

## Best Management Practices Information Sheets

---

This chapter provides information on how to implement several best management practices discussed in Chapter III and Chapter IV. It also provides information on available water quality treatment facilities. Stormwater treatment facilities are covered in the King County Surface Water Design Manual. Existing sites may be able to incorporate treatment facilities, depending on the site constraints and conditions, without review or approval by the King County Department of Development and Environmental Services (DDES). Some treatment BMPs can be installed after review and approval by King County Water and Land Resources Division Water Quality Compliance Program staff. To obtain approval it may be necessary to complete the Alternative BMP form located in this manual.

Table 5.1 below lists the BMPs that are discussed in this chapter.

<b>No.</b>	<b>TITLE</b>
1	Illicit Connections
2	Disposal Options
3	Covering Options
4	Pave Area and Slope to Holding Tank
5	Containment and Elevation
6	Integrated Pest Management
7	Drainage System Maintenance
8	Water Quality Treatment BMPs
9	Oil/Water Separator – Treatment BMP
10	Catch Basin Insert - Treatment BMP
11	Processing Requirements for Use of Soil Amendments on Construction Sites

## Source Control BMPs

---

The following BMP Info Sheets discuss a variety of source control BMPs and other methods used to prevent, control, and dispose of pollutants. Source control BMPs prevent pollutants from contaminating stormwater runoff or entering water bodies. Some source control BMPs are operational, such as reducing the frequency of engaging in a polluting activity, checking regularly for leaks and drips from equipment and vehicles, and educating employees about site cleanup and spill prevention procedures. Other source control BMPs use structural methods to prevent rainwater from coming in contact with materials or stored items that will contaminate stormwater runoff. Examples of these BMPs include a berm or containment structure to prevent clean stormwater from entering work or storage areas, or a roof over a storage area. A source control BMP can also include altering or revising your industrial process to use less potentially contaminating substances.

The goal of King County's Water Quality Compliance program is to reduce the contamination of water resources by emphasizing source control BMPs. The following BMP Information Sheets provide more detailed information on how to implement some of these source control BMPs.

## Illicit Connections

---

An illicit connection is a connection that could convey anything not composed entirely of surface and stormwater directly to the storm drainage system or a water body. Many buildings throughout King County could have illicit connections to the storm drainage system. These typically include, but are not limited to, sanitary sewer pipes, process wastewater discharges, sump overflows, and internal building drains connected to the storm drainage system. As a result of illicit connections, wastewater containing a variety of pollutants is discharged directly to storm drains and drainage ditches, and ultimately to receiving waters rather than to the sanitary sewer system or a septic system. In many instances these connections are unknown to the business or property owner, and may not show up on building drawings. Elimination of illicit storm drainage connections is an important facet of stormwater pollution reduction and must be addressed as a top priority. King County is currently making a committed effort to determine where illicit connections are present and to require their removal.

### **FINDING AN ILLICIT CONNECTION**

All businesses, residents and public agencies in unincorporated King County must investigate their plumbing/drainage systems to determine if there are any illicit connections to the storm drainage system, such as internal floor drains plumbed to the storm drainage system. If building and property drawings are available with plumbing details, they should be reviewed to understand pipe connections.

If you are unsure whether a particular drain (such as a floor drain) discharges to the storm drainage system, you should identify where the potential illicit connection drains to by consulting plans, side sewer cards, and possibly conducting a dye test. Running water from a hose into the drain and observing where the water discharges is often a very simple and effective method of identifying illicit connections.

Any pipes or other conveyances connected to storm drainage facilities that drain anything but stormwater must be permanently plugged or rerouted to a sanitary sewer, holding tank, on-site process treatment system, or septic system (with approval from the appropriate agencies or jurisdiction).

If building plans and side sewer cards do not show your plumbing, the most basic methods for determining a connection is either dye tracing or running water through the system. A nontoxic dye can be put in water and flushed or drained into the suspect piping. Observations should then be made in manholes, drainage ditches, or other storm drainage conveyances that are present on

site (or adjacent to the property) to search for the dye. Enough water must be poured or flushed through the indoor drain to force the flow to reach the point(s) of observation. If possible, all other drains in the building should be out of use while the dye test is conducted to ensure the results can pinpoint the problem drain. This test should be conducted for each suspect drain on the property. Any observations of dye in the storm drainage system must be noted and the corresponding indoor drains tagged for followup plugging or rerouting.

If you are uncertain as to the locations of catch basins or manholes that can be used for observation, or if you can not determine how the storm drainage system is constructed on your property, contact the King County Water and Land Resources Division (WLRD) at 206-296-1900 for assistance. Notify WLRD at least one day in advance if you are performing a dye test.

### **ELIMINATING AN ILLICIT CONNECTION**

Drains and pipes that are found to connect to the storm drainage system and have the potential of discharging pollutants or wastewater must either be permanently plugged or disconnected and rerouted as soon as possible. Drains that are no longer needed can be plugged with concrete or another similarly effective material. Whenever process water, stormwater, or other wastewater is redirected to the sanitary sewer, the local sewer authority and the King County Industrial Waste Program must be contacted to obtain approval for discharging to the sanitary sewer. The local sewer authority and King County must also be contacted prior to the installation of any permanent connection to the sanitary sewer. The name of your local sewer authority is identified on your water and sewer bill. The local sewer authority and King County Industrial Waste will regulate the connection both for discharge quantity and quality, but the responsible party will have to arrange for the necessary plumbing supplies and pipe disconnection/rerouting work.

If a sanitary sewer does not service the property, and one is not available for hookup, alternative measures are necessary. If the discharge is domestic wastewater from a toilet, sink, appliance, or shower/bathtub, a septic system can be used to receive the rerouted discharge. The connection of plumbing fixtures to an on-site sewage disposal system usually requires an on-site sewage disposal system repair permit. Therefore, before any pipes are rerouted, the Seattle-King County Department of Public Health must be contacted for further information. If a septic system is not present on the property then one should be installed. The Seattle-King County Department of Public Health should be contacted for advice and information on septic system requirements. If the discharge is industrial process water or other nondomestic wastewater, a holding tank or on-site treatment system will be needed. If an illicit connection needs to be rerouted to a holding tank, King County Water and Land Resources Division staff should be contacted for assistance and information on tank content disposal requirements. As with septic system and sanitary sewer hookups, the property owner or responsible business operator is responsible for rerouting the illicit pipe connections.

## Disposal Options

---

Every business, property owner, and public agency in King County must dispose of solid and liquid wastes and contaminated stormwater properly. There are generally five options for disposal depending on the types and quantity of materials. These options are: (1) sanitary sewer system, (2) septic system, (3) recycling, (4) municipal solid waste disposal facilities, and (5) waste transportation and disposal services. Ordinary stormwater runoff is not considered to be contaminated to the point of requiring special disposal. Stormwater that is mixed with concentrated wastes requires special disposal, as discussed below.

### **DISCHARGE TO SANITARY SEWER SYSTEM**

Process wastewater (depending on the pollutants and associated concentrations present) can be put into the sanitary sewer, subject to approval by the local sewer authority and the King County Industrial Waste Program. Animal waste can be disposed of in a sanitary sewer, subject to loading capacity constraints. The King County Industrial Waste Program may require that all stormwater discharged to a sanitary sewer be metered. Sewer fees may be collected on such discharges.

The first priority is to discharge process water to a sanitary sewer using an existing plumbing connection or a new pipe connection. Whenever the diversion of any process water or other wastewater to the sanitary sewer is needed, the local sewer authority and King County must be contacted to obtain approval prior to discharging to the sanitary sewer. Pretreatment of discharges to remove some of the process water pollutants may be required to obtain approval. The local sewer authority and King County must also be contacted prior to the installation of any permanent connection to the sanitary sewer. The name of your local sewer authority is identified on your water and sewer bill. Sumps or other temporary storage devices may be useful for storing liquid wastes on a temporary basis if you cannot discharge to a sanitary sewer system. Consideration should be given to using a holding tank for process water if the volume of process water generated by the activity is not excessive. See BMP Info Sheet 4 for more information on holding tanks. The contents of the holding tank must be pumped out or drained before the tank is full. Several commercial services are available for pumping out sumps and holding tanks. These can be found in your telephone directory's yellow pages under the headings "Sewer Contractors and Cleaners" and "Tank Cleaning," or on the King County Stormwater Services website at <http://dnr.metrokc.gov/wlr/stormwater/DrainageMaintVendors.htm>. Septic system pumpout and hauling contractors must not be used for disposing wastes other than domestic sewage. They are not allowed to haul industrial wastes.

## **DISCHARGE TO SEPTIC SYSTEM**

If your site is not serviced by a sanitary sewer system, you probably have a septic system. Only liquid waste that is comparable to residential sewage in strength and constituency may be disposed of in septic systems. Hazardous chemicals cannot be disposed of in septic systems. Further, the septic system must be designed to accommodate the volume of suitable wastewater generated. Any changes in waste volume and constituency from those present when the system was permitted must be approved by the Seattle-King County Department of Public Health. Stormwater, whether contaminated or not, may not be disposed of in septic systems. Animal waste also may not be disposed of in a septic system.

## **RECYCLING**

Recycling facilities are a recommended option for many commercial items, including used oils, used batteries, a variety of used auto parts, metal scrap materials, solvents, paints, and other solid wastes. There are a number of private businesses that accept materials for recycling. In addition there is an Industrial Material Exchange clearinghouse which facilitates the transfer of unwanted materials from the generator to another business that can use them. The Industrial Material Exchange or IMEX website is <http://www.govlink.org/hazwaste/business/imex>

Process wastewater such as wash water can be recycled on-site as an alternative to discharge to the sanitary sewer. There are numerous products on the market that are designed to recycle wash water. Contact the King County Water and Land Resources Division at 206-296-1900 for more information.

## **MUNICIPAL SOLID WASTE DISPOSAL FACILITIES**

Municipal solid waste disposal facilities are designed to handle solid wastes. Hazardous and dangerous wastes and many liquid wastes must be properly disposed of at an appropriate facility. Contact your local solid waste disposal facility or see <http://www.metrokc.gov/dnrp/swd/garbage-recycling/index.asp> for information on which materials are accepted at these facilities. Call the Business Waste Line at 206-296-3976 or see <http://www.govlink.org/hazwaste/business> for information on the proper disposal of oil, antifreeze, and other hazardous wastes.

## **WASTE TRANSPORTATION AND DISPOSAL SERVICES**

There are numerous services that can help you identify, quantify, transport, and dispose of any waste that you may generate. Many people have their wastes picked up by a disposal contractor.

Costs of disposal vary considerably depending on the types of materials, quantities, methods of collection and transport, and whether the wastes are mixed. The rate the contractor charges will generally reflect the costs of testing and/or treating waste materials (if necessary) and the subsequent disposal. It is important to keep different types of wastes separated, so that the disposal contractor(s) can take them to the appropriate place(s) without causing inadvertent contamination problems elsewhere, and so that you are not paying too much for disposal of materials that are not contaminated (e.g. regular garbage). If you are properly implementing your

BMPs and collect contaminated waste materials for proper disposal, your efforts are compromised if a disposal contractor subsequently disposes the contaminated materials as regular garbage. Therefore, it is essential to be familiar with disposal alternatives and the different types of contractors for each disposal option.

The Seattle-King County Department of Public Health's Waste Characterization Program serves hazardous waste generators in Seattle and King County that have questionable wastes. Information supplied by the generator on questionable wastes such as sludges, sandblast waste, treated wood, and contaminated soils is reviewed by the Health Department. Permits are issued for those wastes that will be allowed in the garbage. The dangerous waste regulations as well as other criteria are used in the decision process.

The disposal of wastes is the responsibility of the generator. Before agreeing to let a company handle your waste, it is recommended that you ask for (and check) the company's references. All waste collected by the company should be delivered to an authorized site. Make sure you keep copies of all your transactions.

## Covering Options: Tarp, Roof, or Awning

One of the most effective actions a person can take to prevent stormwater contamination is keeping potential pollutant generating materials out of the rain. There are numerous options for covering an activity or stored materials. This BMP, combined with the prevention of stormwater runoff into the covered area, can be as effective as storing materials or conducting activities indoors.

The simplest cover is a tarp or other nonstructural device. Building a permanent structure may require a building permit and must comply with all applicable building and fire codes. These building requirements may in some cases make some of these structures too expensive to be practical. Contact the King County Department of Development and Environmental Services for information on building permits and requirements for a roof structure.

Many activities, such as stockpiling of raw or erodible materials or storage of drums, can be effectively covered with a heavy plastic tarp made of impermeable material. Weights such as bricks, tires, or sandbags should be used to anchor the cover in place.



*Tarp Covering*

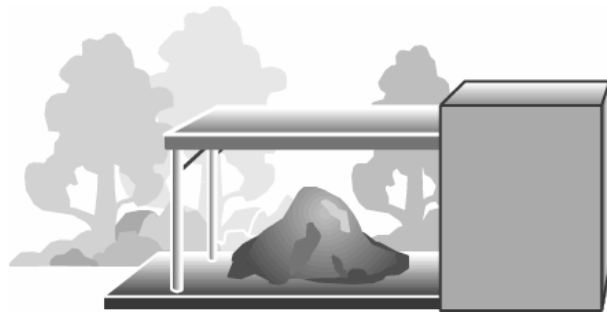
Care should be taken to ensure that the tarp covers the stored materials completely and that stormwater runoff does not penetrate significantly under the cover. If several tarps are used to form a cover, they should be tethered together or overlapped. If necessary, pins or stakes should be used to anchor the tarps to the ground. The tarp/cover will be easier to keep in place and will last longer if some form of wind protection is possible. Attempts should be made to locate stockpiles in areas where winds are minimal.

The tarps must be in place when the material is not being used. The tarps must be inspected weekly to ensure that no holes or gaps are present. Tarps are inexpensive, and therefore are a cost effective BMP for many activities. This BMP can be combined with containment for better effectiveness. See BMP Info Sheet 5 for more information.

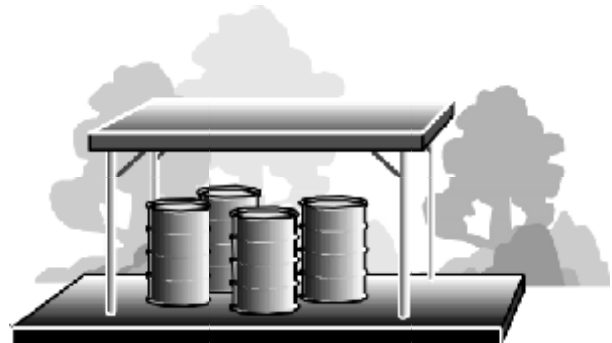
The other option for covering is the use of a roof. The particular roof cover option used at a given site is subject to the site layout, available space, affordability, and limitations imposed by other regulations. The area of the roof should be sufficient to prevent any precipitation from reaching the contents underneath. This BMP should be implemented in conjunction with



prevention of stormwater run-on into the covered area. BMP Info Sheet 5 presents information on containment/run-on prevention. Examples of various structures are shown below.



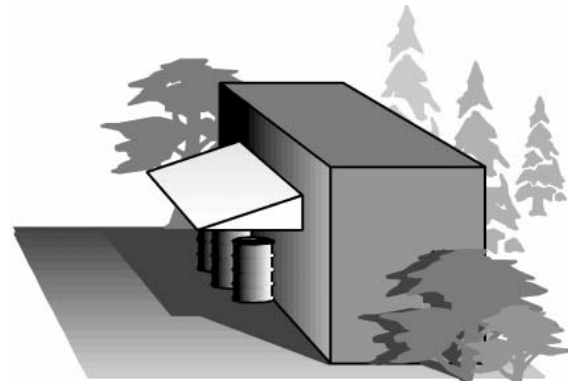
*Lean-To Structure*



*Stand-alone Canopy*

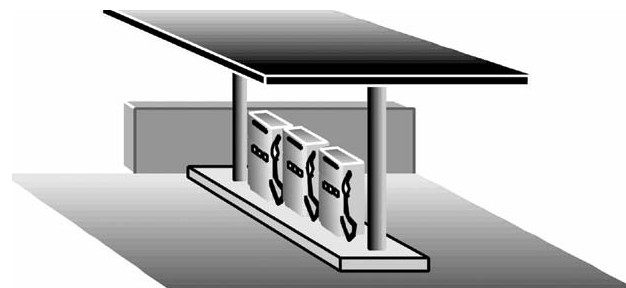
There are also numerous prefabricated storage sheds that can be purchased to enclose and cover materials. This may be a preferred alternative on some sites. Before purchasing these structures ensure they meet applicable building and fire codes.

Another option for covering an activity or stored materials is to use an overhanging awning of sufficient size to prevent precipitation from reaching the contents underneath. This cannot be an awning already in place over a public right-of-way such as a sidewalk in front of a store. Many of the building permit, fire code, and zoning code requirements mentioned above apply to these structures.



*Overhanging Awning*

Activities such as fueling operations may be covered by an island-type overhanging roof. This roof arrangement is supported by columns along the center of the structure rather than at the corners, enabling vehicular traffic underneath while still providing sufficient protection from precipitation.



*Island-Type Overhanging Roof*

## Pave Area and Slope to Holding Tank

---

This BMP applies to several activities that cannot be covered effectively, and therefore require a method of controlling runoff from leaving your site that may be contaminated. It is particularly suited to activities with the potential for spills and leaks, but that otherwise do not generate excessive amounts of polluted runoff. In addition, this BMP is well suited to activities that intermittently produce wastewater such as washing or steam cleaning operations. A sump or holding tank serves to provide containment until the liquids can be pumped from the holding tank and disposed of properly. If the activity produces large amounts of runoff or wastewater, this BMP will not be very effective because contaminated water will overflow the sump or pass through the sump before collection and disposal are possible. The following information is intended for situations where this BMP can be effective.

A designated area must be paved and sloped to a drain connected to a central collection point. A sump, vault, or holding tank must be installed to capture the wastewater. Some materials, such as gasoline, can react with and cause deterioration of asphalt pavement. It is preferable for the area to be paved with Portland cement concrete. If the area is already paved with asphalt, an asphalt sealant should be applied to the pavement surface. Whichever paving material is used, the paved surface must be free of gaps and cracks.

The sump or holding tank should have a large enough capacity to contain the entire volume of wastewater generated by the activity, or the entire volume of a potential spill (whichever is applicable, or the greater of the two). Depending on the circumstances, the sump or tank can be equipped with an outflow pipe to allow discharge of normal, uncontaminated runoff to the storm drainage system. The local sewer authority may, in some instances, allow a connection to the sanitary sewer system.

The paved activity area must also be contained to prevent stormwater runoff and runoff. This can be achieved by constructing a curb, dike, or berm that directs uncontaminated surface water flows away from the area. See BMP Info Sheet 5 in this chapter for more information. This way, only the precipitation that falls within the activity area is discharged and/or treated along with the process water.

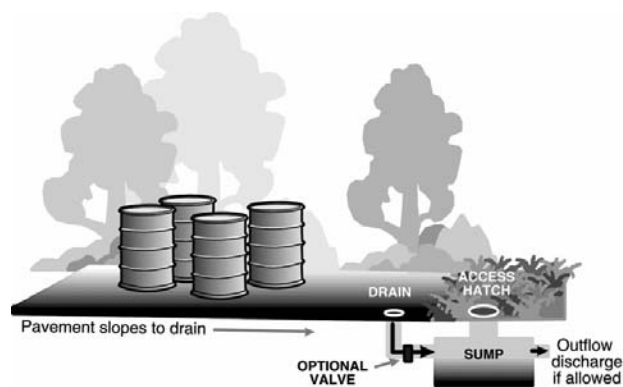
The catch basin/tank/sump must have a two-way valve installed at the outflow pipe so that uncontaminated runoff from the activity area can discharge to the storm drainage system at times when the pollutant generating activity is not occurring. The two-way valve must be able to easily be switched between discharges to the sanitary sewer, holding tank, or treatment facility, and discharges to the storm drainage system. Each time the activity is occurring, the two-way valve must be switched so that the polluted runoff discharges to the sanitary sewer, holding tank, or

treatment facility. After the pollutant generating activity operation is finished and no more process water is generated, the area must be sprayed, hosed, or otherwise washed down with the wash water discharging to the sanitary sewer, holding tank, or treatment facility. The two-way valve must be switched after clean up is completed so that subsequent runoff is discharged to the storm drainage system until the next time the activity that produces wastewater occurs. It is critical that careful attention be given to this valve so that it is always switched to the correct position. Approval for discharges with a two-way valve should be obtained from the King County Industrial Waste Program, the local sewer authority and King County Water and Land Resources Division, Water Quality Compliance Program.

If discharges to the storm drainage system or sanitary sewer are not allowed, the sump or holding tank contents will need to be pumped out periodically and disposed of properly. This requirement can make this BMP costly, especially during the wet season. See BMP Info Sheet 2 for disposal options.

An example of a paved activity area with a sump drain is shown to the right.

Drainage into the sump or holding tank should only occur at times when the activity that generates wastewater is occurring. To keep disposal costs down, a drain cover, plug, or shutoff valve in the pipe leading to the sump should be used at times when the activity is not occurring. Before starting the activity (if the activity is intermittent), the cover, plug, or valve must be opened.



*Paved Area with Sump Drain*

The cost of constructing a sump and disposing of accumulated contents can be high, so businesses should consider whether other allowable BMP alternatives could be used. Individual cities, sewer agencies and King County may charge additional fees if a sanitary sewer hookup is made. The fees depend on location, quantity of discharge, and whether the hookup is for a business or residence. A King County industrial waste permit may also be required in some situations.

Several commercial services are available for pumping out sumps and holding tanks. These can be found in your telephone directory's yellow pages under the headings "Sewer Contractors and Cleaners", and "Tank Cleaning." You can also find information on Drainage Maintenance Contractors on the King County Stormwater Services website at <http://dnr.metrokc.gov/wlr/stormwater/DrainageMaintVendors.htm> or by calling 206-296-1900. Septic system pump-out and hauling contractors must not be used for disposing wastes other than domestic sewage. They are not allowed to haul industrial wastes.

## Secondary Containment and Elevation: Surround with Dike or Berm, or Elevate

---

These BMP options can be an effective means for prevention of uncontaminated stormwater from flowing into or onto a contaminated activity area. These BMPs also explain containment of spills in activity areas where pollutants may be present. These BMPs may be less expensive to implement than paving the area and providing storm drainage collection, but can also be more difficult to maintain if stormwater ponding occurs inside a secondary containment dike.

If a curb, berm, or dike is used to prevent stormwater run on to a covered area, and the area is paved or otherwise impermeable, it should be covered so that precipitation will not pond inside the secondary containment area. In some instances, run on prevention can be accomplished by placing a curb or berm on the upslope sides of the area. Elevating the activity or stored materials with a platform or other type of pedestal can also prevent stormwater run-on.

Secondary containment may be achieved with concrete curbing, an earthen berm, a tub such as a plastic wading pool, or some other dike structure, depending on the activity, its size, and resources available. If a curb, berm, or dike is used to contain possible spills, and other containment regulations (such as fire codes or Washington State Department of Ecology requirements) do not apply, the containment area must be sized to hold a volume of 110 percent of the volume contained in the tank/containers.

Secondary containment without a cover generally will allow rainwater to accumulate in the containment area. Contaminated water cannot be drained from the containment area to surface water or the ground. The water must be collected and disposed of either into a sanitary sewer, a stormwater treatment system, or at a licensed vector waste disposal facility. During the wet season, secondary containment without any cover provisions can lead to frequent disposal of relatively clean water that can be costly. In addition, monitoring may be needed to determine if the water is contaminated. If the stormwater is typically clean, or if a stormwater treatment system is present on-site, a valve must be installed in the secondary containment area so that excess stormwater can be drained out of the containment area and directed either to storm drainage facilities (if clean) or into the stormwater treatment system (if contaminated), whichever applies. If a discharge valve is installed in the containment area, the valve should always be kept closed unless excess stormwater is being discharged, so that any spills that occur within the area can be contained. Local sewer authorities and the King County Industrial Waste Program may not allow discharges from a large containment area into the sewer system. Discharge authorizations from the local sewer district must be obtained prior to releasing water from containment areas into the sanitary sewer system.

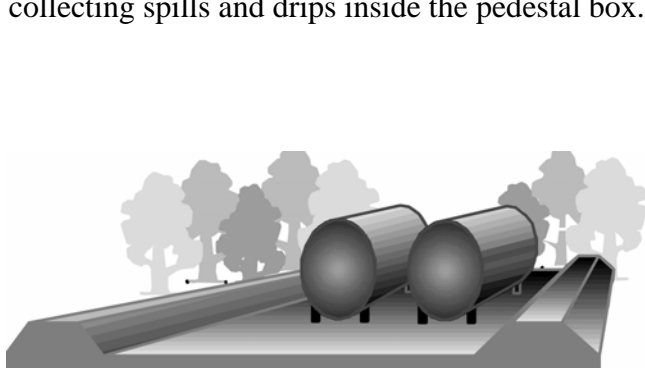
If containment is used for stockpiles of erodible material, a dike, berm, or filtering device such as basic erosion control must be placed on at least three sides of every stockpile to act as a barrier or filter to treat runoff and to remove suspended solids. If the containment device is three-sided, the open side should not be on the upslope or the downslope side of the stockpile, if feasible. The dike or filter can be made of hay bales, silt fencing (filter fabric), concrete curbing, ecology blocks, compacted earth with grass planted on it, or similarly effective materials. Timbers treated with creosote or other preservatives should not be used because they can leach contaminants into runoff. If ponding will occur due to a sturdy dike, filter materials should be used instead. All filter materials used around stockpiles must be maintained to work effectively and must be replaced when necessary (see Appendix D of the *Surface Water Design Manual* for other options).



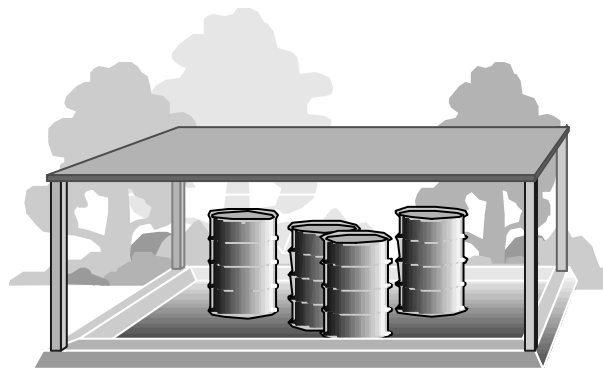
*Simple Containment Devices*

For storage of small items, a simple containment device is a tub or wading pool. A rubber or plastic wading pool may be sufficient for containment of some stored materials that do not require a lot space, such as storing remodeling and painting materials, and temporary storage of wastes in drums. These small storage devices should also be covered with a tarp or other cover. An example of this is shown to the left. You must also take into consideration the type of materials stored to ensure adverse chemical reactions do not occur with the containment material.

It should also be noted that neglect and poor maintenance can render the secondary containment useless. Maintenance of containment devices must be stressed, as maintenance is essential for containment to work as intended. Commercial products are available that are a combination of containment boxes/elevated pedestals. These commercially available products prevent stormwater run-on by elevating containers of liquids (such as drums) off the ground and collecting spills and drips inside the pedestal box.



*Containment Dike*



*Containment Curb*



## Integrated Pest Management

---

The use of herbicides, insecticides, fungicides, and rodenticides can be extremely harmful to the environment due to the highly toxic nature of many chemicals in pesticide products. In light of this, special attention should be given to pesticide use in all applications. The discussion below applies more to large scale pesticide users, but should be considered for backyard applications as well.

Commercial, agricultural, and other large scale pesticide users such as golf courses and parks should adhere to the principles of integrated pest management (IPM), a decision-making process for pest management that strives for intelligent, environmentally sound control of pests. It is a systems approach to pest management that combines agronomic, biological, chemical, and genetic information for educated decisions on the type of control(s) to use, the timing and extent of chemical application, and whether nonchemical means can attain an acceptable level of pest control.

IPM is a preventive measure aimed at knowing the exact pest(s) being targeted for control, the locations and times when pests will pose problems, the level of pest-induced damage that can be tolerated without taking action, the most vulnerable life stage, and control actions that are least damaging to the environment. The major components of IPM are as follows: monitoring and inventory of pest populations, determination of pest-induced injury and action levels, identification of priority pest problems, selection and timing of least toxic management tools, site-specific treatment with minimized chemical use, and evaluation and adjustment of pesticide applications. Monitoring of pest populations is a key to successful IPM implementation. Pest problems are universally easier to control if the problem can be discovered early. With IPM pesticides are used only as a last resort; maximization of natural controls, including biological controls and removal of pests by hand, is a guiding rule.

A list of IPM resources is available on the web at  
<http://www.govlink.org/hazwaste/interagency/ipm/ipmlinks.htm>.

## Maintenance of Drainage Systems

---

Many commercial, industrial, residential and public agency properties have storm drainage flow control and water quality systems to capture and treat stormwater flows. Most of these systems have catch basins as key components. Catch basins are typically located along curbs, at low spots in parking lots, and where stormwater conveyance pipes combine flows. Storm drains collect runoff that directs flows into basins and pipes that are located underneath parking lots and storm drain grates. Most catch basins have a few feet of storage in the bottom or sump. This storage area is intended to trap sediment, debris, and other particulates that settle out of stormwater, to prevent clogging of downstream pipes and to keep solids from being flushed into receiving waters.

Anyone who has ever looked into a catch basin can attest to its ability to capture dirt, leaves, twigs, litter, and a variety of other materials that make for a mucky buildup in the bottom. However, if the sump (the bottom of the catch basin) is full of solid material, everything in the incoming runoff passes straight through to an outflow pipe. The bottom (or sump) in catch basins must be cleaned out periodically so they can continue to trap solids from stormwater runoff. Routine maintenance practices at all sites with storm drains and catch basins must include cleaning/removal of sediment or solids from these important drainage system features. If catch basins are not cleaned, they can actually contribute to receiving water pollution problems as trapped solids, and stagnant, polluted water in sumps can be flushed out in large quantities with turbulent storm flow conditions.

Check your catch basins regularly for needed maintenance (at a minimum twice a year) Once during the dry summer months and once prior to the rainy season. As a rule of thumb, catch basins must be cleaned out when the solids, trash, and debris in the sump reaches one-third of the depth between the bottom of the sump and the bottom (invert) of the lowest inflow or outflow pipe connected to the catch basin. This is the level at which flushing of pollutants can be a problem. The rate at which a sump fills with solid material is quite variable, and depends on the characteristics of the drainage basin feeding into it. If activities that generate a lot of sediment are taking place in the drainage area that contributes stormwater flows to a catch basin, such as exposing soils due to construction or landscaping, stockpiling erodible materials, or if your site is not paved and has heavy traffic use on dirt or gravel surfaces, the sump will fill up relatively quickly. Therefore, sites with activities generating a lot of sediments and other debris will have to clean out their catch basins more often.

Other components of drainage systems include ponds, tanks, and bioswales. These components must also be maintained to ensure your drainage systems functions as designed. Vegetation in ponds and bioswales must be mowed or thinned, and sediment accumulations must be removed. Maintenance of ponds, tanks, and bioswales is generally beyond the ability of the typical property owner. Drainage system maintenance contractors are available to complete this work.

If you clean out/maintain the catch basins yourself, you may dispose of up to one cubic yard of solid material as solid waste in your regular garbage. If you exceed this threshold you are encouraged to contact a company offering catch basin cleaning services. You can locate a cleaning service by calling the King County Water and Land Resources Division at 206-296-1900 for a list of firms performing drainage system maintenance services or in your telephone directory's yellow pages under headings like "Sewer Cleaning Equipment and Supplies," "Sewer Contractors," and "Tank Cleaning." All of the solids and stagnant water collected from catch basin sumps must be disposed of properly. None of the sump contents can be flushed into the catch basin outflow pipe. Depending on the nature of the pollutants in the sump, and the associated types of activities taking place on the site, the sump contents may need to be handled as contaminated waste. Contractors who perform catch basin clean-out services are required to follow appropriate disposal requirements.

Frequent sweeping of paved parking and storage areas, covering pollutant generating activity areas, and containing runoff from activity areas will help reduce catch basin and drainage system cleaning frequency, and may save time and money spent on required maintenance. All businesses and public agencies should set up maintenance schedules for all of their BMPs so that coordinated BMP efforts result in reduced catch basin and drainage system maintenance and cleaning.



## Water Quality Treatment BMPs

---

Water quality treatment BMP options may be required if operational or basic structural source controls do not adequately address pollutant discharges from your site. Source control BMPs, as presented in Chapter Three, must always be implemented before treatment BMPs are considered.

The following information describe some basics of water quality treatment systems/facilities. Design and construction details can be found in the King County Surface Water Design Manual (which contains relevant information for the treatment BMPs discussed). A private vendor specializing in the treatment system or an engineering consultant can provide information on treatment systems.

Businesses and agencies are allowed to select a treatment BMP other than those presented in this manual if they follow the adjustment process as outlined in the King County Surface Water Design Manual or if they complete the Alternative BMP request in this manual.

Table 5.2 (next page) presents a brief description of some typical water quality treatment BMPs. Table 5.3 presents water quality treatment BMPs for removing specified pollutants. One treatment BMP usually cannot treat all pollutant problems. Each BMP is designed for a specific purpose and is capable of removing only specified pollutants. If you decide to install a water quality treatment BMP, always ensure that it is removing the pollutant of concern from your site runoff.

<b>TABLE 5.2 WATER QUALITY TREATMENT BMPs</b>	
<b>TREATMENT BMP</b>	<b>BRIEF DESCRIPTION</b>
Oil/Water Separator	An underground vault specifically designed to remove oil and grease. Also will remove floatable and some settleable solids.
Catch Basin Insert	A filtering device that is installed within an existing catch basin and uses various sorbent materials and settling space to collect pollutants.
Catch Basin Sump and Vault Filter	A device similar to catch basin inserts, only larger and placed underground.
Leaf Compost Filters	A filtering device that is installed above or below ground and uses leaf compost to remove pollutants from stormwater.
Wet Pond, Constructed Wetland, Wet Vault	A wet pond is a stormwater pond that retains a permanent pool of water. A constructed wetland is similar to a wet pond, but shallower and supporting wetland vegetation in large areas. A wet vault is an underground, covered, engineered structure that retains a permanent pool of water.
Vegetated Biofilter - Biofiltration Swale and Filter Strip	A biofiltration swale is a long, gently sloped ditch or depression designed to treat water as it passes through the vegetation. Grass is the most common vegetation. A filter strip is a grass area, wider than biofilters, also with gentle slopes. Water usually enters as sheet flow from the adjacent pavement.
Sand Filter	A structure placed in the landscape, with grass grown on top, or in vaults. Stormwater passes through the sand allowing particulate pollutants to be filtered out.
Infiltration	A normally dry basin which temporarily stores stormwater until it soaks through the bottom and sides of the basin, and infiltrates into surrounding soil.

**TABLE 5.3  
APPROPRIATE USES FOR WATER QUALITY TREATMENT BMPs**

<b>POLLUTANTS TO REMOVE</b>	<b>APPROPRIATE TREATMENT BMPs</b>
<p><b>Oil/Grease</b> Sources: vehicle and equipment areas, industrial areas, food preparation</p>	<p>Oil/water separators; catch basin inserts; catch basin sump/vault filters, leaf compost filters.</p>
<p><b>Sediments/Solids</b> Sources: sand/gravel storage, construction sites, unpaved areas, agriculture/livestock uses</p>	<p>For coarse sediments -Wet pond/vault; constructed wetland (with forebay); vegetated biofilter; sand filter; catch basin insert; catch basin sump/vault filters; leaf compost filters. For fine sediments -Wet pond/vault; constructed wetland (with forebay); vegetated biofilter; sand filter. Also see catch basin sump/vault filters.</p>
<p><b>Phosphorus Compounds</b> Sources: detergents/cleaners, fertilizers, organic matter, animal wastes</p>	<p>For particulate phosphorus -Wet pond/vault; constructed wetland (with forebay); vegetated biofilter; sand filter. If dissolved phosphorus must also be removed - a large “oversized” wet pond or sand filter.</p>
<p><b>Nitrogen Compounds</b> Sources: fertilizers, animal wastes, organic matter</p>	<p>For particulate nitrate -Wet pond/vault; constructed wetland (with forebay); vegetated biofilter; sand filter. For dissolved nitrate - constructed wetland.</p>
<p><b>Metals</b> Sources: industrial areas, vehicle and equipment areas, paints, pesticides</p>	<p>For particulate metals -Wet pond/vault; constructed wetland (with forebay); vegetated biofilter; sand filter. For dissolved metals - leaf compost filter or constructed wetland.</p>
<p><b>Fecal Coliform Bacteria</b> Sources: animal wastes; fertilizers</p>	<p>There is no treatment BMP that can reliably reduce fecal coliform bacteria to acceptable levels. Some studies have shown constructed wetlands provide some benefit.</p>
<p><b>pH</b> Sources: metal plating, printing/graphic industries, cement/concrete production, cleaners</p>	<p>A constructed wetland can neutralize some ranges of pH.</p>
<p><b>BOD and Trace Organics</b> Sources: organic debris, food wastes, some chemical wastes</p>	<p>For particulate BOD - see “particulate nitrate” above. For dissolved BOD -A constructed wetland will remove some dissolved BOD and trace organics; more reliable performance requires activated carbon.</p>

## Oil/Water Separator

---

### **APPLICATION AND DESCRIPTION**

An oil/water separator is a device designed to remove oil, grease, and similar floatable pollutants from stormwater runoff. The name commonly refers to an underground structure. If a site requires spill control due to fueling activities, more simple designs exist.

Oil/water separators are appropriate at locations where petroleum products may be difficult to control with source-control BMPs. An oil/water separator can be a tee section in a catch basin that contains spills on an emergency basis, or a complex unit that is designed to treat runoff from sites with high vehicle use, equipment storage and parking or fueling areas and are more expensive and maintenance-intensive. Tee sections or down turned elbows are only effective in controlling and temporarily capturing and containing spills. Spills must be cleaned up immediately to avoid downstream contamination of surface waters and other natural resources.

For many sites, such as small parking lots, a simple tee section in a catch basin will temporarily retard pollutants, making it possible to clean up a spill before pollutants leave the site. On sites with greater potential for oil spills and high concentrations of oil and grease in runoff, such as a fleet vehicle lots, auto repair shops, or fueling stations, a more complex oil/water separator is needed.

Tee sections or down turned elbows or “snouts” can be placed in catch basins along with oil pads and booms in the primary conveyance system. Because of their simplicity, there are few restrictions on their application and locations of use. If tee sections are used or installed in catch basins, other measures must be used such as oil absorbent pads or booms.

There are two types of complex oil/water separators commonly used in situations where oily runoff is a significant concern: the American Petroleum Institute (API) and the coalescing plate interceptor (CPI). The API separator has the appearance of a long septic tank. An API separator must be large relative to the area it is treating to be effective. By placing coalescing plates in the separator, its size can be significantly reduced while retaining the efficiency needed. Consequently, the CPI separator is more commonly used. The savings from reducing the cost of vault construction offset the relatively high cost of the plates.

These oil/water separators should be used for targeted pollutant removal in high traffic areas where oil or petroleum products are a significant problem rather than as an all-purpose stormwater treatment facility. The separator will function more efficiently and require less

maintenance if the amount of stormwater passing through is limited. Only runoff that has been exposed to high oil activity areas should be directed through the oil/water separator. Avoid directing stormwater (from other areas on your site) through the separator.

For information on oil/water separators that will be used as pretreatment prior to discharge to the sanitary sewer, contact your local sewer agency or King County's Industrial Waste Program within the Wastewater Treatment Division.

## **DESIGN AND MAINTENANCE**

API and CPI oil/water separators must be designed and sized in accordance with the King County Surface Water Design Manual.

Oil/water separators must be checked at least weekly during the wet season. How often material should be removed depends on the amount of petroleum in the influent, but the separator should be cleaned at least quarterly, and particularly in the fall before the first storm of the wet season. All residuals removed from the surface and vault bottom must be disposed of properly. In addition, the following maintenance requirements apply:

- ◆ Oil absorbent pads should be replaced as needed, but should always be replaced in the fall prior to the wet season, and in the spring.
- ◆ The outlet pipe of the separator must be blocked during cleaning operations.
- ◆ Waste oil and residuals shall be disposed of in accordance with current Seattle-King County Department of Public Health requirements. Several vendors handle waste oil hauling and disposal.
- ◆ Any standing water removed during the maintenance operation must be disposed to a sanitary sewer at a discharge location approved by the local jurisdiction.

## Catch Basin Insert

---

### **APPLICATION AND DESCRIPTION**

**A catch basin insert is a device installed in a storm drain to provide water quality treatment through filtration, settling, or absorption. Catch basin inserts ARE NOT a requirement for properties in King County unless other source control measures are not effective.**

Catch basin inserts are commercially available products which fit into existing catch basins and are generally configured to remove one or more of the following contaminants: coarse sediment, oil and grease, and litter and debris. While it has been suggested that some units may be able to remove dissolved pollutants and pollutants associated with fine sediments, King County is not aware of independent tests that have confirmed this. When selecting an insert, ensure that your specific pollutant-removal needs are met. *As with any treatment BMP, catch basin inserts should never be used in place of sound source control practices.*

Oil and Grease Removal: Inserts designed for the removal of oil and grease contain, and depend on, oil-absorbing media. The King County Surface Water Design Manual (SWDM) requires specific materials/media to be used in catch basin inserts to ensure oils are not re-released during storm flows. These materials are described in Section 6.1.2 of the SWDM. These inserts are appropriate for use in any area in which vehicles are used, maintained or stored. Because of the small storage capacity of these inserts, they are not acceptable as the sole line of defense against actual oil spills in areas where large amounts of oil could be released. Large amounts of sediment entering the catch basin significantly reduce the effectiveness and longevity of the oil absorbing media. Under these conditions, an oil/water separator with a pre-settling chamber may be more appropriate.

Sediment Removal: Inserts designed for sediment removal may be used at construction sites, and in situations where stockpiles or unpaved areas are likely to contribute high sediment loads. They may also be appropriate for small (low traffic) businesses in which the per-inlet cost of cleaning would be excessive. Tests indicate that these units do little to remove fine materials and dissolved pollutants and are not considered a substitute for other pollutant-removal BMPs.

Debris Removal: Inserts can also be used for the removal of litter and debris. Some evidence suggests that the removal of large debris such as cigarette butts, candy wrappers, and beauty bark reduces the amount of bacteria and solids in receiving waters.

## **DESIGN AND MAINTENANCE**

Unlike most other treatment BMPs, which must be designed and constructed specifically for your site, catch basin inserts may be purchased directly from a vendor and installed by the user. While standardized insert units are available, most vendors are able to customize their systems for your site. This service may improve the performance of your drainage system while adding relatively little to the cost of the product. Before purchasing a catch basin insert, the following factors must be considered.

Conveyance Capacity: The conveyance capacity refers to the amount of water that the insert can pass without causing flooding. This capacity is equal to the amount of water that is able to pass through the insert's treatment area, plus the amount that can pass through the built-in overflow structure. As the unit treats the stormwater, the treatment area begins to clog and the total conveyance capacity is reduced. If maintenance is neglected, or an unusually high amount of sediment or debris enters the system, the treatment capacity may drop to zero, and all of the water will have to exit through the overflow. In order to minimize the chance of flooding, the insert should be able to pass the maximum expected flow from the area draining to the catch basin. In most cases the vendor should be able to tell you what the overflow capacity is.

Treatment Capacity and Bypass: The treatment capacity refers to the amount of stormwater that the insert unit will pass through its treatment area. The insert unit should be sized to ensure that most of the water entering the drain inlet is treated even as the treatment area starts to clog. The ability of the insert to remove pollutants will be reduced if water is able to seep between the storm drain grate and the edge of the pavement. Ensure that this gap is sealed. The vendor should provide you with information on how to prevent this situation and information on the treatment capacity of the system.

Maximum Weight: The maximum weight of the insert/filter will be equal to the weight of the insert/unit when new, plus the weight of the sediment and water trapped in the unit. Under the most extreme cases, the treatment area of the insert/unit may become completely clogged, and the unit may be full of water when it comes time to service it. It is essential the maximum weight of the insert be less than what can be lifted by the people or equipment to be used during maintenance. Before ordering a system, or having a system customized to your site, be sure the vendor knows how you will be removing the insert/unit for maintenance.

Simplicity and Durability: Since the installation of one or more catch basin inserts represents a long-term commitment to maintenance, it is important that the unit selected be easy to use and maintain, and that it is built to last. Be sure to have the vendor provide a complete demonstration of the product at your site, and if possible, ask to try an insert for an extended period of time before committing to its purchase and use.

Catch basin inserts will generally require more frequent, but less costly maintenance than other treatment BMPs. Frequent inspection of the insert is necessary to ensure that it is not clogged by large debris. Actual maintenance will generally consist of removing the insert from the catch basin, cleaning or replacing the filter media (if applicable), and re-installing the catch basin insert.

In addition to the weight considerations mentioned above, you must insure that the drain inlet will not be obstructed when it is time to clean the filter, that you have the time and personnel to do the job (or can arrange for this service through a private contractor), and that you have a legal means of disposing of the trapped material and spent media. In most cases these materials may be disposed of as regular solid waste, however, media used for oil and grease removal may require special treatment. See BMP Info Sheet 2 in this chapter for more information on disposal.

Maintenance frequency will vary depending on the amount and type of pollutant targeted. Tests conducted by King County suggest that initially, all units should be inspected every one to two weeks (except during periods of dry weather), and that complete maintenance will be required approximately monthly. Units configured simply to catch litter and debris may work for several months without maintenance. The simplest way to determine whether the units need maintenance is to inspect them during a rainstorm and see whether water is exiting out the overflow. If this is the case, the unit is probably in need of service. Alternatively, the depth of sediment accumulation or appearance of the filter media may provide insight as to whether the unit is in need of maintenance. Again, be sure the vendor provides you with this information.



## Processing Requirements for Use of Soil Amendments on Construction Sites

**Purpose:** This Info Sheet establishes procedures for implementing BMPs when using soil amendments on construction sites. See Activity Sheet 43, "Use of Soil Amendments on Construction Sites" for a description of the BMPs. This document outlines an expedited review process and typical approval conditions that will allow contractors and builders to use soil amendments without impacting water quality. Additional BMPs may be required based upon site specific conditions that may warrant more protection. This policy is limited to those amendments, defined below, commonly known to add stability to sloppy soil conditions but can alter water runoff quality.

**Use of Soil Amendments:** It is sometimes a construction practice to add soil amendments to the surfaces of some construction areas in order to stabilize the ground for building. This practice includes placing an additive on the ground then mixing with the soil to a specified depth and finally compacting the mix. When mixed with the soil, the moisture in the ground may allow these additives to create a chemical reaction that cures similar to concrete and may absorb excessive moisture to allow soils to be compacted. The end result is a stable site for constructing a road or building pad.

Because soil amendments may be rich in lime content and other material, water runoff from these areas can be affected. If not controlled and treated, this could result in a degradation of water quality and natural drainage systems. Because these additives come in a fine powder form, the actual application can create fugitive dust. When mixed with water, some additives can become corrosive.

**Authority:** KCC 9.12.025 prohibits discharges of polluted or contaminated water into surface or storm water drainage systems. The purpose of this statute is to protect surface and ground water by regulating the discharge of potentially contaminated surface water. If soil amendments are proposed with an initial application, an environmental review is required, under SEPA, which assesses impacts, provides public input and mitigated conditions for its use.

King County Road Standards, Section 4.02 also requires an engineered design for use of a soil amendment on road surfaces or around drainage systems. The design may incorporate a thorough assessment of soil composition and laboratory analysis. The Surface Water Design Manual authorizes DDES to adopt BMPs for the control and protection of surface water. Currently, for all sites, the BMPs established in this policy are the minimum standards that shall be applied.

**Definitions:**

The following are definitions of soil amendment products that are allowed for use under these procedures:

1. Cement Kiln Dust (CKD) is a by-product in the manufacturing of cement<sup>1</sup>.
2. Cement Treated Base (CTB) utilizes Portland Cement Type II as the soil additive..

**Procedure:** An applicant may apply for use of soil amendments allowed under this policy anytime during the permit application review or after the permit has been issued and site construction is underway. After making a submittal to DDES, the applicant may receive approval conditions. Conditions may vary from site to site, but typically will include many of the BMPs included in this policy.

Applicants should identify any use of soil amendments as early in the process as possible to avoid delays in obtaining approval for use during the construction phase. If a site has known soil and water conditions that might make work during rainy periods difficult, they may want to plan to use soil amendments on their site. Obviously, if this issue is addressed at the permit review phase, implementation in the field can occur without delay. However, because of the potential risks of surface water pollution discharge and required treatment, an environmental assessment will be necessary before conditions for use can be established.

**Limitations:** This policy applies to intended the use of soil amendments in areas that will be covered impervious surfaces. For areas not covered by impervious surfaces, additional reviews, study, and BMPs may be required. In addition, alterations to original approved use plans will require a resubmittal for approval. Approval for the use of the soil amendments in unincorporated King County can only occur by strictly following the procedures contained herein and not by any other approval obtained from DDES.

**Submittal Requirements:** To obtain approval for the use of soil amendments allowed under this policy, the applicant shall prepare a submittal package to DDES that includes the following:

- Letter to DDES requesting use of soil amendments at a construction site allowed under this policy.
- Document or letter attachment that identifies source of materials and description of mixing and laydown process, plan for disposal of treated contact water, sanitary sewer permits and/or BMPs, and special precautions proposed to prevent the contamination of surface or stormwater drainage systems, other than 'sealed' drainage systems..
- Site Plan: Show a site plan map which:
  - 1) Shows overall grading plan showing existing and proposed contours.

---

<sup>1</sup> CKD is collected by air pollution control devices used to clean kiln exhaust during the manufacturing of Portland Cement. EPA has classified CKD a non-hazardous waste product provided management standards are followed for groundwater protection and control of fugitive dust releases.

CKD should not to be confused with Fly Ash, which is a by product of burning coal or wood and incineration of other material. Fly ash can contain major oxides and trace metals, depending upon the fuel source, and is considered too hazardous for use as a soil amendment. Using this product is not authorized or endorsed by DOE or King County.

- 2) Identifies sensitive areas and permanent or temporary drainage facilities.
  - 3) Identifies areas that soil amendment is planned.
  - 4) Shows depths of application and percent of amendment to be used.
  - 5) Shows location of special wheel wash facility.
  - 6) Shows location of collection and conveyance swales or pipes for contact water.
  - 7) Shows location of sealed storage/treatment tanks or temporary ponds (fully lined).
  - 8) Identifies any discharge point from the site into natural drainage systems.
  - 9) Includes soil log locations that identify seasonal high groundwater areas.
- Report and analysis of engineering mix design which includes depths of application and percent of amendment usage.
  - For proposals that use CKD and CKD additive, provide analysis of source material for soluble contaminants. Include a description of fuel source.
  - Monitoring criteria, including locations for pH and turbidity testing.
  - Provide contingency plan should use of soil amendment and site and weather conditions result in polluted or contact water entering natural drainage systems.
  - Provide contact information or water quality specialist assigned to monitor application of soil amendments and BMPs.

If the project is under construction, the applicant shall contact the DDES inspector assigned to the project to initiate a review for compliance with the BMPs and requirements herein. Otherwise contact the planner or engineer assigned to review the permit or land use application.

**Review and Approval:** Once the review has been completed, the applicant shall be notified by letter which stipulates the conditions of approval. Prior to authorizing the use of soil amendments at the site, the applicant shall provide a special restoration financial guarantee cash deposit in the amount as determined by the existing, established processes. Note: It remains the applicant/contractor's responsibility to comply with any other applicable state or federal regulations such as use of NIOSH respiratory protection, safety goggles, gloves and protective clothing whenever using hazardous materials.

### **Applicable Standards:**

Typically, all proposals using soil amendments in unincorporated King County shall have these conditions as standard requirements:

1. Prior to any application of CKD/CTB, the general contract shall hold a preconstruction meeting with the assigned DDES inspector at least 3 working days in advance.
2. CKD will not be permitted for use in areas adjacent to or in proximity to wetlands and streams areas. CTB may or may not be permitted in these areas.
3. Areas not covered by impervious surfaces:
  - CKD will not be permitted in areas that will not be covered by impervious surfaces.
  - If CTB is proposed in these areas, an analysis of whether or not the soil amendment will change the post-development runoff characteristics and the permanent stormwater facilities were sized appropriately shall be submitted for review. Use of CTB in areas not permanently covered by impervious surface may require re-sizing of the permanent stormwater facilities.

4. If CKD is proposed, the contractor shall provide mill certificates verifying the product composition. The contractor/developer must be prepared to follow BMPs during and after soil treatment and be prepared to treat runoff from the treatment area(s) immediately. All stormwater collection systems must be in place and all equipment (pH meters, dry ice, etc.) must be onsite.
5. Collection of stormwater (see BMP # 5):
  - Stormwater from the application area shall be kept separate from and prevented from comingling with uncontaminated stormwater.
  - During the application of CKD/CTB, stormwater runoff shall be collected in temporary collection systems and shall not be allowed to enter the permanent facilities. Permanent drainage systems shall be capped to prevent contact stormwater from entering the inlets of the catch basins. Stormwater from the application area shall not be collected in the temporary/permanent detention ponds, even if the underlying soils are 'impermeable'.
6. Treatment: If necessary, pH adjustment shall be done in the collection tanks or temporary ponds and not in the permanent detention ponds.
7. Disposal options: The proposal to use CKD/CTB must contain a disposal plan that may include one or a combination of sanitary sewer or approved offsite disposal. Treated contact water may be discharged to the sanitary sewer if authorizations are obtained from the King County Industrial Waste Program (206-263-3000) and the local sewer district. All discharge conditions (e.g. pH, settleable solids) must be followed. If a sanitary sewer is not available at the site, contact water may be transported offsite to an approved site for disposal and proof of proper disposal must be submitted to King County. All authorizations for disposal shall be obtained prior to CKD/CTB application.
  - Infiltration: Depending on the site conditions, pH-adjusted stormwater may be infiltrated. Prior to infiltration, pH must be between 6.5 and 8.5.
  - Surface Water: Contact water from the application area shall not be discharged to surface waters, even if treatment has adjusted the pH.
8. Emergency backup plan: An emergency backup plan must be prepared and ready to implement to handle large quantities of stormwater.
9. Monitoring shall be conducted to determine that contact stormwater is not leaving the site. Offsite monitoring shall also be conducted to identify impacts to adjacent water bodies. Bonding may be required to cover mitigation of impacts and restoration.
10. A soils specialist will establish the mixing percentage for onsite soils. Soil amendments will never occur in excess of the ability of the onsite equipment and resources to meet all BMP requirements.
11. For sites 5 acres or larger, a National Pollutant Discharge Elimination System (NPDES) Construction Stormwater permit must be obtained from DOE. NPDES permits and 'Stormwater Pollution Prevention Plans' (SWPPPs) must be amended and the use of CKD/CTB must be approved by DOE prior to application.

The contractor/developer shall comply will all federal, state and local regulations. A health and safety plan may be required for the protection of King County inspectors.

Additional BMPs may be applicable depending on mix design, proximity of wetlands or streams (e.g. within 300 feet of class/type I and 100 feet or less for other types) and site conditions.