



Maintaining Detention Ponds

Definitions...

Wet detention pond: a pond designed to have a remaining permanent pool of water after a storm event.

Dry detention pond: a pond designed to NOT have a significant pool of water remaining after a storm event.

Regional Pond: a pond designed to capture stormwater runoff from a larger, regional area.

Water Quality Pond: a detention pond with an orifice sized to allow time for settling and filtering of pollutants before the runoff is discharged from the pond.

Tributary drainage area: the total land area that drains to the pond.

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 pond.

Trickle channel: A channel that efficiently conveys stormwater from the inlet to the outlet structure (selected ponds).

Outlet: A structure that controls the rate of release from the pond and the water depth and storage volume in the pond.

Orifice: A controlled opening on the outlet structure through which stormwater is discharged from the pond (selected ponds).

Trash Rack: A structural feature of the outlet that filters stormwater by trapping debris before runoff is discharged (selected ponds).

Rip rap: Rock material typically used to stabilize conveyance channels.

Emergency spillway: Conveyance feature of a detention pond to discharge excess stormwater flows to maintain the integrity of the pond structure during substantial runoff events.

Easement: A set-aside area with various restrictions to provide open access for inspection or repair of drainage feature.

Forebay: A pre-treatment area constructed to settle out coarse sediment particles.

Weir: A structure typically constructed to control the timing & amount of stormwater flowing into an adjacent detention basin.

So you have a detention pond on your property...

Detention ponds 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 providing temporary storage during larger storm events. If the detention pond on your property was constructed early in the development process, it was probably used to trap sediment from construction activities in the tributary drainage area, a very effective way to collect and remove pollutants. In addition, the detention pond on your property may provide other benefits such as passive recreation and open space opportunities in addition to reducing peak runoff rates and improving water quality. A functioning detention pond is a requirement for stormwater management.

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 detention pond facility and your obligation to assure its continued proper function. This detention pond maintenance fact sheet will provide the information and the contacts you need to operate a fully functional detention pond on your property.

Who's responsible for your pond...

Designation of a responsible party is important to assure proper operation of your detention pond feature. 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 of the pond. Some ponds 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 pond, and easements provide for this.

Why maintain your pond...

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. Detention ponds help to counteract both of these problems by providing a treatment basin for pollutant removal as well as a collection basin to retain the larger flows and reducing the peak runoff rates downstream. Studies have shown that *properly maintained detention ponds* can be very effective at removing certain pollutants and providing necessary storage volumes during larger storm events. Improperly maintained ponds 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 ponds fail...

Studies show that *poor operation and maintenance* is the leading cause of pond failure. Poor maintenance can also create unpleasant odors, nuisance insects, algae blooms and a generally unsightly, unkempt area. Detention ponds 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 pond 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 pond failure.



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Maintenance considerations...

Routine maintenance, like mowing and debris removal, is vital to the proper operation of the detention pond, 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 pond is different in the size, type and characteristics of the tributary area that contributes runoff to the pond, as well as the location of the pond.

- A pond serving a large commercial district will likely require more maintenance than one serving an established neighborhood, and a pond in a prominent location in the development will require more frequent collection of trash to make a favorable impression.
- Maintenance considerations for a wet pond will need to focus on floating litter, scum and algal blooms, shoreline erosion, possible unpleasant odors and mosquitoes, as well as more difficult sediment removal.
- Maintenance considerations for a dry pond will concentrate more on mowing to control the vegetation and frequent removal of the trash and debris that may clog the outlet/trash rack.

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 pond's temporary storage abilities during a large storm event, and its 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 pond 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 pond after the development is established. An excellent source of information about pond maintenance costs is the Urban Drainage & Flood Control District, www.udfcd.org

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 or orifice?*
- Has trash accumulated in the pond or on the rack?*
- Any erosion or instability on the slopes?*
- Any sedimentation in the basin?*
- Any settling or cracking of the bermed areas?*
- Are there any upstream or downstream conditions that could affect pond operation?*
- Is trickle channel conveyance in good working order?*
- 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. Limited use of fertilizers and pesticides in and around the ponds to minimize entry into pond and subsequent downstream waters.

Trash, debris and litter removal: Removal of any trash, etc causing any obstructions at the inlet, outlet, orifice 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.

Mechanical Equipment check: Inspection of any valves, pumps, fence gates, locks or mechanical components during periodic inspections and appropriate replacement/repair.

Structural Component check: Inspection of the outlet works, inlet, orifice, trash rack, trickle channel 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 pond 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 trickle channel or trash rack will need repair or be replaced.



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DETENTION POND "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 detention pond facility.

Detention Pond 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 pond 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, pond banks, inlet pipe, trickle channels, 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 detention pond 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 the pond.

Notify supervisor of any hazardous conditions or materials found during inspection.

DON'T

DO NOT mow detention pond 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 detention pond, 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 pond area, or in areas where the residue could make it into the pond during a storm event.

DO NOT attempt to clean up any unidentified or possibly hazardous materials found in or around pond 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

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

General Observations:

Is water flowing? Yes No Standing water (more than 48 hours after the last storm event)? Yes No Depth: _____

Any evidence of obstructions or erosion in vicinity of the pond that could affect performance? Yes No _____

Pond Conditions:

Does the pond sides/slopes/bottom show signs of settling, cracking, sloughing or other problems? Yes No _____

Do the embankments, emergency spillway (if applicable), 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 the pond or improper use of the pond? Yes No _____

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

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

If permanent pool, any visible pollution? Yes No Erosion at high water mark? Yes No _____

Abnormally high water level? Yes No _____ Unusual Algae blooms? Yes No _____
(May indicate obstruction at orifice, or trash rack; verify outlet structure operating properly) (May signal too many nutrients in runoff; identify dog activity and clippings management; will need monitoring)

Structural Components:

Are the pipes/inlets going into or out of the pond clogged or obstructed? Yes No _____

Is the outfall channel from the pond functioning appropriately? Yes No _____

Is the inflow trickle channel working properly? Yes No _____

Is the orifice and/or trash rack obstructed? Yes No _____

Is the outfall channel, trickle channel or other conveyance in need of repair? Yes No _____

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

Do any safety features, such as fences, gates or locks need repair or replacement? 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: _____ Need more monitoring (Anticipated schedule to re-visit; identify what will trigger action)
(Yes answers) _____ 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 _____