Maintaining Stormwater Facilities

Definitions…

Grass Swale: A densely vegetated drainageway with low-pitched sideslopes that collects and coveys stormwater runoff. They facilitate sedimentation while limiting erosion. They may or may not have check dams.
Permeable Paving: Bricks, gravel or other material that provides structure and stability, yet allows water to infiltrate through to the ground surface. It can be used in place of traditional asphalt in parking areas, sidewalks and areas with low vehicular traffic.
Porous Landscape Detention (PLD): A low-lying vegetated area constructed with an underlying sand bed and underdrain pipe. A PLD allows for infiltration of stormwater runoff which is gradually discharged to a nearby channel, swale or storm sewer.
Water Quality Vault: An underground chamber, or series of chambers, designed to remove common stormwater pollutants like sediment, gravel, oil and trash. May be purchased ready to install or constructed on site.
Check dam: Small structures built across a facility (such as a drainage channel or swale) used to slow runoff and create small areas of ponding.
Tributary drainage area: the total land area that drains to the facility.
Impervious area: a solid surface that does not allow rain to enter.
Stormwater runoff: runoff that occurs as a result of a rain or storm event hitting an impervious surface and running off.
UDFCD: Urban Drainage and Flood Control District; assists local governments with urban stormwater issues.
Inlet: The point where stormwater enters the facility.
Outlet: A structure that controls the rate of release from the facility.
Trash Rack: A structural feature of the outlet that filters stormwater by trapping debris before runoff is discharged (selected facilities).
Rip rap: Rock material typically used to stabilize conveyance channels.
Easement: A set-aside area with various restrictions to provide open access for inspection or repair of drainage feature.

So you have a stormwater facility on your property…

Stormwater facilities are used to **improve the quality** of urban runoff from roads, parking lots, residential neighborhoods, commercial areas, and industrial sites, and to **reduce peak stormwater runoff rates** by slowing runoff during larger storm events. In addition, the facilities are designed to increase water quality by reducing or removing sediment, trash, debris and chemicals such as oil.

Facilities include grass swales and buffers, permeable pavement, porous landscape detention and water quality vaults. Detention basins and retention ponds are also stormwater facilities which are covered in a separate flier.

You, as the owner of this stormwater feature, the manager of a commercial site, or as a member of a Homeowner Association (HOA), need to understand the importance of the stormwater facility and your obligation to assure its continued proper function. This facility maintenance fact sheet will provide the information and the contacts you need to operate a fully functional facility on your property.

Who's responsible for your facility…

Designation of a responsible party is important to assure proper operation of your stormwater facility. In some instances this may be a shared responsibility. In the majority of cases, the commercial property owner or the HOA is responsible for the correct operation and proper maintenance. Some facilities may be eligible for maintenance by the City of Cañon City. The City of Cañon City does have the authority to inspect and review maintenance activities to ensure the viability of your facility, and easements provide for this.

Why maintain your facility…

Stormwater runoff is a significant source of water pollution in urbanizing areas. In addition, the increased volumes of flow resulting from added impervious areas during urbanization result in increased runoff volumes. Stormwater facilities help to counteract both of these problems by providing an area for pollutant removal as well as helping to reduce the peak runoff rates downstream. Studies have shown *that properly maintained stormwater facilities* can be very effective at removing certain pollutants and reducing runoff rates during larger storm events. Improperly maintained facilities can increase the discharge of pollutants downstream, increase the risk of flooding downstream, increase the instability of downstream channels, and lead to aesthetic and nuisance problems. There may also be legal liabilities associated with improperly maintained stormwater facilities.

Why some may fail…

Studies show that *poor operation and maintenance* is the leading cause of failure. Poor maintenance can also create unpleasant odors, nuisance insects, algae blooms and a generally unsightly, unkempt area. Stormwater facilities may fail due to

- poor vegetation maintenance in terms of mowing and weed control,
- clogged inlets resulting from trash and debris, sediment accumulation,
- failed side slopes, and
- inadequate access for routine maintenance activities.

Knowing why this facility was built at your commercial site or in your subdivision community and the importance of all the components working together should reduce the chance of failure.

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Maintenance considerations…

Routine maintenance, like mowing and debris removal, is vital to the proper operation of the stormwater facility, and needs to be done on a frequent basis. Non-routine maintenance, like slope stabilization and sediment removal, will probably be more on an annual basis. Every facility is different in the size, type and characteristics of the tributary area that contributes runoff.

- A facility serving a commercial district will likely require more maintenance than one serving an established neighborhood, and a facility in a prominent location in the development will require more frequent collection of trash to make a favorable impression.
- Maintenance considerations for swales and PLDs will concentrate more on mowing to control the vegetation and frequent removal of the trash and debris that may accumulate.
- Maintenance considerations for a water quality vault will need to focus on floating litter, scum and sediment removal.

Maintenance will always be needed; if maintenance is not done, or not done frequently enough, or properly, a false sense of security exists for the facility's pollutant removal abilities during a typical runoff event.

Costs and Funding…

The property owner or the HOA should consider establishing an O&M fund and assess annual fees for maintenance. Typically, fees are established by the developer prior to turning the responsibility of the facility over to the owner. After several years of operation with these set fees, it may be necessary to re-evaluate maintenance costs for the actual operation of the facility after the development is established. An excellent source of information about facility maintenance costs is the Urban Drainage & Flood Control District, www.udfcd.org or the EPA, http://cfpub.epa.gov/npdes/stormwater/menuofbmps

The Operation & Maintenance (O&M) Program…

An effective Operations and Maintenance Program requires several things:

- A good plan that specifies what maintenance actions are needed, when they will be performed and how often they will be performed, inspection checklists and follow-up repair timetables
- An understanding of the routine and non-routine activities to be employed
- An understanding of the equipment and materials needed for maintenance
- An identification of responsible parties for routine maintenance, non-routine maintenance, inspections and repairs
- Adequate funding for the maintenance activities

Minimum checklist components…

(A good time to fill out checklist is every time routine maintenance is done; while mowing, someone can check the other features, too)

Any obstructions of the inlet or outlet?
Has trash accumulated in the facility or on the rack?
Any erosion or instability on the slopes?
Any sedimentation in the bottom?
Any settling or cracking of the bermed areas?
Are there any upstream or downstream conditions that could affect the facility's operation?
Is outlet channel conveyance in good working order?

Routine Maintenance…

Routine maintenance includes:

Inspections: Periodic scheduled inspections with a specified checklist, and inspections after major rainfall events, to check for obstructions/damage & to remove debris/ trash.

Vegetation Management: Mowing on a regular basis to prevent erosion or aesthetic problems. Limit use of fertilizers and pesticides in and around the area to minimize entry into the facility and subsequent downstream waters.

Trash, debris and litter removal: Removal of any trash, etc causing any obstructions at the inlet, outlet or trash rack during periodic inspections and especially after every runoff producing rainfall event. General pickup of trash, etc in and around the pond during all inspections.

Structural Component check: Inspection of the outlet works, inlet, and trash rack on a regular basis for additions to the annual Non-routine Maintenance list

Non-routine maintenance…

Non-routine maintenance includes:

Bank erosion/stabilization: It is critical to keep effective ground cover on all vegetated areas in order to see the benefits of proper infiltration of runoff, and effective filtering of pollutants. All areas not vegetated should be re-vegetated and stabilized immediately

Sediment removal: Every six months or so, the accumulated sediment should be removed from the bottom of the outlet structure and the facility depths checked at several points. If the depth of the accumulated sediment is greater than 25% of the original design depth, sediment should be removed.

Structural Repair/Replacement: Eventually the outlet structure or other structural components like the trash rack will need repair or be replaced. PLDs and permeable paving may need to be reconstructed at some point.

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Stormwater Facilities "Quick Study" Standard Operating Procedure (SOP) Fact Sheet

Standard Operating Procedures (SOPs) are prepared for activities that have the potential to impact 'waters of the state. One of the primary goals of these SOPs is to **provide time-tested, generally accepted routine procedures that minimize the potential for release of pollutants.** This Fact Sheet provides an overview of routine maintenance standard operating procedures at a stormwater facility.

Stormwater Facility Maintenance is an operational best management practice (BMP) developed to control pollutant discharges by keeping these stormwater facilities operating properly with routine maintenance procedures, including mowing and debris control.

These procedures are critical steps that must be included during facility maintenance on an annual basis, after an inspection, or on an as-needed basis after a storm event.

DO

- Inspect inlet and outlet works initially on a monthly basis until the appropriate timing of maintenance is established; prepare a maintenance schedule that assures proper function.
- Conduct maintenance per schedule, or on an as-needed basis as identified during an annual inspection, or on an as-needed basis after a storm event.
- Keep screen and/or trash rack free from debris using established maintenance schedule or on an as-needed basis after a storm event; notify supervisor if screen or rack is in need of maintenance at a higher level than scheduled.
- Report damage/compromise to side slopes, inlet pipe, outlet structure; prepare a repair schedule and complete repairs.
- Remove vegetation adjacent to outlet works that may interfere with operation; note if noxious weeds present and notify supervisor to schedule treatment/removal.
- Remove debris/trash from the facility and surrounding area and dispose properly.
- When mowing, collect grass clippings and all other clippings/trimmings and take offsite for disposal or dispose in trash on site; do not leave in or near the facility.
- Notify supervisor of any hazardous conditions or materials found during inspection.

DON'T

- DO NOT mow too close to the surface; height should be 4 to 6 inches to maintain healthy grasses.
- DO NOT clean equipment or conduct maintenance on equipment in the facility, or near a storm drain or other stormwater conveyance feature.
- DO NOT leave grass clippings or trimming residue in pond; collect and dispose of in trash.
- DO NOT apply landscaping chemicals in facility area, or in areas where the residue could make it into the facility during a storm event.
- DO NOT attempt to clean up any unidentified or possibly hazardous materials found in or around the area during inspections; notify supervisor immediately upon discovery of hazardous materials.

Contact Numbers…

City of Cañon City Stormwater Program: 719-276-5265

Urban Drainage and Flood Control District: 303-455-6277

Websites of interest: www.canoncity.org
www.udfcd.org
www.epa.gov/nps

Reference Document: "Maintaining Your BMPs", available as a pdf at www.novaregion.org/pdf/Maintaining_BMPs.pdf

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Example Maintenance Inspection Checklist

Facility:_____ Date:_____ Inspected by: _____ Type of Inspection: ☐ Routine ☐ Storm Event _____ (# days since event)

General Observations:
Is water flowing? ☐Yes ☐ No Standing water (more than 48 hrs. since last storm event)? ☐ Yes ☐No Depth: _____

Any evidence of obstructions or erosion in vicinity of the facility that could affect performance? ☐Yes ☐No_____

Facility Conditions:
Do the sides/slopes/bottom show signs of settling, cracking, sloughing or other problems? ☐ Yes ☐ No _____

Do the embankments or side slopes show any erosion or instability? ☐Yes ☐No _____

Is there any evidence of animal burrowing or other activity that could contribute to instability or increased erosion? ☐Yes ☐No _____

Is there evidence of encroachment into or improper use of the facility? ☐Yes ☐No _____

Do vegetated areas need mowing? ☐Yes ☐No ☐ Mowed today ☐ Will schedule mowing
Are there areas that need to be re-vegetated? ☐Yes ☐No _____ ☐ Will schedule re-vegetation activities

Do vegetated areas need thinning, i.e. cattails, willows, trees? ☐Yes ☐No ☐Thinned today ☐Will schedule thinning

Is there accumulation of trash, debris and/or litter to be removed? ☐Yes ☐No ☐ Removed today ☐ Will schedule removal

Any signs of vandalism or other activity that could affect performance of the facility? ☐Yes ☐No_____

Is there evidence of sediment accumulation? ☐Yes ☐No _____ ☐ Will schedule removal

If water quality vault, is there a visible oil sheen or film? ☐Yes ☐No _____ ☐ Will schedule removal
(Be sure to follow manufacturer's recommendations for removal of sediment)

Structural Components:
Are the pipes/inlets going into or out of the facility clogged or obstructed? ☐Yes ☐No _____

Is the trash rack obstructed? ☐Yes ☐No _____

Are the manholes, frames, and covers associated with the facility in appropriate condition? ☐Yes ☐No _____

Do any safety features need repair or replacement? ☐Yes ☐No _____

Do check dams or berms show any signs of settling or cracking? ☐Yes ☐No _____

Plan of Action:
If answered YES to any of the above, the following is an anticipated *Maintenance Needs Action List*:

Total number of concerns: _____ (Yes answers)

_____ Need more monitoring (Anticipated schedule to re-visit; identify what will trigger action)

_____ Need routine repair (Approximate schedule for repairs; date of follow-up to re-inspect)

_____ Need immediate repair (Take action if correct equipment on site; or contact supervisor)

_____
Signature