

STORMWATER FACILITIES: MAINTENANCE REQUIREMENTS



Privately Owned

- *Detention Ponds*
 - *Retention Ponds*
 - *Sedimentation Ponds*
 - *Managed Wetlands*
 - *Grassed Swales*
 - *Catch Basins*
 - *Treatments*
 - *Concrete*
 - *Sand Filters*
 - *Underground Detention*
-

Stormwater facilities that you own in your development may need help! Over half of the installed stormwater facilities fail in the first five years due to lack of proper maintenance. Failure may result in property damage and cause pollution of our waterways. This manual contains the information you need to determine your stormwater facility maintenance needs.



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WHAT YOU NEED TO KNOW ABOUT STORMWATER FACILITIES

If you are receiving this information, then you are probably responsible for maintaining stormwater facilities for your Home Owner's Association (HOA), business, or commercial development. Identifying what stormwater facilities you have and understanding your responsibilities will allow you to plan for inevitable costs associated with maintenance in the future.

What are Stormwater facilities?

Stormwater facilities are those structures that channel, divert, and capture stormwater flows to control flooding of downstream properties and improve the water quality of our stormwater runoff before it gets to creeks and rivers. Examples of stormwater facilities are swales or ditches, detention ponds, and outlet structures.



Why do we need stormwater facilities to control flooding and improve water quality?

Before the neighborhood, business or commercial site was built, stormwater most likely soaked into permeable grassy areas or fields. When rooftops, driveways, streets and parking areas were built, most of the stormwater no longer soaks into the ground, but flows at a rapid rate across paved (impervious) surface, picking up materials such as trash, metals, oil, soil and chemicals along the way before it discharges into creeks and rivers. Swales, depressions, and ponds are used as stormwater facilities because they slow the water down to reduce the potential for downstream flooding, and settle out contaminants so that only clean water flows from the development.

Who maintains these stormwater facilities?

In general, the owner, possibly through HOAs and/or management companies, are responsible for maintaining stormwater facilities. Many owners are not aware of their responsibility nor do they understand the financial burden associated with it. Generally, the builder conveys the open tracts to HOAs or to the business or commercial entity when the building is complete. The new owner is then responsible for maintaining stormwater facilities. The City maintains the curb, gutters, streets, inlets, manholes, and public underground pipes that convey stormwater. It is important to inventory the stormwater structures that you own and are responsible for maintaining; the City can help you do that.



What must we do to maintain our stormwater facilities and how much does it cost?

This manual outlines basic maintenance and planning tasks that will help keep your stormwater facilities functioning properly. Costs vary greatly and are impacted by a number of factors including the size and type of facility, previous maintenance activity, and accessibility. Understanding what maintenance needs to be conducted will assist you in estimating costs.

Over half of the installed stormwater facilities fail in the first five years due to lack of proper maintenance. A consistent maintenance program is the best way to ensure that a stormwater facility will continue to perform its water quality functions.



Outlet Stabilization: Erosion and undercutting may occur below the outlet structure, where water from the development flows offsite. Filter fabric (a webbed fabric which serves to filter pollutants or to hold a filter medium such as gravel or sand in place) and rip rap (a layer or mound of large stones placed to prevent erosion) can be placed below the outlet to stabilize the area to prevent erosion. Remember to inspect the filter fabric and/or rip-rap placed below the outfall regularly to assure it is working properly.

Signs of Vandalism: This could include litter and damage to mechanical components and safety devices. Monthly inspection and prompt repair will keep the structure operating as designed.



Upstream Conditions: Erosion problems upstream of the stormwater facility can dramatically increase the amount of sediment entering the facility, as well as other activities which may contribute pollutants such as motor oil, pet waste, and lawn care products. Commercial or recreational areas upstream could contribute to an increased need for litter removal. Everything that accumulates on the sidewalk, street, or driveway is washed into the curb gutters and storm drains, and flows into and through your stormwater facilities. Be aware of developments near you and how stormwater flows onto and off of your development to help determine potential sources of pollutants. For example, the presence of algae indicates inputs of fertilizers and nutrient-rich wastes. A large amount of litter may mean that residents do not cover their trash before placing it on the street. Educate residents about how they affect water quality to help avoid future problems in the stormwater facility.



Debris and Litter Control: Regular removal of debris and litter is necessary in order to prevent clogging of outlet structures and trash racks or devices used to intercept it. Damaged vegetated areas, as a result of the accumulation of debris, increases the potential for mosquito breeding, and is detrimental to the facility's appearance.



Sediment and pollutant removal: Excess sediment may inhibit good vegetative growth, promote weed growth, is unsightly and cause unexpected ponding to occur leading to mosquitoes and foul odors. The primary purpose of many stormwater features, besides controlling flood waters, is to remove or trap sediment and other pollutants that are usually attached to sediment from stormwater. Sediment will naturally accumulate and eventually need to be removed. Once sediment is removed, the disturbed areas require re-vegetation immediately.

Mechanical Components: These could include valves, gates, pumps, anti vortex devices, fence gates, locks, grates, piping, and access hatches. These components should be operational at all times. Know when a professional should be consulted regarding these types of stormwater facilities.

Maintenance Access: Facilities should be designed so that stormwater facilities can safely and easily be reached to perform the required maintenance.



TYPICAL STORMWATER FACILITIES IN ARVADA

What stormwater facilities do you have in your subdivision that must be maintained?

Take a walk in your development during a rainstorm and watch where the water flows. There are aboveground stormwater facilities that fill up with water and overflow during a rain event. In some cases, there might also be below ground facilities that are harder to see. The City can help you identify, understand and locate your stormwater facilities. Below is a description of the most common stormwater facilities found in the City of Arvada.

Aboveground Stormwater Facilities:

Aboveground stormwater facilities commonly include detention/retention basins, grassed swales, managed wetlands, and others. Lack of proper maintenance will result in the overgrowth of these facilities and reduce their proper function. With unchecked vegetative growth and sediment accumulation, the ability to perform a comprehensive inspection of the facility becomes difficult if not impossible. Some owners do not even know there is a stormwater facility present due to the years of neglect, since it may appear to be a nice, wooded or fenced area in a corner of the property.

Detention Basins (dry ponds) retain water for a specified period of time after a storm. Water is detained temporarily to allow pollutants to settle to the bottom. The water is slowly discharged through an outlet that provides prolonged release.



Retention Basins (wet ponds) contain a permanent pool of water much like a lake. Above the pool's normal level is where stormwater runoff is temporarily stored and released at a controlled rate. The release is regulated by an outlet similar to that in a dry pond. Wet ponds often provide improved water quality, aesthetic, recreation and wildlife habitat amenities.

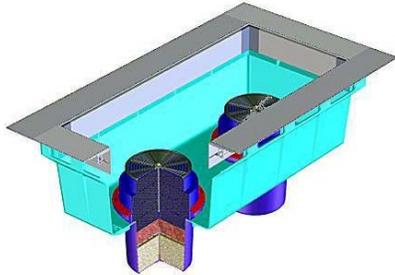
Grassed Swales are not always designed to treat stormwater but are simply an elongated depression in land used to transfer runoff. As a water quality device, a grassed swale is constructed to allow stormwater to soak into the soil, and particles to be trapped by the groundcover. Many swales are constructed with berms (small dams made of earth, rock or wood) to create temporary ponds that prevent erosion and help promote infiltration of stormwater into the soil.



Managed Wetlands or stormwater wetlands are structural practices similar to wet ponds that incorporate wetland plants into the design. Wetlands are among the most effective stormwater practices in terms of pollutant removal and also offer aesthetic and habitat value. Natural wetlands are different than managed wetlands, which are designed specifically for stormwater treatment.

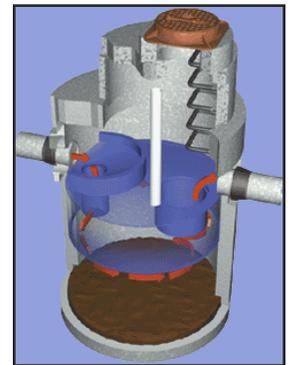
Below Ground Stormwater Facilities:

Below ground stormwater facilities commonly include catch basins, below ground stormwater treatment units, inlet filters, detention structures, sand filters, and others. Lack of proper maintenance of below ground facilities is not as readily apparent as it is in aboveground ones. Clogging of many below ground facilities can go unnoticed since many are designed to bypass once clogged. Many owners do not know that they have a below ground stormwater facility until they encounter flooding or some other failure of the system. Most manufacturers have a recommended frequency for inspection and maintenance of their below ground facilities.

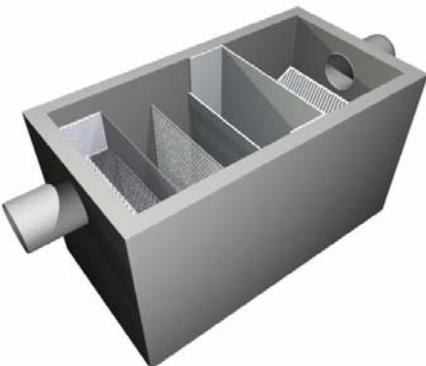
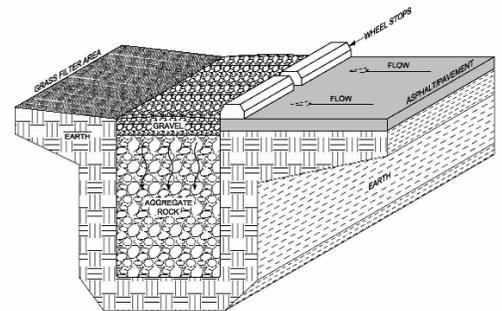


Catch Basins are sumps designed to catch sediment, debris and associated pollutants. They act as pretreatment for other treatment practices by capturing large sediments. The catch basin pictured also has an inlet filter to further remove contaminants.

Below Ground Proprietary Stormwater Treatment Facilities remove a combination of sand, oil and trash from stormwater. They work by settling out the sand and skimming off the oils prior to allowing the water to discharge.



Sand Filtration Systems are usually used to treat runoff from commercial, office complexes and high density residential areas. Sand filters typically are constructed inside a concrete shell and placed under ground to conserve space. They work by slowly filtering stormwater through a layer of sand so pollutants are removed and trapped between the sand particles.



Underground Detention is used when space is at a premium. In some cases detention chambers also treat stormwater by forcing the water through filters.

TYPICAL STORMWATER FACILITY MAINTENANCE PROGRAMS

Stormwater facilities can fail prematurely if not properly maintained. Once a facility fails, it will no longer perform as it was designed to do and is often very expensive to replace. The key to ensuring that the stormwater facility is performing as intended and preventing expensive repairs is a comprehensive preventive maintenance program. This program should include:

- Understanding how the stormwater facilities in your HOA, business or commercial site work and what the maintenance needs are for each stormwater facility.
- Defining maintenance tasks and assigning who will be responsible for these tasks.
- Identifying routine and non-routine expenses and developing a long-term fund allocation plan.
- Educating your community on the purpose of stormwater facilities and how they can help prevent pollution.
- Establishing a record keeping system to define chronic maintenance problems and aid in budget preparation.
- Inspecting stormwater facilities regularly. Some stormwater facilities require monthly inspections while some can be inspected on a yearly basis.



Vegetation Management: Vegetation is used as a filter to remove contaminants, such as sediment, from stormwater. However, tree and bush roots can destabilize the structure and require routine maintenance. Consistent mowing will control any unwanted overgrowth. Weed control is very important. If chemicals are used, apply according to manufacturer's specifications and never apply them when rain is expected.



Unexpected Ponding: Is the standing water by design or a sign that maintenance is required? Pondered water can create a breeding ground for **mosquitoes** and other insects. A mosquito problem in dry ponds may be an early indication that there is a maintenance issue. Clearing out trash racks of vegetative debris and trash will allow the ponded water to drain. It may take several cleanings to get the desired result. If this doesn't work, low spots may need to be filled in to get the desired flow.

Embankment Stabilization: A stable embankment is important to ensure that erosion does not contribute to water quality problems and downstream flooding. Maintaining a healthy vegetative cover and preventing the growth of deep-rooted (woody) vegetation on embankment areas will protect the embankment of a wet or dry pond.



Animal Burrows: Animal burrows will deteriorate the integrity of an embankment. Some animals will burrow tunnels up to six inches in diameter. Prevention of animal burrowing and the repair/filling in of existing burrows should be done as soon as possible. Professional extermination or relocation services may need to be contacted.

MAINTENANCE PERSONNEL

Routine maintenance: that is typically conducted by a facility owner includes maintaining landscaping, cleaning of outlet grates and plates, removal of litter and communicating to those who could impact the facility.

Non-routine maintenance: such as sediment removal and disposal, mechanical component repair or replacement, outlet stabilization is typically conducted by specialized firms.

Professional landscaping companies: should be consulted for mowing and landscaping on dangerous slopes and embankments, planting eroded areas, sodding, pest and weed control, and the removal of unwanted vegetation. ***Instruct mowing companies to remove grass clippings from any stormwater facility and not to blow clippings into the gutter or parking areas. Cleaning of ponds, removing trash from rock and grates should be part of a routine maintenance program.***

MAINTENANCE COSTS AT A GLANCE

Routine costs are typically part of your landscaping plan. For infrequent, non-routine costs, many owners establish a reserve fund. Identify what needs to be done and how often maintenance needs to happen to determine annual costs associated with stormwater facility maintenance.

FOR ASSISTANCE

Please call the City of Arvada for assistance in identifying and locating your stormwater facilities.

City of Arvada	www.arvada.org	
Engineering		720-898-7640
Environmental Services		720-898-7807

TO LEARN MORE

Visit these websites or call these resources for more information on surface water quality and the environment.

State of Colorado		
Environmental	www.cdphe.state.co.us	303-692-2000
Department of Natural Resources		
<i>Division of Wildlife</i>	www.wildlife.state.co.us	303-297-1192
<i>Division of Water Resources</i>	www.water.state.co.us	303-866-3581
U.S. Environmental Protection Agency	www.epa.gov	
Region 8		303-312-6312
Rooney Road Recycling Center	www.rooneyroadrecycling.org	303-316-6262

Copy this page of this manual to distribute to community members.

EVERYONE CAN MAKE A DIFFERENCE: PROTECT OUR WATERWAYS

The gutter in the street outside your home carries water into a network of storm drains that lead straight to local creeks and rivers. These waterways are fragile ecosystems that need to be protected from urbanized pollution. Stormwater is not treated before it is discharged into area waterways. Anything on the streets, sidewalks, and driveways, like grass clippings, lawn chemicals, pet waste, detergent, mud or trash, ends up in storm drains and flows into our creeks. What you do at home does make a difference in the environment. Follow the guidelines below to do your part to protect our waterways.

1. Keep paved surfaces such as sidewalks, parking lots, driveways, curbs, gutters and streets free of trash, lawn clippings, leaves, and landscape and construction materials.
2. Never dump or wash anything out in the gutter, into a stormwater inlet, or on any pavement, including paint, dry wall, RV discharge, used oil, antifreeze or other automotive fluids.
3. Educate do-it-yourself mechanics on the need to recycle used automotive fluids. Use drip pans and drop cloths while draining fluids and to capture leaks. Use absorbent on spills, clean up and dispose of absorbent in the trash.
4. Encourage homeowners to take their vehicles to commercial car washes or wash in an area that does not drain to the storm sewer.
5. Reduce fertilizers and herbicides used on lawns. Follow the manufacturers instructions for the application of fertilizers, herbicides, or pesticides; never over apply. Sweep driveways and walks after application and place remnants onto lawn.
6. Sweep up and dispose of ice melting granules from driveways and walks.
7. Properly dispose of or recycle household chemicals, paints and other hazardous wastes. Never dispose of household chemicals or hazardous materials in or near stormwater inlets or drainageways.
8. Consider porous landscaping materials such as bricks, blocks or gravel that allow water to soak into the ground. Incorporate native plants and shrubs that require less water and chemicals.
9. Always bag pet waste and place it in the trash. Install "Pet Waste Pick-up" stations in common areas.
10. Never leave soil bare where sediment from erosion can degrade water quality of streams or ponds.



Educate your HOA, business or commercial community members on the negative water quality effects of sediment, nutrients, motor oil, pet waste, lawn care products, and anything else that can wash from roof tops, driveways, parking lots, lawns and streets during a storm event. You can reach your community through meetings, local newsletters, signage, pamphlets, and participating in an organized drainageway clean up day.