and herbicides
- Detergents
- Asphalt and concrete compounds
- Hazardous chemicals such as acids, lime, adhesives, paints, solvents and curing compounds
- Any other material that may be detrimental if released to the environment

***Design and Installation Specifications***

The following steps should be taken to minimize risk:

- Temporary storage area should be located away from vehicular traffic, near the construction entrance(s), and away from waterways or storm drains.
- Material Safety Data Sheets (MSDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers.
- Hazardous material storage on-site should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- During the wet weather season (Oct 1 – April 30), consider storing materials in a covered area.
- Materials should be stored in secondary containments, such as earthen dike, horse trough, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, in secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting.

Material Storage Areas:

- Containers and drums shall be stored in temporary secondary containment facilities.
- In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as hazardous waste unless testing determines them to be non-hazardous.
- Sufficient access and separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- During the wet weather season (Oct 1 – April 30), each containment facility shall be covered during non-working days, prior to and during rain events.

- Keep material storage areas clean, organized and equipped with an ample supply of appropriate spill clean-up material (spill kit).

### ***Maintenance Standards***

All storage areas should be reviewed daily for spills and/or leaks in containers; general cleanliness; organization; sufficient separation between stored containers; and space for delivery vehicles to park, maneuver, and access all storage areas.

Secondary containment areas should be checked weekly; before and after each storm event; and after every delivery for spills and/or leaks that need to be removed, cleaned, or treated and disposed of.

## **BMP 123: Material Containment**

### ***Purpose***

Prevent, reduce, or eliminate the discharge of pollutants from material storage to the storm water system or watercourses by installing secondary containment.

### ***Conditions of Use***

These procedures are suitable for use at all construction sites with delivery and storage of any material, but in particular for the following:

- Petroleum products such as fuel, oil and grease
- Soil stabilizers and binders (e.g. PAM)
- Fertilizers, pesticides and herbicides
- Detergents
- Asphalt and concrete compounds
- Hazardous chemicals such as acids, lime, adhesives, paints, solvents and curing compounds
- Any other material that may be detrimental if released to the environment

### ***Design and Installation Specifications***

The following steps should be taken to minimize risk:

- Storage areas should be located away from vehicular traffic, near the construction entrance(s), and away from waterways or storm drains.
- Material Safety Data Sheets (MSDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers.
- Hazardous material storage on-site should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- During the wet weather season (Oct 1 – April 30), consider storing materials in a covered area.
- Materials should be stored in secondary containments, such as earthen dike, horse trough, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, in secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting.

Secondary Containment Practices:

- Liquids, petroleum products, and substances listed in 40 CFR Parts 4-53 110, 117, or 302 shall be stored in approved containers and drums and shall not be overfilled. Containers and drums shall be stored in temporary secondary containment facilities.
- Temporary secondary containment facilities shall provide for a spill containment volume able to

contain precipitation from a 25 year, 24 hour storm event, plus 10% of the total enclosed container volume of all containers, or 110% of the capacity of the largest container within its boundary, whichever is greater.

- Secondary containment facilities shall be impervious to the materials stored therein for a minimum contact time of 72 hours.
- Secondary containment facilities shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as hazardous waste unless testing determines them to be non-hazardous.
- Sufficient access and separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- During the wet weather season (Oct 1 – April 30), each secondary containment facility shall be covered during non-working days, prior to and during rain events.
- Keep material storage areas clean, organized and equipped with an ample supply of appropriate spill clean-up material (spill kit). See BMP 120, Kits and Containment Materials for more details.

### ***Maintenance Standards***

All storage areas should be reviewed daily for spills and/or leaks in containers; general cleanliness; organization; sufficient separation between containers; and space for delivery vehicles to park, maneuver, and access all storage areas.

Secondary containment areas should be checked weekly; before and after each storm event; and after every delivery for spills and/or leaks that need to be removed, cleaned, or treated and disposed of.

## **BMP 124: Concrete Handling**

### ***Purpose***

Concrete work can generate process water and slurry that contain fine particles and high pH, both of which can violate water quality standards in the receiving water. This BMP is intended to minimize and eliminate concrete process water and slurry from entering waters of the state.

### ***Conditions of Use***

Any time concrete is used these management practices shall be utilized. Concrete is often used on construction projects for, but are not limited to: curbs, sidewalks, roads, bridges, foundations, floors, walls, runways, driveways, parking lots and garages, patios, and manholes.

### ***Design and Installation Specifications***

Concrete truck chutes, pumps, and internals shall be washed out only into formed areas awaiting installation of concrete or asphalt.

- Unused concrete remaining in the truck and pump shall be returned to the originating batch plant for recycling.
- Hand tools including, but not limited to, screeds, shovels, rakes, floats, and trowels shall be washed off only into formed areas awaiting installation of concrete or asphalt.
- Equipment that cannot be easily moved, such as concrete pavers, shall only be washed in areas that do not directly drain to natural or constructed stormwater conveyances.
- Wash down from areas such as concrete aggregate driveways shall not drain directly to natural or constructed stormwater conveyances.
- When no formed areas are available, wash water and leftover product shall be contained in a lined container. The container can be single-use or re-usable as long as the concrete is contained.
- Contained concrete shall be disposed of in a manner that does not violate groundwater or surface

water quality standards.  
See also BMP 132 Washouts for additional information.

### ***Maintenance Standards***

All containers shall be checked for holes daily during concrete pours and repaired the same day. Lined containers are more susceptible to puncturing; especially if cleaned out using “heavy” on-site equipment (anything larger than a shovel).

## BMP 125: Saw-Cutting and Surfacing Pollution Prevention

### ***Purpose***

Saw-cutting and surfacing operations generate slurry and process water that contains fine particles and high pH, both of which can violate the water quality standards in the receiving water. This BMP is intended to minimize and eliminate process water and slurry from entering waters of the State.

### ***Conditions of Use***

Anytime saw-cutting or surfacing operations take place, these management practices shall be utilized. Saw-cutting and surfacing operations include, but are not limited to, the following: sawing, coring, grinding, roughening, hydro-demolition, bridge and road surfacing.

### ***Design and Installation Specifications***

- Slurry and cuttings shall be vacuumed during cutting and surfacing operations.
- Slurry and cuttings shall not remain on any permanent pavement between shifts.
- Slurry and cuttings shall not drain to any natural or constructed drainage conveyance.
- Collected slurry and cuttings shall be disposed of in a manner that does not violate groundwater or surface water quality standards.
- Process water that is generated during hydro-demolition, surface roughening, or similar operations shall not drain to any natural or constructed drainage conveyance and shall be disposed of in a manner that does not violate groundwater or surface water quality standards.
- Cleaning waste material and demolition debris shall be handled and disposed of in a manner that does not cause contamination of water.
- Surfaces on and adjacent to public travel ways shall not be opened to traffic (foot or vehicular) until the surface has been swept and/or vacuumed a second time to ensure that all slurry and cuttings have been collected.
- If the materials area is swept, all slurry and cuttings shall be picked up and gathered into a holding container until the end of each shift. The container then should be hauled to an appropriate disposal site at the necessary intervals.

### ***Maintenance Standards***

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the State. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and vacuum trucks.

## BMP 130: Gross Solids and Solid Waste

### ***Purpose***

Every project should provide appropriate containers to accept solid and liquid items of trash, packing materials, construction debris, sweepings, spill clean-ups, etc.

***Conditions of Use***

Separate containers should be made available if hazardous materials are expected on-site. Hazardous material containers left on-site should be locked at all times. They should also be checked at least 3 times to look for leaks and spills in the 48-hour period immediately following each “addition” to the container. Recyclables can also be collected separately from regular “trash” and potentially hazardous materials.

***Design and Installation Specifications***

Waste containers can be contractor-owner or supplied; supplied and maintained by a subcontractor; location could be part of an existing established municipal route. All containers should be secured in such a way that the public can not access the container after hours for the disposal of non-site-related items. Unsecured containers that are easy to access tend to attract furniture and appliances.

***Maintenance Standards***

Most containers have a weight or volume limit. Unless part of a regularly maintained route, the container should be emptied before its capacity (by weight or volume) is reached. Containers should be checked at least once per week for capacity and damage.

**BMP 131: Sanitary Services**

***Purpose***

Every project should provide access to sanitary services and drinking water for on-site employees.

***Conditions of Use***

Separate disposal containers should be made available if liquid hazardous materials are expected on-site.

***Design and Installation Specifications***

Provide and maintain ample sanitary facilities by the use of existing toilets, or a sufficient number of enclosed temporary toilets. If access is through the use of existing toilets, the public sewer service provider should be made aware of the approximate amount of use expected and length of project. Safe and fresh drinking water shall be provided from single service containers, sanitary drinking stands, or fountains. Facilities can be contractor-owner or supplied; supplied and maintained by a subcontractor; a may be part of an existing established municipal route. All facilities should be secured in such a way that the public can not access the container after hours for the disposal of non-site-related items.

***Maintenance Standards***

Facilities should be serviced regularly, unless connected to a public sewer system. All facilities and services shall be furnished to strict accordance with federal, state and local laws and regulations.

**BMP 132: Washouts**

***Purpose***

Each site should provide a method for the disposal of washouts from concrete trucks and finishing; paint brushes and sprayers; oil and other petroleum spills; etc.

***Conditions of Use***

When other collection or containment options are not available.

***Design and Installation Specifications***

Containers should be lined with at least 10 mm thick liner or have secondary containment. Containers should be kept under a cover or have sufficient secondary containment capacity for a 10-year, 24-hour storm event.

Certain liquids or mixtures placed in the container will evaporate, leaving solids behind that may or may not require hazardous material disposal.

***Maintenance Standards***

Containers should be checked at least 3 times in a 48-hour period immediately following each use.

Containers should be checked weekly for spills or leaks. At the end of a project, washouts should:

- Have solids removed and properly disposed of.
- If liquids remain, they should be properly disposed of with other sanitary waste; per manufacturer's specifications; or as hazardous waste, if no other suitable option is available.

## BMP 140: Qualified Site Official (QSO)

***Purpose***

The project proponent designates at least one qualified person as the responsible representative in charge of erosion and sediment control (ESC), and water quality protection. The designated person shall be the Qualified Site Official (QSO), who is responsible for ensuring compliance with all local, state, and federal erosion and sediment control and water quality requirements.

See Appendix F for additional information on training courses.

***Conditions of Use***

A QSO shall be made available on projects that discharge stormwater to surface waters of the state.

The QSO shall:

- Have a current certificate proving attendance in an ESC training course that meets the minimum ESC training and certification requirements established by ADEQ or the local municipality. ADEQ will maintain a list of ESC training and certification providers at: [www.adeq.state.ar.us](http://www.adeq.state.ar.us)

**OR**

- Have a current certification as a Certified Professional in Erosion and Sediment Control (CPESC), Certified Erosion, Sediment, and Storm Water Inspector (CESSWI), Certified Professional in Storm Water Quality (CPSWQ), or Certified MS4 Specialist (CMS4S)

***Specifications***

- The QSO shall have authority to act on behalf of the contractor and/or developer and shall be on-call 24 hours per day throughout the life of the project.
- The Construction SWPPP shall include the name, telephone number, fax number, and address of the designated QSO.
- A QSO may provide inspection and compliance services for multiple construction projects in the same geographic region.

- Duties and responsibilities of the QSO shall include, but are not limited to the following:
  - Maintaining site permit file at all times including the SWPPP and any associated permits and plans.
  - Directing BMP installation, inspection, maintenance, modification, and removal.
  - Updating all project drawings and the Construction SWPPP to show any changes made.
  - Keeping daily logs, and inspection reports. Inspection reports should include:
    - Inspection date/time.
    - Weather information; general conditions during inspection and approximate amount of precipitation since the last inspection.
    - A summary or list of all BMPs implemented, including observations of all erosion/sediment control structures or practices.
    - Visual monitoring results, including a description of discharged stormwater. The presence of suspended sediment, turbid water, discoloration, and oil sheen shall be noted, as applicable.
    - Any water quality monitoring performed during inspection.
    - General comments and notes, including a brief description of any BMP repairs, maintenance or installations made as a result of the inspection.
    - Facilitate, participate in, and take corrective actions resulting from inspections performed by outside agencies or the owner.

## BMP 150: Scheduling and Sequencing

### ***Purpose***

Sequencing a construction project reduces the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

### ***Conditions of Use***

The construction sequence schedule is an orderly listing of all major land disturbing activities together with the necessary erosion and sedimentation control measures planned for the project. This type of schedule guides the contractor on work to be done before other work is started so that serious erosion and sedimentation problems can be avoided.

Following a specified work schedule that coordinates the timing of land disturbing activities and the installation of control measures is perhaps the most cost-effective way of controlling erosion during construction. The removal of surface ground cover leaves a site vulnerable to accelerated erosion. Construction procedures that limit land clearing; provide timely installation of erosion and sedimentation controls; and restore protective cover quickly can significantly reduce the erosion potential of a site.

### ***Design Considerations***

- Avoid rainy periods.
- Schedule projects to disturb only small portions of the site at any one time. Complete grading as soon as possible. Immediately stabilize the disturbed portion before grading the next portion. Practice staged seeding in order to revegetate cut and fill slopes as the work progresses.

If extended wet periods delay the project schedule, revisions should be made so that everyone involved is kept current on which processes should be underway and which areas should be protected, treated, and/or stabilized.

## BMP 170: Stormwater Pollution Prevention Plans

***Purpose***

SWP3s are to prevent the discharge of sediment and other pollutants to the maximum extent practicable from all ground-surface-disturbing projects.

***Conditions of Use***

A SWP3 is needed on all projects adding, replacing, disturbing, or clearing more than 1,000 square feet of ground surface.

***Design and Installation Specifications***

- Plan and implement proper clearing and grading of the site. It is most important only to clear the areas needed, thus keeping exposed areas to a minimum. Phase clearing so that only those areas that are actively being worked are uncovered. **Note: Clearing limits should be flagged in the lot or area prior to initiating clearing.**
- Soil shall be managed in a manner that does not permanently compact or deteriorate the final soil and landscape system. If disturbance and/or compaction occur, the impact must be corrected at the end of the construction activity. This shall include restoration of soil depth, soil quality, permeability, and % organic matter. Construction practices must not cause damage to or compromise the design of permanent landscape or infiltration areas.
- Locate excavated basement soil a reasonable distance behind the curb, such as in the backyard or side yard area. This will increase the distance eroded soil must travel to reach the storm sewer system.
- Soil piles should be covered until the soil is either used or removed. Piles should be situated so that sediment does not run into the street or adjoining yards.
- Backfill basement walls as soon as possible and rough grade the lot. This will eliminate large soil mounds, which are highly erodible, and prepares the lot for temporary cover, which will further reduce erosion potential.
- Remove excess soil from the site as soon as possible after backfilling. This will eliminate any sediment loss from surplus fill.
- If a lot has a soil bank higher than the curb, a trench or berm should be installed moving the bank several feet behind the curb. This will reduce the occurrence of gully and rill erosion while providing a storage and settling area for stormwater.
- The construction exit should be stabilized where traffic will be leaving the construction site and traveling on paved roads or other paved areas within 500 feet of the site.
- Provide for periodic street cleaning to remove any sediment that may have been tracked out. Sediment should be removed by shoveling or sweeping and carefully removed to a suitable disposal area where it will not be re-eroded.
- Utility trenches that run up and down slopes must be backfilled within 7 days.
- Cross-slope trenches may remain open throughout construction to provide runoff interception and sediment trapping, provided that they do not convey turbid runoff off-site.

***Maintenance Standards***