



Pond & Swale Maintenance

A Guidebook for Private Owners in Cranberry Township



July 2017



Maintaining Your Detention Basin

Table of Contents

Introduction.....	2
Function of the Detention Pond Basics.....	3
Detention Pond Maintenance Responsibility	4
Detention Pond Maintenance.....	4 - 5
Vegetated Swale	6
Long Term Maintenance.....	7
Pond Enhancement.....	8
Detention Pond Inspection Guidelines	Appendix A
Cranberry Township Water Basin & Vegetative Swale Checklist.....	Appendix B
References	15



Introduction

Detention (Dry) and retention (Wet) basins are a storm water Best Management Practice (BMP) designed to reduce the impacts of pollutants and increased storm water on local streams caused by development. Retention ponds are stormwater basins that include a permanent pool for water quality treatment and additional capacity above the permanent pool for temporary storage. A dry detention basin is an earthen structure that provides temporary storage of runoff and functions hydraulically to attenuate stormwater runoff peaks. The basins are designed to control runoff peak flow rates of discharge for the 1 year through the 100 year events. The Pennsylvania Department of Environmental Protection (PA-DEP) has recently mandated that every municipality inspect all detention and retention ponds annually. Cranberry



Township wants to inform the homeowners how to properly maintain your ponds. Your storm water detention and/or retention pond is an essential part of Pennsylvania's efforts to improve the water quality of our streams, rivers, and lakes. But, we need your help to properly maintain the detention ponds so they don't fail prematurely. Once failed, it will no longer perform the way it was designed and may become very costly to replace. In addition to ponds some developments storm sewer system were design to convey surface through vegetated swale and these system need to be inspected and maintained.

This guidebook is to serve as a practical tool and aid the owner in the inspection and maintenance of the stormwater management facility. The individuals responsible for maintaining the facility may need to engage the services of a licensed professional engineer for additional site specific guidance.



Function of a Detention Pond

During precipitation (Rain, Snow) portions of the water soak into the ground, evaporate or flow over land. When a piece of land is altered to build homes and other developments, the natural system of trees and plants over relatively porous soil is replaced with harder surfaces like sidewalks, streets, decks, roofs, driveways and even lawns of compacted soils. As a result, less rain water is soaked up and more storm water flows off the land at a quicker rate. This can lead to stream bank erosion within the local streams and possible downstream flooding. As more development occurs, storm water runoff contains higher levels of pollutants.

Your detention basin is important because:

- It helps slow the rate of runoff from the neighborhood
- It improves the quality of storm water leaving the detention pond
- It collects and detains storm water; and
- It helps protect local creeks and private property

A detention pond is typically a man-made depression that collects and cleans storm water runoff. The pond collects and traps sediment from storm water that would otherwise clog our rivers and streams, and degrade the environment for fish, birds, and other wildlife.



The establishment of wetland vegetation within your basin as well as the creation of vegetated buffer zones around the basin will help improve water quality by filtering pollutants in storm water. This helps to reduce algae growth within the basin and in downstream rivers and streams. Reducing pollutants that may get to the basins is important in protecting water quality. Excess nutrients, including nitrogen and phosphorus, encourage algae growth. Maintaining your BMP is an important part of Cranberry Township's environmental protection efforts.



Detention Pond Maintenance Responsibility

Responsibility varies throughout the Township, but if your homeowner's association (HOA) or business owns the property where the pond is located and subject to a maintenance agreement, most likely you are the responsible party. If you are unsure, contact the Township.



Detention Pond Maintenance

A consistent maintenance program is the best way to ensure that a detention basin will continue to perform its water quality and flood control functions. The first step in a maintenance program is to obtain a copy of the stormwater facility plans from either the Butler County Courthouse Recorder of Deeds or the Engineering Department within the Township to determine how your basin was designed to function. Second step create an inspection plan that includes:

- General Site Condition
 - Monthly Inspection Frequency
 - Scope of Inspection
 - Trash and debris
 - Animals burrows
 - Vandalism
 - Dry Basins: If significant amount water remains in the basin longer than 3 days after a rain event, further investigation maybe required to inspect for blockage of outlet structure.
- Structural Condition
 - Annual Inspection Frequency and after 2-inch of rain under a 24 hour rain event
 - Scope of Inspection
 - Obstruction of outlet structure, spillway, pipes, and endwall
 - Outlet stabilization
- Earthwork
 - Annual Inspection
 - Scope of Inspection
 - Buffer Vegetation (Maintain 85% Cover, Weeding, Replanting)
 - Protrusion (Tree Growing in Embankment)
 - Landscaping (Trimming, Remove Unwanted Growth)

- Embankment and outlet stabilization
 - Annual Inspection
 - Scope of Inspection
 - Ground Sinking
 - Tension Cracks / Earth Material Pulling Apart
 - Ground Movement (Slow Creep)
- Reviews by a licensed professional engineer, if erosion or structural problem is observed)
 - On an As Needed Basis
- Reporting and Record Keeping
 - Annual Submittal
 - Complete checklist located in appendix “B” and submit to Township.
 - Report all inspection findings and maintenance activities.
 - Report any emergency maintenance required during the year.

The Township recommends pictures and/or videos be taken during the inspections and maintenance repairs. These images can assist with future comparisons of any changes with the stormwater facility. If the HOA members or facility owners may change over time, these images will provide valuable a record of what maintenance repairs have been performed. It is crucial to keep records of all your inspections, maintenance activities, repairs, and associated costs. A checklist is provided in Appendix “B” of this Guidebook for your use and assistance for documentation. Before starting any maintenance activities, check with the Township Engineering Department to determine, what, if any, approvals or permits may be necessary.





Vegetated Swale

The Pennsylvania Stormwater Best Management Practice Manual defines “a Vegetated Swale is a broad, shallow, trapezoidal or parabolic channel, densely planed with a variety of trees, shrubs, and/or grasses. It is designed to attenuate and in some cases infiltrate runoff volume from adjacent impervious surfaces, allowing some pollutants to settle out in the process. In steeper slope situations, check dams may be used to further enhance attenuation and infiltration opportunities.”

A vegetative swale serve to control excessive stormwater flows from adjacent properties to protect homes and buildings located downstream. Within Cranberry Township vegetative swales provide an open conveyance system to collect surface water from roadways, trails, open space, etc. and direct this water into the stream. The swales reduce the velocity of the surface water runoff compared to pipes and enhance volume control through infiltration. The open channel enables surface water an entree point and removes it quicker from the curbed roadway sections. Vegetative swales shall be inspected annually to make sure they are functioning properly.

- Earthwork
 - Annual Inspection
 - Scope of Inspection
 - Buffer Vegetation (Maintain 85% Cover, Weeding, Replanting)
 - Protrusion (Tree Growing in Embankment)
 - Landscaping (Trimming, Remove Unwanted Growth and Debris)
 - Reporting and Record Keeping
 - Annual Submittal
 - Report all inspection findings and maintenance activities.
 - Complete checklist located in appendix “B” and submit to Township





Long Term Maintenance

The regular inspection can be performed by visual observation of problem with the facility. Over time the sediment will eventually accumulate in the facility. The maintenance plan will need to also include the long term changes with the facility. The use the original design plans will enable the owner to determine how much sediment has settled into the facility over time. As a rule of thumb, detention ponds may need to be dredged every 10 to 15 years to restore the facility back to the original pond elevation. Pond dredging requires a permit from the Butler County Conservation District if the pond is 1 acre or larger.

When performing the dredging maintenance, care should be taken with the equipment accessing the site to minimize the excessive compaction which will result in the damage to underdrain system and reduce the infiltration.



Pond Enhancement

In addition to the inspection and maintenance the Township recommends the owner consider establishing activities to enhance the detention basin and minimize long-term maintenance. Example of these activities are described below:

- Do not use pesticides, herbicides, or fertilizers in your pond
- Do not place yard waste such as leaves, grass clippings, or brush in or near the detention pond or in the storm water inlets located on the roadways
- Do not dump or allow any materials, such as motor oil, into the storm sewer system
 - Yard waste releases excess nutrients as they decompose and will adversely affect the pond operation and may clog or reduce the capacity
- Pick up and dispose of pet waste with your weekly garbage
- Provide educational updates to property owners. Discuss maintenance plans at HOA meetings and relay information to our neighbors



Appendix “A”

Detention Pond Inspection Guidelines



Appendix "A" DETENTION POND INSPECTION GUIDELINES



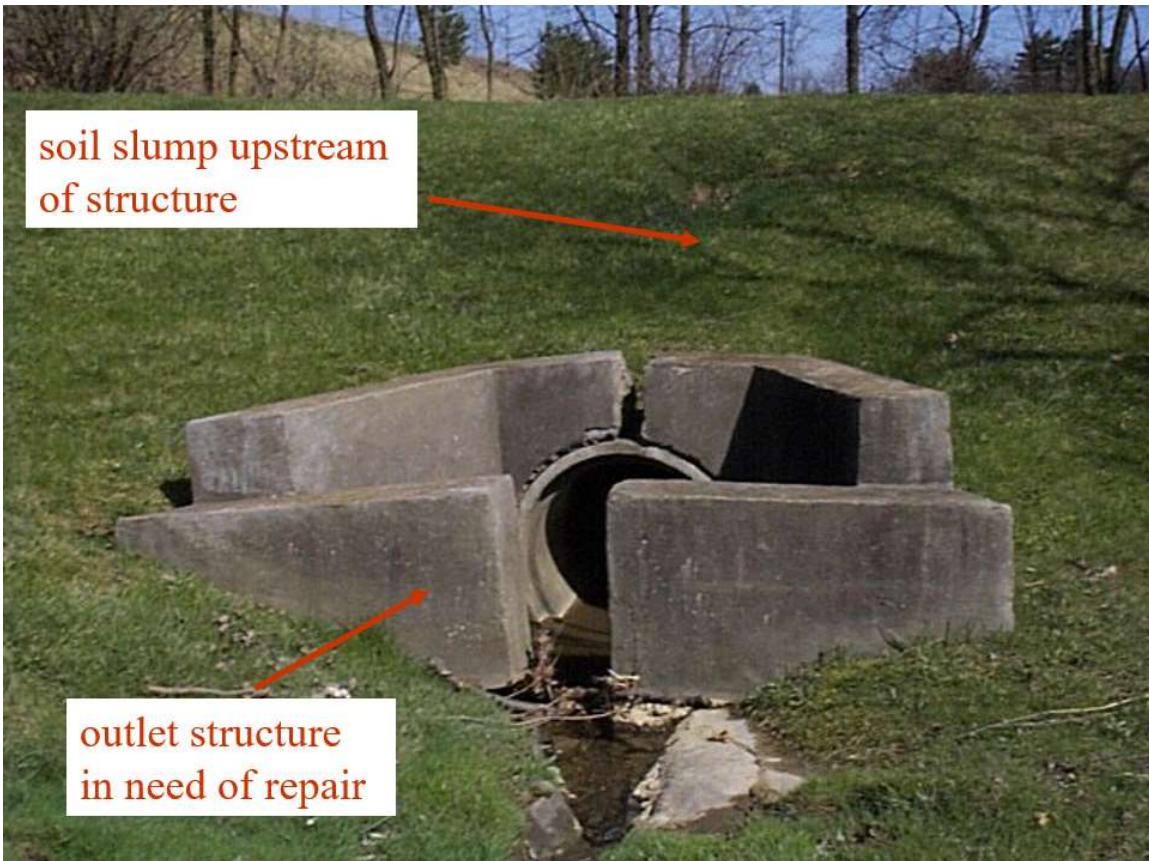
JUNE 2017

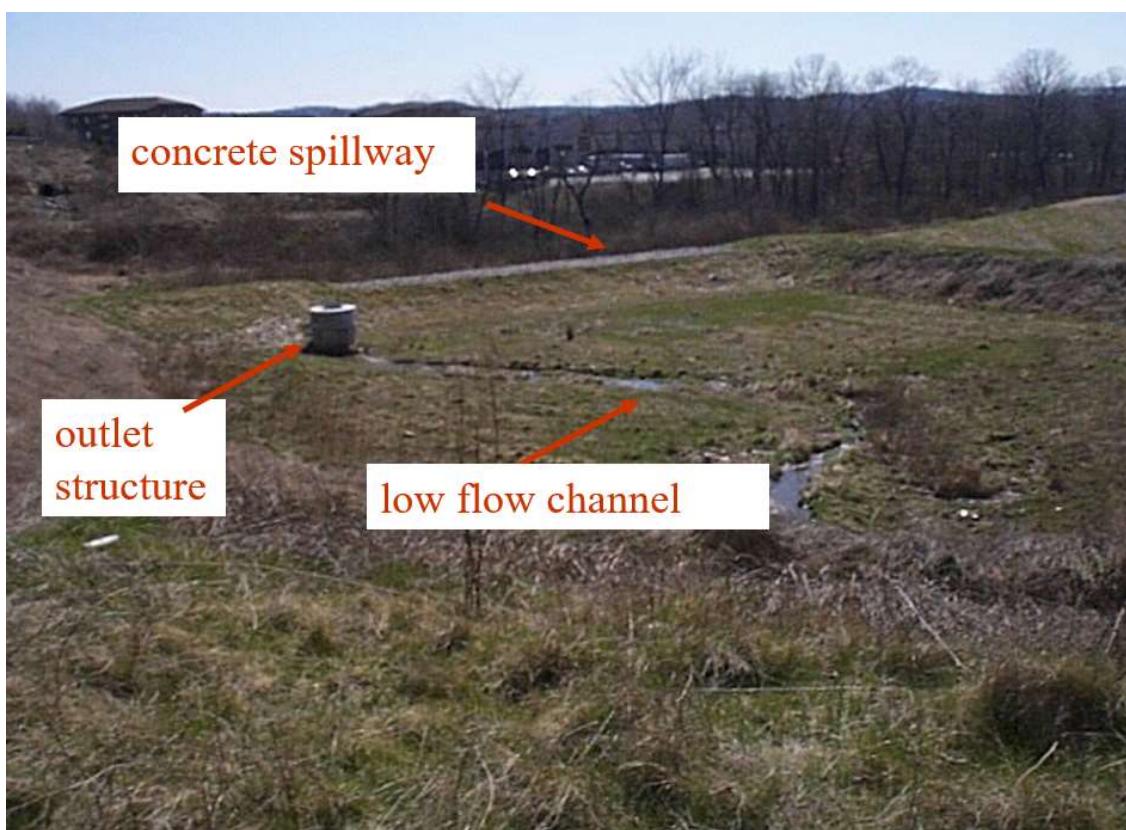
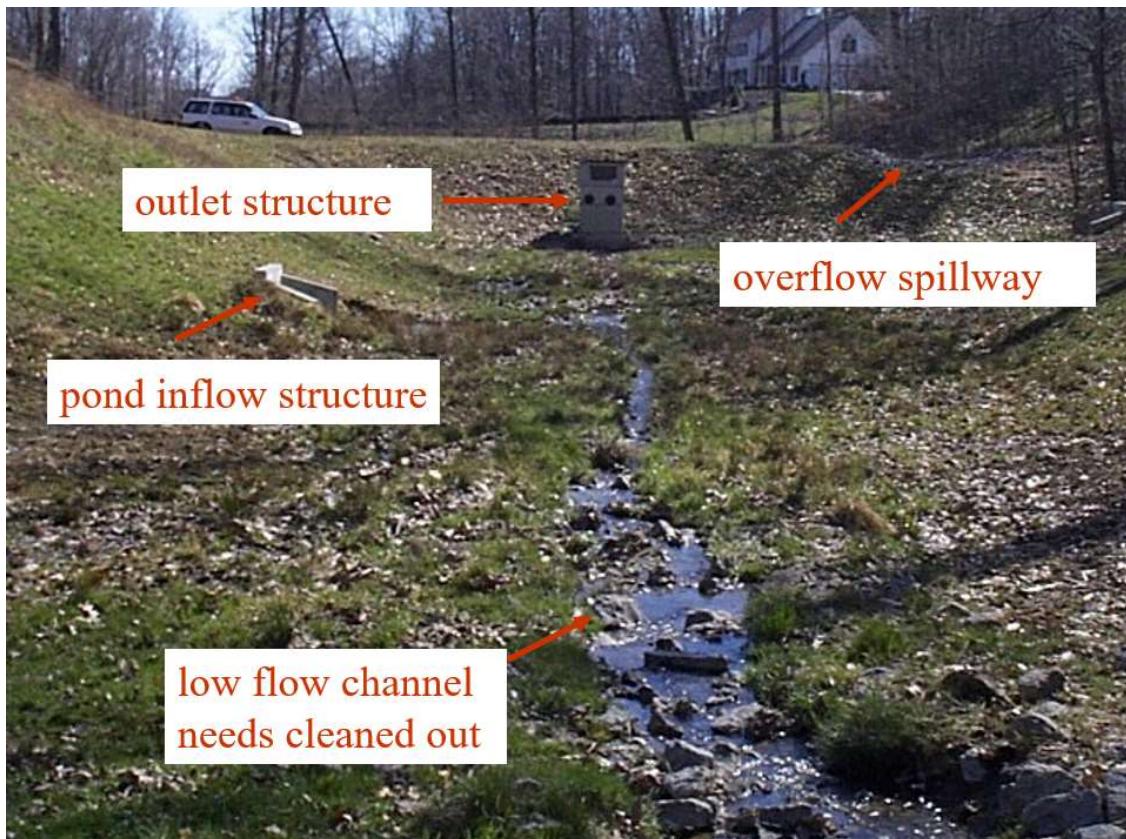
Detention Basin

Maintenance should be performed as per PA Stormwater BMP Manual

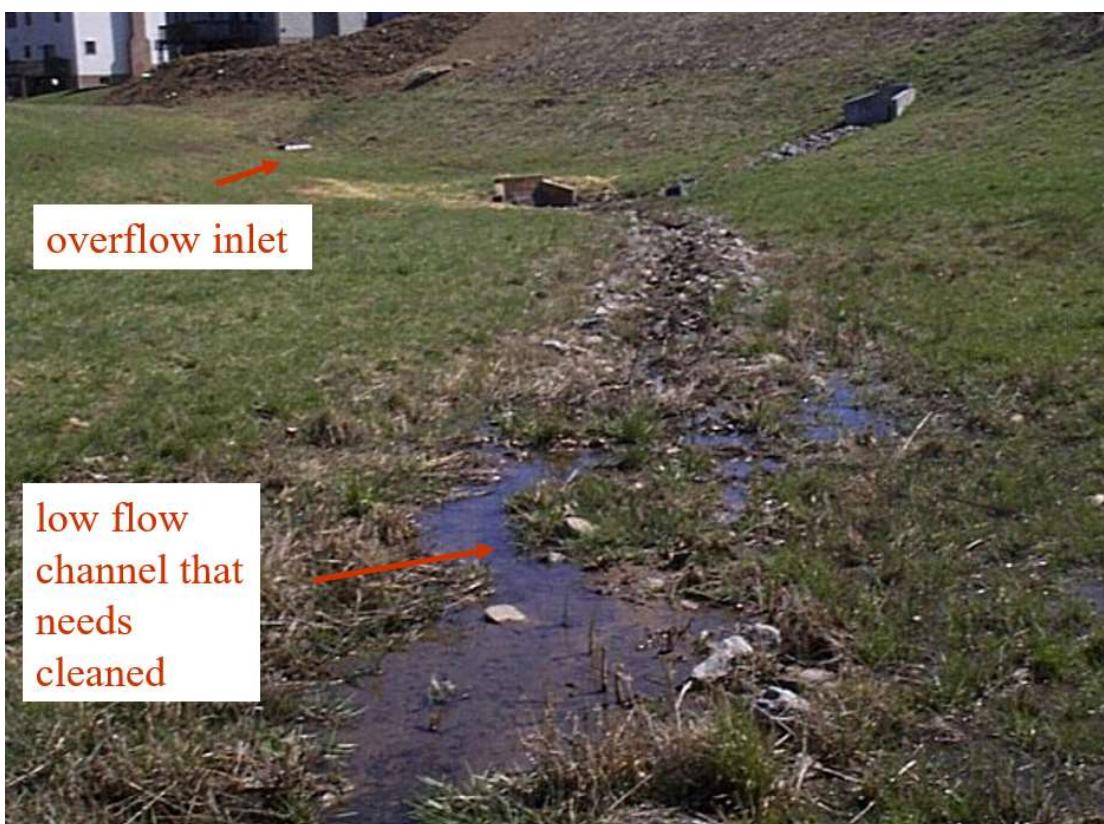
Maintenance reports should be provided Annually to the Township and includes the following measures:

- All basin structures expected to receive and/ or trap debris and sediment should be inspected for clogging and excessive debris and sediment accumulation once per year, as well as after every storm greater than 2 inch.
- Sediment removal should be conducted when the basin is completely dry.
- Sediment should be disposed of properly and once sediment is removed, disturbed areas need to be immediately stabilized and revegetated.
- Mowing and/or trimming of vegetation should be performed as necessary to sustain the system, but all detritus should be removed from the basin.
- Vegetated areas should be inspected annually for erosion.
- Vegetated areas should be inspected annually for unwanted growth of exotic/invasive species.
- Vegetative cover should be maintained at a minimum of 85 percent. If vegetative cover has been reduced by 10%, vegetation should be reestablished.











Appendix “B”

Inspection and Maintenance Checklist

Cranberry Township Water Basin Checklist



Date: _____ Pond Type: _____

Inspector: _____ Phone # _____

Pond Location : _____

Rating system based on visual inspection

Rating System:

Good – No Structural Deficiencies (No further action required during inspection)

Fair – Low Risk Structural Deficiencies (No immediate action required at this time)

Poor – High Risk Structural Deficiencies (Further action required)

A. Storm Outlet Structure Inspection

Good Fair Poor

1. Structural Condition (Concrete Deteriorating, Metal Frame Damaged) _____
2. Stability (Ground Settling, Structure Sinking, etc.) _____
3. Volume Capacity (Sediment Buildup, Debris, Obstructions, etc.) _____
4. Protrusions (Roots, Rebar, etc.) _____
5. Other: _____

Additional Comments: _____

B. Earth Pond Inspection

Good Fair Poor

1. Stability (Ground Settling, Slope Slide, Burrows in Embankment, etc.) _____
2. Protrusions (Tree Growing in Embankment, etc.) _____
3. Buffer Vegetation (Watering, Weeding, Mulching, Replanting) _____
4. Erosion (Maintain 85% Cover Emergent Vegetation Zone) _____
5. Landscaping (Trimming and/or Mowing to Remove Unwanted Growth) _____
6. Spillway (Overflow Unobstructed, Section of Embankment Stabilized) _____
7. Inlet Pipes (Unobstructed, Erosion Control Functioning) _____
8. Endwall (Structural, Stable, Attached to Pipe) _____
9. Other: _____

Additional Comments: _____

Annual inspection report should be sent to Tim Schutzman: email Tim.Schutzman@caranberrytownship.org or 2525 Rochester Road, Suite 400, Cranberry Township, PA 16066.

Cranberry Township – Vegetative Swale Checklist

Annual Inspection Checklist



Date: _____ Swale Surface Type: _____

Inspector: _____ Phone # _____

Swale Location : _____

Rating system based on visual inspection

Rating System:

Good – No Structural Deficiencies (No further action required during inspection)

Fair – Low Risk Structural Deficiencies (No immediate action required at this time)

Poor – High Risk Structural Deficiencies (Further action required)

A. Storm Swale Inspection:

	Good	Fair	Poor
1. Embankment Structural Condition (Possible Breach)	—	—	—
2. Stability (Ground Settling, Slope Slide, Burrows in Embankment, etc.)	—	—	—
3. Volume Capacity (Sediment Buildup, Debris, Obstructions, etc.)	—	—	—
4. Erosion (Vegetation Reduced by 10% should be reestablished)	—	—	—
5. Landscaping (Trimming and/or Mowing to Remove Unwanted Growth)	—	—	—
6. Outlet Pipe, Basin, (Unobstructed) If applicable	—	—	—
7. Other: _____	—	—	—

Additional Comments: _____

Annual inspection report should be sent to Tim Schutzman: email Tim.Schutzman@cranberrytownship.org or 2525 Rochester Road, Suite 400, Cranberry Township, PA 16066.



References

- Pennsylvania Department of Environmental Protection, Pennsylvania Stormwater Best Management Practieces Manual December 2006.
- Public Involvement and Education Committee of the Assembly of Rouge Communities, Maintaining Your Detention Basin.
- Van Cleef Engineering Associates, Detention Basin Inspection and Maintenance Guidelines, September 16, 2016