



OPERATING AND MAINTAINING DETENTION PONDS

CITY OF WESTMINSTER, CO



WESTMINSTER

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WHEN YOU HAVE A DETENTION FACILITY ON YOUR PROPERTY...

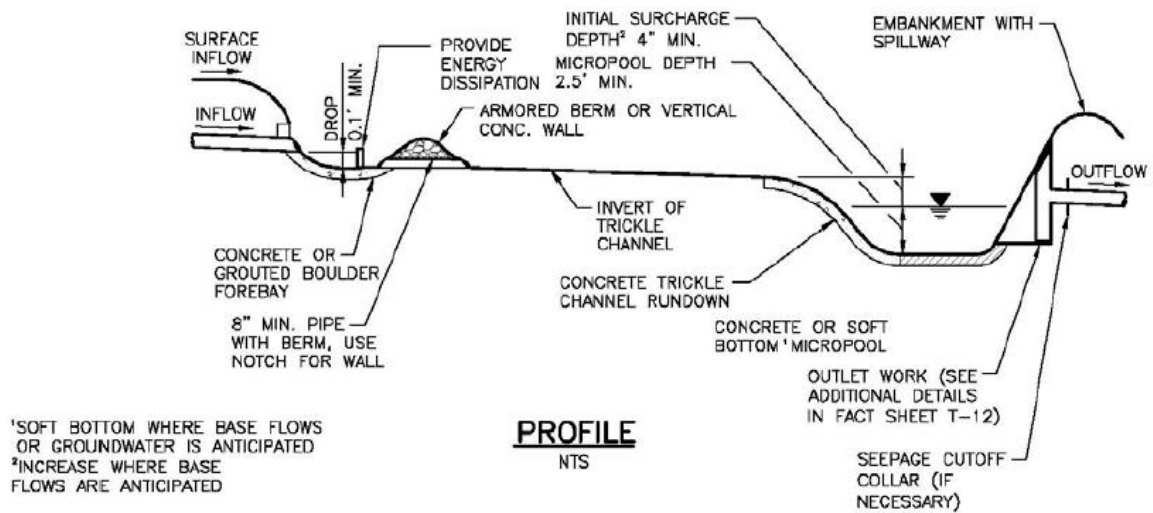
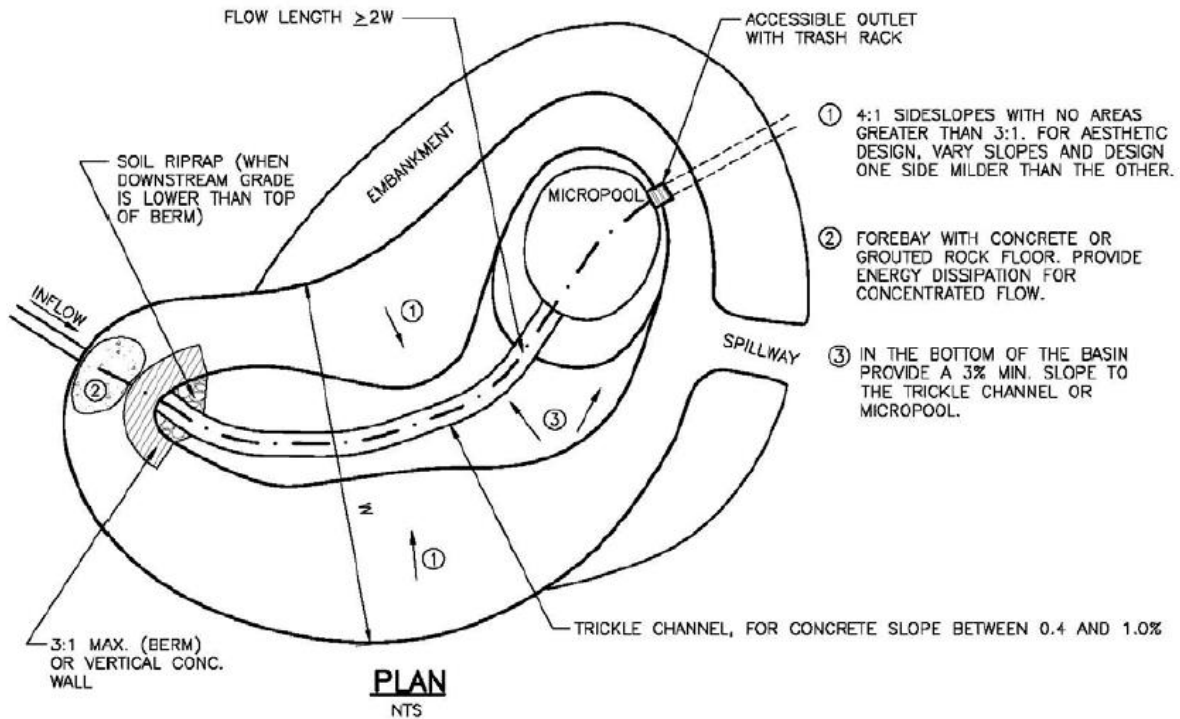
Detention facilities are used to improve the quality of urban runoff from roads, parking lots, residential neighborhoods, commercial areas and industrial sites, as well as reduce peak stormwater runoff rates by providing temporary storage during larger storm events. In addition, the detention facility on your property may provide other benefits such as passive recreation and open space. A functioning detention pond is a requirement for stormwater sustainable management.



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



Extended Detention Basin (EDB) Concept Design



<https://udfcd.org/volume-three?highlight=extended%20detention%20basin>

WHO IS RESPONSIBLE FOR YOUR POND...



Designation of a responsible party is important to ensure 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 located in parks and open space might be under the ownership and responsibility of the City of Westminster, you can find out more information about this by calling 303-658-2339 or email jmoyer@cityofwestminster.us. The City of Westminster does have the authority to inspect and review maintenance activities to ensure the viability of your pond. Enforcement action by the city is

possible if a detention pond is not maintained by the responsible party. This enforcement action may also include fines for non-compliance.

WHY MAINTAIN YOUR POND...

Stormwater runoff is a significant source of water pollution. In addition, the increased volumes of flow resulting from added impervious areas during urbanization results in increased runoff volumes which contributes to property damage during flooding events. Detention facilities mitigate both scenarios by providing a treatment basin for pollutant removal as well as a collection basin to retain the larger flows and reduce the peak runoff rates downstream. 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.

MAINTENANCE CONSIDERATIONS...

Studies have shown 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. It is important to understand the different working parts of a detention facility as well as the associated maintenance. Every pond is different in size, type and functional characteristics which make maintenance operations specific for your site. Depending on your site, detention facilities have low to moderate maintenance requirements on a routine basis, but may require significant and costly maintenance once every 15 to 25 years if left unmaintained. Maintenance frequently depends on the amount of construction activity within the tributary watershed, the erosion controls implemented, the size of the watershed, and the design of the facility.

COMPONENTS OF A DETENTION FACILITY...

Detention facilities are designed for specific tributary watersheds and come in all shapes, sizes and design components. Older facilities are going to be less advanced in the design components but may require often weekly maintenance to function properly. Newer designs focus more on facilitating maintenance by providing easier access and focusing more heavily on sediment capture. It is important to understand the function of each of these facility components as well as associated maintenance.

Pipes/Swales - The pipes and slopes in the landscape which feed stormwater into and out of a detention basin.

Correct

Clean inlet after proper maintenance



Needs Maintenance

Inlet with sediment and other debris that needs to be removed



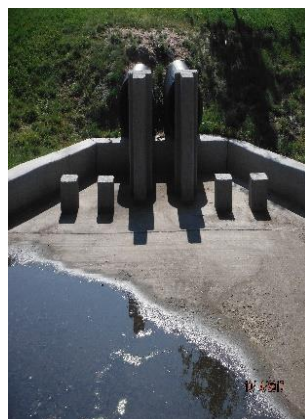
Maintenance Requirements:

- Remove any sediment, trash or other debris that has accumulated near the inlet and dispose of in landfill.
- Remove excess vegetation (especially large, woody vegetation) from the area around the inlet (Do not wait for the vegetation to get too large, it is less expensive to remove vegetation when it is small.).
- Look for erosion and structure damage near the inlet.
- Minor erosion/structure repair may be performed by an appropriate contractor. These repairs may include adding riprap to provide energy dissipation and minor concrete patching.
- Major erosion/structure repair may require consultation with an engineer and/or the City of Westminster.

Forebay - Located below the inflow point of a detention facility and is designed to remove large particles, trash and other debris. It is typically made of concrete and has a flat bottom for easier maintenance. Frequent (2-4 times per year) maintenance is much less expensive than removing sediment from other parts of the facility. *Note that not all facilities have a forebay.

Correct

Clean forebay in working condition after recent maintenance



Needs Maintenance

Forebay with excess sediment and vegetation that needs to be removed. Vegetation in the forebay is a clear sign that maintenance is needed.



Maintenance Requirements

- Remove any sediment, trash or other debris that has accumulated in the forebay and dispose of in a landfill.
- For large forebays, heavy machinery (skid-steer, long-reach excavator, front-end loader) may be used.
- Wet sediment may need to dry several days before the landfill will accept it.
- Make sure the forebay drain pipe or weir is not clogged so that runoff will flow through the forebay properly.

Trickle Channel - Longitudinal channel constructed along the center and lowest part of a channel or through a detention or retention facility and intended to carry low flows.

Correct

Clean trickle channel with no sediment, debris or woody vegetation nearby.



Needs Maintenance

Trickle channel that needs maintenance. Standing water is a sign that sediment and other debris are blocking the flow of water.



Maintenance Requirements:

- Remove any sediment, trash, or debris that has accumulated in the trickle channel and dispose of in landfill. **DO NOT DISPOSE ON SITE.**
- Remove woody vegetation growing near the trickle channel.
- Look for erosion and structure damage near the trickle channel.
- Major erosion/structure repair may require consultation with an engineer and/or the City of Westminster.
- Standing water and inability to sustain landscaping may be a result if the trickle channel is not maintained. More frequent sediment removal may be needed if the detention facility has been recently installed.

Outlet Structure - A structure built to protect the downstream end of a basin's outlet pipe from erosion and is often designed to slow the velocity of released water to prevent erosion of the stream channel.

Correct

A well maintained outlet structure with no debris or standing water.



Needs Maintenance

Well screen and water quality orifice are missing with sediment built up in front.



Maintenance Requirements:

Well Screen/Trash Rack Clogging:

- *The well screen and trash rack will clog with grass and other debris very frequently.*
- *Gently scrape the debris off of the well screen/trash rack using a rake and dispose of the material in a landfill. DO NOT LEAVE THE MATERIAL ON SITE.*
- *If the well screen/trash rack is not cleaned frequently, the detention basin will have standing water problems.*

Well Screen and/or Orifice Plate Missing/Removed:

A well screen is a filtering device that is usually attached to the outside of the outlet structure and is used to keep sediment from entering the structure. A water quality orifice is either a perforated plate attached to the inside of the outlet structure or a perforated pipe connected to the outside of the structure designed to further filter debris and sediment from the stormwater, allowing cleaner water to flow through the storm system. If either of these devices become clogged creating standing water issues, owners/citizens may remove those components to allow water to flow through the outlet structure. This is NOT an acceptable solution as it allows pollutants to travel freely to receiving waters.

- *If the well screen and/or orifice plate is removed, it should be re-installed per approved design.*
- *If the well screen and/or orifice plate are missing, contact the City of Westminster who may provide information for the installation of a new one.*

Sediment/Trash/Debris Removal:

- Remove any sediment, trash or other debris that has accumulated within or in front of the outlet structure and dispose of in landfill.
- Wet sediment may need to dry several days before the landfill will accept it.
- Frequent (2-4 times per year) removal of these materials will limit clogging of the outlet structure. More frequent removal may be needed if the detention facility has been recently installed.

Micropool – A small area of standing water (about 2-3 feet deep) just in front of the outlet structure. It is designed to prevent the outlet structure from clogging by maintaining a constant pool of water and is the only area in a detention basin where standing water is not a problem. *Note that not all facilities have micropools.

Correct

Clean forebay with little to no trash/debris and low sediment levels.



Needs Maintenance



Micropool that needs maintenance. Sediment buildup needs to be removed and disposed of properly.

Maintenance Requirements:

- Measure depth of sediment in the micropool.
- Remove sediment once 12 inches of sediment has accumulated.
- Sediment removal may require a vacuum truck that is capable of removing both sediment and water.
- Dispose of sediment in a landfill.
- Wet sediment may need to dry several days before the landfill will accept it.
- If large amounts of mosquitos are present, appropriate amounts of "insecticide" may be applied by certified mosquito control applicators.
- Algae consume stormwater pollutants and are beneficial to stormwater quality treatment. Excess algae in the micropool can be removed mechanically (and disposed of in landfill).
- The presence of oil/chemical sheens in the micropool indicate a possible illicit discharge upstream of the detention basin.

- *If an oil/chemical sheen is present, report this to the City of Westminster to assist with proper removal/disposal.*

ROUTINE VS. NON-ROUTINE MAINTENANCE...

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 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.

Structural Component check: Inspection of the pipes/swales, forebay, trickle channel, micropool, and outlet structure 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. Check w/ the City on typical sediment removal schedules for residential ponds and commercial ponds. More frequent removal may be necessary if the detention basin has been recently installed and vegetation has not been established.

Structural Repair/Replacement: Eventually the outlet structure components like the trickle channel or trash rack will need repair or be replaced.

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, inspection checklists and follow-up 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.

An O&M Manual may have been prepared for your pond; please contact the City of Westminster to inquire if there is one or request a sample O&M Manual that may be applicable.

CONTACT US...

The City of Westminster Stormwater Program: 303-658-2339

Urban Drainage Flood Control District: 303-455-6277

Websites of Interest:

www.cityofwestminster.us/stormwater

www.SPLASHCO.org

www.epa.gov/nps

<https://udfcd.org/>

REFERENCES...

Colorado Stormwater Center. (2015). *Permanent Stormwater Quality Best Management Practice Inspection and Maintenance Field Guide* [Brochure]. Fort Collins, CO: Author.

Southeast Metro Stormwater Authority. (2014). *Maintaining Detention Ponds* [Brochure]. Englewood, CO: Author.

POST CONSTRUCTION STORMWATER BMP INSPECTION

Pond ID #	Date:	Inspected By:			
Subdivision/Project Name					
Location Description					
Property Owner or Maintained by: Name:		<input type="checkbox"/> Homeowners Association <input type="checkbox"/> Commercial Property <input type="checkbox"/> City Owned <input type="checkbox"/> Other (describe):			
Address:					
Contact phone/email:					
<input type="checkbox"/> New BMP <input type="checkbox"/> Existing BMP <input type="checkbox"/> If New, is it constructed according to plans? <input type="checkbox"/> Yes <input type="checkbox"/> No					
Type of Stormwater Pond: <input type="checkbox"/> Extended Detention Basin <input type="checkbox"/> Parking Lot (underground) <input type="checkbox"/> Constructed Wetland <input type="checkbox"/> Retention Pond <input type="checkbox"/> Other (describe)					
Type of Outlet Structure: <input type="checkbox"/> WQ + 100 yr <input type="checkbox"/> WQ + 5 yr + 100 yr <input type="checkbox"/> Micro pool + WQ + 100 yr <input type="checkbox"/> 5 yr and/or 100 yr (no WQ) <input type="checkbox"/> WQ + 5yr (EURV)					
Trash Rack on Outlet Structure: <input type="checkbox"/> Yes <input type="checkbox"/> No					
Water Quality Plate on Outlet Structure: <input type="checkbox"/> Yes <input type="checkbox"/> No					
Type: <input type="checkbox"/> Perforated Stand Pipe <input type="checkbox"/> Steel Plate with small openings <input type="checkbox"/> Other, Describe:					
Outlet Pipe Conveys To: <input type="checkbox"/> Storm Sewer Network <input type="checkbox"/> Drainage Swale <input type="checkbox"/> Road <input type="checkbox"/> Other, Describe					
Item	Check here if not applicable	Condition			Corrective Action
		<u>Functional</u>	<u>Needs Maintenance</u>	<u>Needs Repair</u>	
Trickle channel					
Riprap (all)					
Sod					
Outlet structure					
Spillway					
Pipes/swales feeding the BMP					
Trash rack					
Well Screen					
Water quality plate					
Major Storm Weir Restrictor Plate					
Stormceptor/oil separator					
Outlet pipe from pond					
Notes:					
Total time to inspect (hours/minutes)					