

Maintaining Your Detention Pond



*A Guidebook for Private Owners
in Southeast Michigan*





Allen Park
Auburn Hills
Beverly Hills
Bingham Farms
Birmingham
Bloomfield Hills
Bloomfield Twp.
Canton Twp.
Commerce Twp.
Dearborn
Dearborn Heights
Farmington
Farmington Hills
Franklin
Garden City
Inkster

Lathrup Village
Livonia
Melvindale
Northville
Northville Twp.
Novi
Oakland County
Oak Park
Orchard Lake
Plymouth
Plymouth Twp.
Pontiac
Redford Twp.
Rochester Hills
Romulus
Southfield

Superior Twp.
Troy
Van Buren Twp.
Walled Lake
Washtenaw County
Wayne
Wayne County
Wayne County Airport
Authority
West Bloomfield Twp.
Westland
Wixom
Ypsilanti Twp.

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Introduction

Your detention pond is a storm water best management practice (BMP) designed to reduce the impacts of pollutants and increased storm water on local streams caused by development. They are an essential part of southeastern Michigan's efforts to improve the quality of our streams, rivers and lakes. However, detention ponds will fail prematurely if not properly maintained. Once a detention pond fails, it will no longer perform its intended functions and it is often very expensive to retrofit.

What are detention ponds and why are they important?

Do you have a detention pond near your property?

Are there different types of detention ponds?

Are you responsible for maintenance?

Maintenance? Why is it necessary?

What maintenance tasks should be considered?

How can you enhance the appearance and function of your detention pond?

What does it mean to naturalize your detention pond?

How can you maintain a healthy pond?



Whether you are an individual property owner, a homeowner's association representative, or a residential/commercial property manager, this Guidebook will answer all of these questions and provide you with step-by-step instructions for maintenance activities. Routine maintenance will prolong the life of your detention pond, improve its appearance, prevent flooding and property damage, and enhance local streams and lakes. This Guidebook is not a set of rules and regulations on how to design or build a detention pond.



Detention Pond Basics

What are detention ponds and why are they important?

When land is altered to build homes and other developments, the natural system of trees and plants over relatively spongy soil is replaced with harder surfaces like sidewalks, streets, decks, roofs, driveways and even lawns over compacted soils. As a result, less rainwater is soaked up and more rain water, also known as storm water, flows off the land at a faster rate. This can lead to streambank erosion within local streams and possibly cause downstream flooding. Your detention pond is important because:

- It collects and detains storm water.
- It filters storm water runoff.
- It protects local creeks and private property, and
- It reduces downstream flooding.



A detention pond is a man-made depression that collects and cleans storm water runoff. Your detention pond (along with others in the area) helps to slow the rate of storm water runoff from the neighborhood and improve the quality of the storm water leaving the detention pond. They are important in protecting public and private property, public health and safety, and water quality. 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.

A detention pond is a man-made depression that collects and cleans storm water runoff.

Every storm water detention pond located in the communities of southeastern Michigan plays an important role in improving and protecting water quality. There are increased concentrations of pollutants in storm water called non-point source pollution. These pollutants include sediment, phosphorus and nitrogen from fertilizers, salts and oil or grease from roads and parking surfaces, and bacteria from pet waste. These pollutants, which are a direct result of a variety of common outdoor human and animal activities in the neighborhood, degrade water quality and limit the habitat for wildlife in the stream.

A variety of laws, including the federal Clean Water Act, encourage or require the control of urban pollutants. As such, maintaining your detention pond is an important part of Michigan's environmental protection efforts.

Do you have a detention pond near your property?

If your development was built after the mid-1980s, it may have a detention pond that manages storm water runoff. If you live in a residential community, your association bylaws or master deed may indicate the location of any detention ponds. If you are unsure, contact your local community's public works department.

All detention ponds will fill with rainwater or storm water runoff during and after rain events. Because there are several categories of detention ponds, understanding the type of detention pond you have will help to better plan for its maintenance needs.



What are the different types of detention ponds?

Some detention ponds are dry and have mowed turf grass in the bottom of them. These ponds are referred to as dry detention ponds.



Dry detention pond

Some detention ponds are primarily dry, but have a narrow concrete channel for water flow from the inlet to the outlet



Dry detention pond with concrete channel

Newer detention ponds are designed to have a permanent pool of water and are commonly called wet detention ponds. These wet ponds store water throughout the year, but also fill with storm water after rain events, allowing the water to exit to a neighboring storm sewer or creek through an outlet structure. If a detention pond does not have an outlet, then it is called a retention pond. Water that collects in retention ponds must infiltrate into the ground or evaporate.



Wet detention pond

The advantages of a wet detention pond over a dry detention pond are higher pollutant removal and less chance that pollutants will be re-suspended during a storm. Wet detention ponds can also serve as an aesthetic or recreational amenity as well as habitat for some wildlife.

Are you responsible for detention pond maintenance?

Responsibility for maintenance varies across southeast Michigan. However, if your homeowners' association or business is subject to a maintenance agreement, most likely you are the responsible party. It is important to check your maintenance agreement to identify your specific legal obligations. If you are not sure who is responsible for maintenance, contact your local engineering or public works department.



Maintaining Your Detention Pond

The first step in a maintenance program is to obtain a copy of the detention pond plan from your local engineering or public works department to determine how your pond was designed to function. Review the engineering design!

What maintenance tasks should be considered?

A consistent maintenance program is the best way to ensure that a detention pond will continue to perform its water quality functions. In general, a maintenance program should contain the following components:

- Regular inspections;
- Review by a licensed professional engineer;
- Vegetation management;
- Embankment and outlet stabilization;
- Debris and litter control; and
- Sediment/pollutant removal.



The remaining sections of this Guidebook will describe the maintenance tasks required for proper pond function as well as frequency of various tasks. The following categories of maintenance tasks are further described in this Guidebook:

- Storm sewer system and structural components
- Vegetation management, and
- Property management activities that benefit your pond, such as managing algae, naturalizing your pond and good housekeeping activities.

It's important to keep records of all inspections, maintenance activities, repairs and associated costs. A annual Detention Pond Inspection and Maintenance Record has been provided at the back of this Guidebook for your use to assist in documentation. Finally, before starting any maintenance activities, check with your local public works department to determine what, if any, permits are necessary.



Maintenance Tasks: Storm Sewer System

The storm sewer system includes pipes, catch ponds and the outlet structures that enter and exit the detention pond. It is important to regularly inspect the structural elements (inlet/outlet pipes and animal grates) of your detention pond in order to ensure that storm water is flowing in and out of the pond as originally designed. Debris and sediment commonly clog detention ponds and reduce the pond's overall effectiveness.

The following maintenance and inspection tasks should be included for the structural pond components. Please also refer to the maintenance forms beginning on page 15.

Monthly and after rain events:

- *Conduct routine inspections for trash or other debris that may be blocking the inlet or outlet pipes or emergency spillway. Remove all trash and debris from the pond. Improperly maintained ponds can harbor breeding areas for mosquitoes and reduce the storage volume of the pond.*



Twice a year and after rain events:

- *Inspect for sediment accumulation at the inlet pipes. It's important to clean out sediment that might be restricting water flow. Remove accumulated sediment with a shovel and wheelbarrow if it is blocking water flow. Small amounts of removed sediment can be spread evenly on upland areas and seeded with natural vegetation.*
- *Inspect the stone around the riser/standpipe (outlet pipe). If stone has accumulated sediment, vegetation and/or debris to an extent that water is not flowing through the stone and out of the pond as originally designed, then the stone should be replaced with clean 3" diameter stone choked with clean 6A stone.*



Annually:

- *Inspect the inlet pipes and outlet pipe for structural integrity - check inlet/outlet pipes to ensure they aren't crumbling or broken.*
- *Inspect riprap at the inlet pipes- replace when the riprap is clogged with sediment and debris.*
- *Inspect for excess sediment accumulation in the pond - Remove every 5-10 years or when the sediment accumulation is more than 6-12".*
- *Have a pond expert or environmental engineer inspect the pond to ensure it is functioning properly - compare existing conditions to as-built engineering plans.*



Every 5 years or as needed:

- *Inspect and clean the storm sewer system and catch basins upstream from the detention pond.*



Maintenance Tasks: Vegetation Management

Inspect pond vegetation

Many detention ponds rely on vegetation to filter sediment from storm water before it reaches the outlet of the pond and to prevent erosion of the banks and the bottom of the pond. Turf grass is the most common groundcover. However, there are BMPs that can be used such as native vegetation, like wildflowers. Wetland and woody plants can be added to enhance pond functionality.

In the spring and fall, inspect the vegetation along the side slopes/banks and in the pond. In the spring, decomposing vegetation in the pond should be removed if it is clogging pipe openings. Eroded areas should also be repaired to minimize sediment entering the pond.

Remove invasive and nuisance species

- **Every July, inspect pond and no-mow zone for invasive species such as purple loosestrife, phragmites, buckthorn (common & glossy), honeysuckle and autumn olive that out-compete native vegetation.** Purple loosestrife (*Lythrum salicaria*) provides little benefit for wildlife or water quality. These plants should be removed by hand. There are also contractors that will remove purple loosestrife and other invasives.

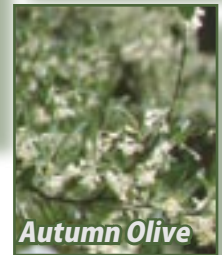
- **Purple loosestrife flower heads can be clipped off to reduce seed production until plant removal may be achieved.** Pulling purple loosestrife is not an effective removal method and may actually encourage plants to multiply. Herbicide application to the plants is the most efficient method. If stands of loosestrife are dense, it may take several years of maintenance to eliminate the plants from the site. Apply one round of herbicide in mid-July. Reassess the site three weeks after application to ensure all plants have been treated successfully. Apply additional herbicide treatment as necessary.



Phragmites



Buckthorn



Autumn Olive



Purple Loosestrife



- **Every July or August, have a qualified professional selectively remove invasive species with applications of appropriate herbicides.** If woody debris is cut, cut four inches above the ground surface and treat the stumps with herbicide immediately after cutting. Monitor for sucker growth.



Maintenance Tasks: Prevent Algae Blooms

Limiting algae growth in your pond

Algae are naturally occurring, microscopic, free-floating plants found in all surface waters and are the vital base of the aquatic food chain. Excess algae can cause conditions in your pond that kill other parts of the food chain. Nutrient-rich conditions created by runoff from fertilizers, agricultural uses and pet waste can cause algae to grow disproportionately, which creates potentially harmful algae blooms in your pond. An overabundance of algae blooms decreases the dissolved oxygen in your pond, which in turn harms fish and wildlife. Additionally, it diminishes the pond's overall aesthetics.

Excess nutrients from fertilizers are the major cause of excessive algae. Reducing pollutants, like fertilizer, from getting to detention ponds is important in protecting water quality.

Establishing wetland vegetation

The establishment of wetland vegetation within your pond as well as the creation of vegetated buffers or no-mow zones around your pond will help to improve water quality by filtering pollutants from storm water. The creation of a vegetated 15-25 foot no-mow zone around the pond will enhance its overall aesthetic appeal and also help reduce the amount of nutrients such as nitrogen and phosphorus entering the pond, ultimately reducing algae growth.

Keep nutrients out of the pond and on the lawn.

Ways to reduce algae growth

- *Soil test - Have your soil tested to find out which nutrients it may be lacking. Soil test kits are available through your local MSU Extension.*
- *Mow high - Avoid mowing directly to the edge of lakes and streams. Grass clippings can get into the water and add excess nutrients as they break down. Having turf grass directly at the edge of a pond also can exacerbate erosion problems.*
- *Use low or no phosphorus fertilizers - Most soils tested throughout Southeast Michigan show that high levels of phosphorus are already present in the soil.*
- *Use slow-release nitrogen that meets this criteria - Natural organic fertilizer or synthetic fertilizer with 50 percent or more water soluble nitrogen (WIN).*
- *Fertilize after and not before a rain event or irrigation - Never fertilize when heavy rain is predicted. Rain can wash the fertilizer into the pond and promote algae growth.*
- *Remove dead vegetation - These materials release excess nutrients as they decompose and will lead to more algae growth.*
- *Use pond water, which can be rich in nutrients, to water your lawn.*



Algae blooms



Vegetated buffer



Dead vegetation

Maintenance Tasks: Naturalizing Your Pond

Plant native plants for water quality and wildlife

There is a variety of wetland vegetation species that may be growing in your detention pond, or those that you may plant that will enhance the overall aesthetic appeal and increase uptake of nutrients contained in the storm water runoff.

The common cattail (*typha latifolia*) utilizes excess nutrients from fertilizers and provides shade and habitat. Cattails also stabilize soil on the banks. Remember to remove dead cattails in the late fall or spring. If more plant diversity is desired, cut some cattails below the water level.

Floating leaved plants such as water lilies cool the water.

Emergent plants near the edge of your pond provide habitat and water filtering. Trees, shrubs, prairie and meadow plants stabilize soil on the banks and deter geese. Wetland vegetation that may be found (or planted) in your pond includes water lilies, arrow arum, pickerel plant, bulrush, sweet flag, swamp milkweed and Joe-Pye weed.



Common cattail



Pickerel Plant



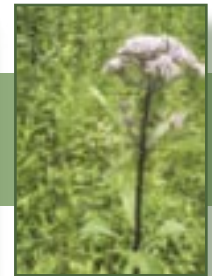
Bulrush



Water Lilies



Arrow Arum



Joe-Pye Weed

The following maintenance and inspection tasks should be included for proper vegetation management: (also see Detention Pond Inspection and Maintenance Record located on page 17):

- **Every spring and after rain events, re-establish permanent native vegetation on eroded slopes.**
- **Increase plant diversity in the early spring or fall.** Purchase native seed mix and wetland vegetation from a native plant nursery. Increasing plant diversity in your pond will enhance water quality, minimize algae blooms and encourage habitat for frogs and toads, birds and other wildlife.
- **Maintain 15-25 foot no-mow and chemical-free buffer zone around the pond.**
- **Mow or burn the no-mow buffer zone to a minimum height of six inches annually in late April or early May.** Rake mowed material off and compost, burn, or discard.



Maintenance Tasks: Good Housekeeping

Good housekeeping refers to specific activities that you as a property owner can perform to enhance the detention pond and minimize long-term maintenance. A number of these activities are described below:

Do not place yard waste such as leaves, grass clippings or brush in the detention pond or in the storm drains located in the streets. Do not dump any materials, such as motor oil, into the storm sewer system. Improperly disposed of materials will pollute the pond. Yard wastes release excess nutrients as they decompose and will lead to more algae growth in the pond.



Do not use pesticides, herbicides, or fertilizers in your pond. These products will leach from the pond and pollute our streams and river. In addition, these chemicals are harmful to the wildlife in the pond, such as frogs, toads, fish, and dragonflies. If you use fertilizers, only use low-phosphorus, slow-release varieties. Keep fertilizers on the lawn and not on paved areas.



If your community does not provide street sweeping, consider contracting with a street sweeping company to minimize excess sediment from entering your storm sewer system and detention pond. This can reduce the need for future pond maintenance.



Pick up and dispose of pet waste with your weekly garbage.



Provide educational updates to the property owners. Discuss your maintenance plan at regular meetings, provide information in newsletters, and host annual clean-up days.



The Health of Your Detention Pond

Maintaining a healthy ecosystem

Detention ponds that are properly maintained will consist of a healthy, balanced animal community that may include birds, mammals, fish and insects. Opportunities for creating habitat in and around detention ponds should be evaluated in conjunction with annual maintenance activities in order to support a balanced ecosystem. Unhealthy ecosystems may occur in ponds that are not maintained and can lead to unbalanced populations of nuisance animal species, including:

Mosquitoes and West Nile Virus. Overpopulation of mosquitoes may occur in detention ponds that are not functioning properly and are not maintained. Many alternatives exist for managing mosquito populations. There are a variety of things you can do to reduce the number of mosquitoes in your environment:

- Install bird houses or bat boxes near your pond.
- Cattails and bulrushes attract dragonflies and other mosquito-eating insects.
- Dense shrubs and brush often provide a habitat for birds and mosquito-eating insects.

The best control technique is to ensure that stagnant pools of water do not develop. For detention ponds that have a permanent pool of water, this means the prompt removal of floatable debris. It may also be possible in larger wet ponds to maintain a stock of fish that feed on mosquito larvae. In addition, many local communities and local health departments have West Nile Virus programs. Contact your local agency for more information regarding individualized programs.

Nuisance Geese. Canadian geese have experienced huge population increases throughout the state and are commonly attracted to lawns that are mowed, fertilized and regularly watered. The following activities will help minimize the presence of geese in and around your detention ponds:

- Do not feed the geese. Feeding the geese leads to large numbers of geese congregating for free food that, in turn, makes controlling the population around your detention pond more difficult. In addition, goose droppings may increase the levels of fecal coliform in the detention pond.
- Establish vegetated buffers around your detention pond.
- Create fence barriers at least 30 inches in height to exclude the geese from the turf areas.
- Contact your local public works department or the Michigan Department of Natural Resources for more information.



Retrofits and Enhancements

How can I improve the functionality and/or aesthetics of my detention pond?

Numerous opportunities exist for improving the functionality of an existing detention pond. Many of these retrofits provide improvements to storm water quality, pond habitat and the aesthetic value of a detention pond. Some common retrofits include:

- **Installation of a sediment forebay.** Forebays, installed at all pipe inlets to the pond will trap coarse sediment, thus improving water quality and improving ease of maintenance.
- **Modifications to the existing outlet structure.** Newer detention pond outlet structures provide extended detention of smaller storm events, thus promoting improved water quality for downstream surface waters.
- **New or enhanced vegetated buffers.** Native vegetation buffers filter pollutants and nutrients from storm water, thus improving water quality within the pond.
- **Enhanced pond plantings.** Wetland plantings in wet ponds improves ecosystem diversity and provides valuable habitat. The planting of perimeter trees provides habitat and shading from the trees helps reduce water temperature within ponds.
- **Dredging.** Dredging accumulated sediment often improves the infiltration capacity of dry ponds and will create deeper water pools in wet ponds. Deeper pools enhance habitat diversity and can improve water quality within the pond.
- **Fish stocking.** Properly retrofitted detention ponds have been demonstrated to support healthy fish communities. Fish populations provide additional ecosystem diversity and can play an important role in controlling mosquito larvae populations. The Department of Environmental Quality and the Michigan State Extension Service can provide additional information on this enhancement option.



Where should I start?

A number of communities have successfully implemented detention pond retrofit projects. Reviewing what others have done is a good place to get ideas for things that may be possible for your detention pond.

The first step in any detention pond retrofit project should be to define the desired outcomes and goals of the project. Do you want to improve storm water quality? Improve wildlife habitat? Improve ecosystem diversity? The site specific goals should be used to identify potential retrofit activities.

The next step would be to evaluate the feasibility of the desired retrofits. Is there sufficient area available for the improvements? Are there existing constraints that would impede implementation of the desired retrofits? What are the costs? A qualified civil engineer or landscape architect may be able to assist you in answering many of these questions.

What resources are available?

A complete list of resources is available on the Alliance of Rouge Communities' website at www.allianceofrougecommunities.com.



Self Inspection Checklist

Identification Information:

Name of person conducting inspection _____

Contact information _____

Business/Development _____

Date of inspection _____

Type of pond (circle one) Dry Wet Wetland/Marsh

Storm Sewer System

Are any pipes entering or exiting the pond cracked, crumbling, broken or showing signs of any other structural deterioration?

Yes No N/A

Is the riprap/stone around the inlet pipes clogged with sediment and/or debris?

Yes No N/A

Does there appear to be any trash or debris blocking the inlet or outlet pipes or the emergency spillway?

Yes No N/A

Has sediment collected in the storm sewer and catch basins upstream from the pond?

Yes No N/A

Has sediment accumulated in and around the inlet pipes?

Yes No N/A

Does it appear that sediment, vegetation and/or debris has accumulated around the stone, slowing the flow of water?

Yes No N/A

Is there evidence of oil, grease or other automotive fluids entering the pond?

Yes No N/A

A yes answer to any of the items on this checklist should result in corrective action or a call to a professional consultant and/or contractor.

Other observations: _____



Self Inspection Checklist

Detention Pond Vegetation

Is there excessive algae growth?

Yes No N/A

Are there areas or signs of erosion along the banks of the detention pond?

Yes No N/A

Is there a 15-25 foot no-mow and chemical-free buffer zone around the pond? (If yes, corrective action is not necessary.)

Yes No N/A

Has the area been inspected for invasive species?

Yes No N/A

Is there vegetation growing in and/or around the inlet or outlet pipe that is obstructing the flow of water?

Yes No N/A

Does it appear that sediment, vegetation and/or debris has accumulated around the stone, slowing the flow of water?

Yes No N/A

A yes answer to any of the items on this checklist should result in corrective action or a call to a professional consultant and/or contractor.

Other observations: _____

Other Considerations

Does the depth of sediment or other factors suggest a loss of storage volume?

Yes No N/A

Is there standing water in inappropriate areas? (Examples may include ruts, divots, bare areas, or typically dry ponds not draining properly)

Yes No N/A

Is there accumulation of floating debris and/or trash?

Yes No N/A

Is there evidence of encroachments or improper use of impounded areas?

Yes No N/A

Does the fence, gate, lock or other safety device need repair?

Yes No N/A

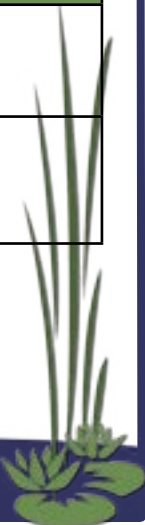
A yes answer to any of the items on this checklist should result in corrective action or a call to a professional consultant and/or contractor.

Other observations: _____



Detention Pond Inspection and Maintenance Record

Task	Inspection Frequency	Year _____		
		Contractor (Name & Phone #)	Cost	Notes
Storm Sewer Systems				
Inspect the riser/standpipe cover for trash and debris	Monthly and after rain events			
Inspect for sediment and trash accumulation at the inlet pipes	Twice a year and after rain events			
Inspect the stone around the riser/standpipe (outlet pipe)	Twice a year and after rain events			
Remove accumulated sediment at pond inlets or in pond forebay	Twice a year and after rain events			
Inspect the inlet pipes and outlet pipe for structural integrity	Annually			
Inspect riprap at the inlet pipes	Annually			
Inspect for excess sediment accumulation in the pond	Annually			
Inspect and clean the storm sewer system and catch basins upstream from the detention pond	Minimum every 3 years			
Have a Professional Civil Engineer inspect the pond to ensure it is functioning properly	Minimum every 5 years or as needed			
Have a Professional Civil Engineer inspect all outlet control structures to ensure they are functioning properly	Minimum every 5 years or as needed			
Detention Pond Vegetation				
Inspect side slopes, berms and spillways for erosion	Annually and after rain events			
Reestablish permanent native vegetation on eroded slopes	Annually in the spring and after rain events			



Detention Pond Inspection and Maintenance Record

Task	Inspection Frequency	Year _____		
		Contractor (Name & Phone #)	Cost	Notes
Maintain 15-25 foot "no-mow and chemical-free" zone around the pond edge	Annually			
Mow (or burn) the "no-mow" buffer zone once a year	Annually - late April/early May			
Inspect pond and no-mow zone for invasive species such as purple loosestrife, phragmites, buckthorn (common & glossy), honeysuckle and autumn olive that out-compete native vegetation	Annually - July			
Have a qualified professional selectively herbicide invasive species	Annually - July/August			
Increase plant diversity by planting additional vegetation in and around the pond	Annually - fall or early spring			
Maintain any maintenance access locations that have a tendency to become "overgrown"	Annually, fall or early spring			
Property Management				
Inspect pond for signs of chemicals (solvents, gas, diesel, paint, natural gas). Identify and control source and remove/dispose of properly	Monthly and after rain events			
Common are maintenance	Annually			
Street sweeping	Annually			
Review maintenance plan	Annually			





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